Iowa Department of Natural Resources
Environmental Services Division
Air Quality Bureau

Air Dispersion Modeling Guidelines

For Non-PSD, Pre-Construction Permit Applications

Version 01-22-13

Overview

Air dispersion modeling analyses are conducted to predict ground level ambient air concentrations of pollutants from facility emissions. According to 567 Iowa Administrative Code (IAC) subrule 22.3 (1) "A construction or conditional permit shall be issued when the director concludes that…the expected emissions from the proposed source or modification in conjunction with all other emissions will not prevent the attainment or maintenance of the ambient air quality standards specified in 567-Chapter 28." Dispersion modeling is the primary tool used in air quality assessments to determine predicted attainment of the National Ambient Air Quality Standards (NAAQS). Air dispersion modeling allows the impacts from a source to be determined before a source is constructed or modified and is not restricted to the spatial and temporal limitations of an ambient monitor.

These guidelines should be used to assist in the completion of air dispersion modeling analyses. All construction permit applications are required to include a form MD (Modeling Determination) and possibly Modeling Information forms MI-1 (Plot Plan Requirements) and MI-2 (Emission Point Characteristics) if applicable. This information is required so the permit engineers in the Construction Permit Section may determine if a dispersion modeling analysis will be required. The construction permit directions, construction permit forms and additional modeling information can be found at the DNR website.

Home page: http://www.iowacleanair.com
Modeling: http://www.iowadnr.gov/idnr/InsideDNR/RegulatoryAir/Modeling/DispersionModeling.aspx
Permitting: http://www.iowadnr.gov/idnr/InsideDNR/RegulatoryAir/ConstructionPermits.aspx
Contact info: http://www.iowadnr.gov/InsideDNR/DNRStaffOffices/AirQualityStaff.aspx

These guidelines apply to construction permit applications that are not subject to the Prevention of Significant Deterioration (PSD) regulations. For PSD modeling analyses, the applicant should refer to the Iowa DNR's PSD modeling guidelines. Facilities that are associated with a State Implementation Plan (SIP) maintenance area may be required to conduct a facility-wide modeling analysis for the applicable pollutants regardless of the predicted impacts from the project.

Pollutants affected by these guidelines include all criteria pollutants except volatile organic compounds (VOCs) and ozone. If the Construction Permits Section requests modeling for these pollutants or for non-criteria pollutants, the department's Modeling Group should be contacted for guidance on modeling. There is no requirement to address secondary formation of fine particulate matter ($PM_{2.5}$) at this time.

A modeling protocol is not required for projects subject to only this guideline document.

Questions related to these guidelines and air dispersion modeling in general can be answered by calling (515) 242-5100. Ask to speak to a member of the Modeling Group.

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Air Dispersion Modeling Applicability Procedure

The Air Dispersion Modeling Determination Flow Chart on the following page is used to determine if source emissions associated with non-PSD construction permit projects will require an air dispersion modeling analysis and if so, the type of analysis required. This flow chart should be used for both new construction permit projects and for modifications to previously modeled projects.

This flow chart is pollutant specific. The project emissions to be evaluated are the net increase in potential emissions, excluding any units that are exempt from permitting. When determining if previous modeling was within one significant impact level (SIL) of the NAAQS (see second box in flowchart), the modeled concentration should be updated to include the current background value.

The flow chart does not address emissions of lead and ozone. Since there is no significant impact level for lead, any net increase in lead emissions will require a lead modeling analysis. Sources with direct ozone emissions may require a non-PSD dispersion modeling evaluation on a case-by-case basis.

There are unique circumstances that the Air Dispersion Modeling Determination Flow Chart does not address that may trigger a modeling review. Recommendations for modeling reviews that fall outside of the flow chart will be reviewed by DNR management.

When dispersion modeling is required, the modeling analysis is either conducted by the DNR or is submitted by the applicant for DNR review as noted below:

- All applicants have the option to prepare and submit a complete dispersion modeling analysis according to these guidelines.
- For major sources as defined in 567 IAC 22.100 that have previously been modeled, the DNR will conduct the modeling analysis if resources allow. Applicants with extensive changes to their facility may expedite the modeling review by submitting their own modeling analysis.
- For projects at major sources that have not previously been modeled, the applicant must prepare and submit the dispersion modeling analysis.
- For projects at non-major sources (minor), the DNR will conduct the initial dispersion modeling as a service to the minor source when a modeling analysis has not been submitted by the applicant.

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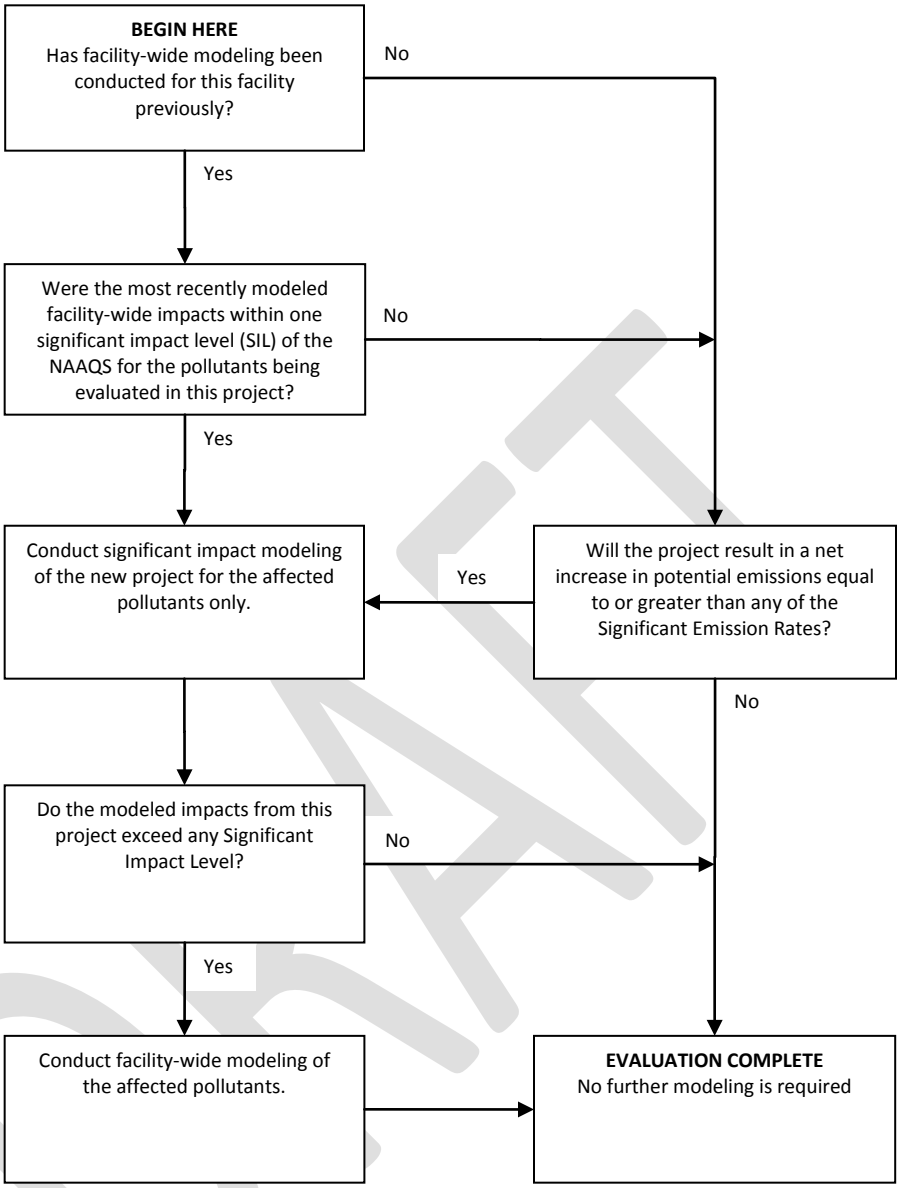

Pollutant	Significant Emission Rate	National Ambient Air Quality Standard (μg/m³)					Significant Impact Level (SIL) (μg/m³)				
		1-hour	3-hour	8-hour	24-hour	Annual	1-hour	3-hour	8-hour	24-hour	Annual
PM_{10}	3.42 lb/hr				150					5	
$PM_{2.5}$	2.28 lb/hr				35	15				1.2	0.3
NO_2	9.13 lb/hr	188				100	7.5				1
SO_2*	9.13 lb/hr	196	1,300		365	80	7.9	25		5	1
CO	22.8 lb/hr	40,000		10,000			2,000		500		

~~* For 1-hour SO_2: no dispersion modeling is currently required for minor projects. Ambient air impact evaluation will be required in the future State Implementation Plan revision.~~

Dispersion Model Selection and Options

1. Unless approval has been secured from the department to use another model, the latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) model shall be used. Regulatory default options must be used unless otherwise approved by the department.

2. For significant impact level modeling, the predicted impact for the applicable averaging periods for each pollutant being evaluated must be compared to the appropriate significant impact levels as defined in 567 IAC subrule 33.3(20) and EPA memos *General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level*, June 28, 2010. These levels are listed in Table1.

Table 1. Significant Impact Levels

Pollutant	**Averaging Period**	**Significant Impact Levels** ($\mu g/m^3$)	**Modeling Value Rank** ($\mu g/m^3$)
NO_X	1-hr[a] Annual	7.5 1	Average of each year's H1H over 5-years H1H
SO_2[~~b~~]	1-hr 3-hr 24-hr Annual	7.9 25 5 1	Average of each year's H1H over 5-years H1H H1H H1H
$PM_{2.5}$	24-hr Annual	1.2 0.3	Average of each year's H1H over 5-years Average of each year's highest annual value over 5-years
PM_{10}	24-hr	5	H1H
CO	1-hr 8-hr	2,000 500	H1H H1H

[a] The 1-hour NO_2 SIL has not been formally proposed. The SIL listed above reflects the interim SIL of 4 ppb (7.5 ug/m^3) presented in the U.S.EPA Memo, *General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level*, June 28, 2010.

~~[b] For 1-hour SO_2, no dispersion modeling is currently required for minor projects. Ambient air impact evaluation will be required in the future State Implementation Plan revision.~~

3. For facility-wide modeling, the predicted concentration, including background concentrations, for the applicable averaging periods for each pollutant being evaluated must be compared to the appropriate level and form of the National Ambient Air Quality Standards (NAAQS). The levels of the NAAQS are listed in Table 2.

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Table 2. NAAQS Levels for Modeling Applications

Pollutant	**Averaging Period**	**NAAQS** (µg/m^3)
NO_2	1-hr Annual	188[a] 100[b]
SO_2[e]	1-hr 3-hr 24-hr Annual	196[c] 1300[d] 365[d] 80[b]
$PM_{2.5}$	24-hr Annual	35[e] 15[f]
PM_{10}	24-hr	150[g]
CO	1-hr 8-hr	40,000[d] 10,000[d]
Lead	3-month rolling average	0.15[b]

[a] 5-year average of 8H daily 1-hour maximum.
[b] Never to be exceeded.
[c] ~~For 1-hour SO_2, no dispersion modeling is currently required for minor projects. Ambient air impact evaluation will be required in the future State Implementation Plan revision~~5-year average of 4H daily 1-hour maximum.
[d] Not to be exceeded more than once per year.
[e] Highest average of 1H over 5-years,
[f] Highest average of annual mean over 5-years. Ambient air impact evaluation of the 12 µg/m^3 annual standard will be required in the future State Implementation Plan revision.
[g] H6H over 5 years.

For lead modeling, determining the design concentration requires the use of the EPA post-processor called "leadpost." The latest version may be obtained from the DNR or from EPA's SCRAM website: http://www.epa.gov/ttn/scram/.

4. Each NAAQS has its own rounding convention found in 40 CFR Part 50. It is acceptable to apply these rounding conventions to modeled concentrations. Guidance for applying these rounding conventions to the modeled concentrations can be found in the "Rounding of Modeled Concentrations for Comparison with the National Ambient Air Quality Standards" document.

Source Information

1. Emission units associated with the project must be modeled at their proposed allowable emission rates (lbs./hr). Varying emission rates are not permissible unless included in the permit limitations or it can be demonstrated that the variance is typical of a physical plant limitation. Facility-wide modeling of allowable emissions will only be completed on a case by case basis and is at the discretion of the Department.

2. Existing emission units located at the facility, including non-point source emissions that could be reasonably captured and vented to the atmosphere, may be modeled at their actual emission rates. Actual emission rates are to be completed according to 3), 4), and 5) below.

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For guidance on modeling emission units that vent inside a building please use the Volume Source Tool located on the Department's website. No building enclosure credit will be given for sources of $PM_{2.5}$.

3. If the project emissions result in impacts that exceed the significant impact levels, existing sources that are part of the same facility, or a support facility, must be included in the modeling analysis. The Department may require additional nearby sources to be included in the modeling analysis in areas containing a large concentration of industry. Existing sources should be modeled at actual emission rates, but if this is not possible then the sources can be modeled at potential emissions as a conservative estimate.

4. Actual emission rates used in the modeling analysis for existing emission units at the facility and nearby sources must be supported by the following acceptable methods, in order of acceptability:

   a) Certified continuous emissions monitoring data
   b) The most recent department approved stack test results. Contact construction permitting staff to obtain guidance on calculating an emission rate for modeling based on stack test results.
   c) Mass balance calculations acceptable to the department
   d) AP-42 emission factors or other engineering estimates (as accepted by the department), or other data as accepted by the department

   Note: When actual emission rates are calculated the facility may use actual hours of operation in calculating the emission rate. In addition, when AP-42 emission factors or other engineering estimates are used, the calculations shall be based on a minimum of 12-months of data available and the actual hours of operation. If a minimum of 12-months of data are not available, then the allowable or permitted emission rate should be used as applicable. If this is not considered representative, then the Construction Permit Section staff should be contacted for additional guidance.

5. All calculations, spreadsheets, figures, assumptions, control efficiency rate, and justifications used to determine the actual emission rates for existing facility emission units and nearby sources must be submitted with the modeling analysis report. If this information is not submitted, the Department will use allowable (permitted emission rates or standards). If the allowables show an exceedance then the facility will be required to make appropriate changes.

6. The department may require re-modeling if there is a significant change in the method of operation or actual emissions.

7. Stacks with a horizontal or downward discharge, or an obstructing rain cap on top of the stack, should be modeled with an exit velocity of 0.001 m/s. Flapper-type or Chicago-style rain caps are considered to be unobstructed discharges.

8. An emission point with stack gas exit temperature equal to the interior temperature of the building where the emission unit is located should be modeled at 68° F per the definition of "standard conditions" in 567 IAC rule 20.2, unless the applicant can provide justification acceptable to the department that another temperature is representative of the interior building temperature. An emission point with a temperature equal to that of the ambient air should be modeled at 0° K (which instructs the model to vary the temperature of the source with the ambient temperature).

9. Guidance for evaluating non-standard types of emission units is available on the website at www.iowacleanair.com. This guidance is intended to provide information on how the DNR would typically characterize non-standard sources in a dispersion model. Although this guidance does not preclude the use of other methodologies, the applicant may wish to discuss other methodologies with the DNR prior to conducting extensive modeling analyses.

10. Section 5.2.4 of EPA's "Guideline on Air Quality Models" (Appendix W of 40 CFR Part 51) recommends a 3-tiered screening approach to estimate ambient concentrations of NO_2.

    - Tier 1: assume all emitted NO_x is converted to NO_2
    - Tier 2: multiply Tier 1 result by a representative (or national default) equilibrium NO_2/NO_x ratio. The national default value is currently set at 0.80 for the 1-hour averaging period and 0.75 for the annual averaging period.
    - Tier 3: perform a detailed analysis on a case-by-case basis

    Historically, facilities were generally able to demonstrate compliance using Tier 1 or Tier 2. However, with the stringent requirements of the 1-hour NO_2 NAAQS, the need for facilities to use the Tier 3 approach has increased. EPA has issued a series of guidance memoranda describing the use of the 3-tiered approach.[1] For the Tier 3 detailed analysis EPA recommends the use of either the Ozone-Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM), included as non-default options in the AERMOD dispersion model. Both methods require the specification of an in-stack ratio (ISR) for NO_2/NO_x for each source. When possible, source-specific ISRs should be used. In the absence of this information, the default ISR of 0.50 may be used. Contact DNR for additional guidance if a Tier 3 approach will be used.

11. The merging of exhaust gas streams cannot be used in the dispersion modeling analysis unless the applicable requirements of 40 CFR Part 51.100(hh)(2) are met. If merged exhaust streams were modeled, provide justification.

13. Whenever possible, the base elevations of the sources and buildings should be based on plant survey data. If this data is not available, AERMAP-derived elevations may be used, but care should be taken to use elevations that are as accurate as possible.

[1] Memorandum dated June 28, 2010: "Applicability of Appendix W Modeling Guidance to the 1-hour NO_2 National Ambient Air Quality Standard;" memorandum dated June 29, 2010: "Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program;" memorandum dated March 1, 2011: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour National Ambient Air Quality Standard." These documents can be obtained from the DNR or the EPA SCRAM website.

Depending on the topography, the base elevation of a source may not necessarily match the base elevation of the building on or near which it is located. This is most notable when a building is built into the side of a hill. When this occurs, the elevation of the source should be based on the natural contour of the hill – as if the land had not been graded when the building was constructed, and the stack height should be the height of the top of the stack above that base elevation. The base elevation of the building should be the lowest elevation along the base of the building, and its height should be the height of the peak of the roof above that elevation.

14. A building downwash analysis shall be conducted using the most recent version of EPA's Building Profile Input Program with Plume Rise Enhancements (BPIP-Prime). Off-property buildings that affect downwash must also be included in this analysis. All non-downwash structures should be excluded from the modeling analysis. Non-downwash structures include lattice-type structures such as switchyards, water towers, and elevated storage tanks. In some cases, differences in source and building base elevations can affect the building downwash calculations. Therefore, the downwash analysis should be conducted after the source and building base elevations have been input into the model.

15. Annual Hourly Operating Restrictions:

    If annual hourly limitations are to be implemented without regard to season or month, the number of hours used should be divided by 730 hours and the result rounded to the nearest integer. Monthly averaging periods will then be modeled and the predicted concentrations from the highest months will be averaged. The number of months to include in the average is given by the integer from the previous calculation. The average predicted concentration is then multiplied by the number of hours of operation to which the emission unit will be limited and divided by 8760 hours. The result is the annual average and should be performed for each of the five years. If the number of hours to which the emission unit is to be limited is less than 365, the same procedure should be used replacing 730 hours with 24 hours and using the highest 24-hr averages rather than monthly averages.

16. Daily Hourly Operating Restrictions:

    Varying emission rates may be used if the source(s) will be operated at specific times of the day. Use the EMISFACT keyword to accomplish this. If daily hourly operating restrictions are to be implemented without regard to specific times of day, the emission unit(s) should be modeled with an averaging period that corresponds to the number of hours that will be requested as the daily operating hour restriction. The impacts from this averaging period are then multiplied by the requested hours of operation and divided by 24 hours per day. The calculated impacts from the emission unit(s) with the daily operating restriction should be added to the impacts from the rest of the facility for each year of the modeling analysis. Please refer to guidance in "Suggested DNR Methodology for Modeling Facilities Requesting Restricted Daily Operating Hours".

17. Sources Generally Exempt from Non-PSD Modeling:

The decision to include any exempt source in the modeling analysis is ultimately up to the discretion of the permit engineer; however emission units that are listed as exempt in 567 IAC subrule 22.1(2) are generally exempt from modeling. Facilities using the small unit exemption (567 IAC subrule 22.1(2) "w") should note that once the total combined emissions from all substantial small units using the exemption reaches the "cumulative notice threshold" as defined in 567 IAC subrule 22.1(2) "w"(8) and listed below in Table 3, the facility must apply for construction permits for all substantial small units for which the cumulative notice threshold has been reached. These substantial small units may need to be included in the modeling analysis as a part of the construction permit project.

Table 3. Cumulative Notice Threshold for the Small Unit Exemption

Pollutant	**Threshold** (tons per year)
SO_2	40
NO_X	40
VOC	40
CO	100
Particulate matter	25
PM_{10}	15
$PM_{2.5}$	10
Pb and Pb compounds expressed as Pb	0.6

Additionally, the following are also generally exempt from non-PSD modeling:

a) Emission units used only when the rest of the facility is NOT in operation. The department may require a separate modeling analysis of these units to verify attainment with the short-term NAAQS for CO, $PM_{2.5}$, PM_{10} and SO_2

b) Intermittent sources, such as emergency generators, may present unique difficulties in attempting to demonstrate attainment with the new 1-hour standard for NO_2. The nature of the actual emissions associated with intermittent sources, when coupled with the probabilistic form of the 1-hour standard, may result in modeled impacts being significantly higher than actual impacts would realistically be. Combining the maximum allowable emission rate with the worst-case meteorological conditions defeats the intent of the probabilistic form of the standards to provide a more stable metric which would mitigate the impact that statistical outliers in the distribution might have on the design value. EPA has promulgated specific guidance on this issue in their memorandum of March 1, 2011, "Additional Clarification Regarding Application of Appendix W

Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard." The following is a summary of pertinent points:

The applicant should consider whether the intermittent source needs to be modeled. The EPA says it is "acceptable to limit the emission scenarios included in the modeling compliance demonstration for the 1-hr NO_2NAAQS to those emissions that are continuous enough or frequent enough to contribute significantly to the annual distribution of daily maximum 1-hr concentrations." For example, an intermittent source that is permitted to operate up to 500 hours/yr, but typically operates much less than 500 hours/yr and on a random schedule that cannot be controlled may be appropriate to eliminate from the model. On the other hand, an intermittent source that is permitted to operate only 365 hours/yr, but is operated as part of a process that typically occurs every day, may be less suitable to eliminate from the model.

~~Another approach to mitigate unrealistic modeled impacts when attempting to demonstrate compliance with the 1-hour NO_2 and NAAQS is to model impacts from intermittent sources based on continuous operation at an average hourly emission rate rather than the maximum hourly rate. For example, if a generator is limited to operating 500 hours/year, a modeling analysis could be based on assuming continuous operation at the maximum hourly rate multiplied by 500/8760.~~

~~NOTE: This approach of averaging short-term emissions rates for 1-hour NO_2 over non-operating hours is otherwise not approved by DNR and is prohibited by Appendix W, 40 CFR Part 51 for other pollutants. Short-term impacts (predicted concentrations), not emission rates, may be averaged over non-operating periods for other pollutants.~~

Based on this guidance, the DNR has concluded that any source that operates on a purely random schedule and is limited to operating for no more than 500 hours/yr can be considered an intermittent source. In addition, any source that meets the 500 hour/yr criterion, but operates on a scheduled basis for testing and maintenance purposes, can be considered an intermittent source if the scheduled testing and maintenance is limited to the time of the day with the most favorable dispersion conditions (between 9 AM and 4 PM). Intermittent sources may be excluded from the 1-hour NO_2 and SO_2 analyses.

c) Fugitive emissions from haul roads and material storage piles, unless the department has reason to believe that these units are the cause of a NAAQS violation.

Receptor and Terrain Elevation Information

1. Receptors should be placed along the property line at 50 meter intervals. Off property receptors should be placed at 50 meter intervals within at least 0.5 kilometers of the property line. If necessary to encompass the entire impact area, include receptors at 100 meter intervals from 0.5 kilometers out to 1.5 km, 250 m intervals from 1.5 km out to 3 km, and 500 meter intervals beyond 3 km. Receptor grids must be adequately dense and should use 50 meter receptor spacing to resolve the highest applicable concentrations. The receptor grid must extend at least 500 meters from the property line.

2. Receptor grids must be adequate in extent so that concentrations are decreasing at the edges of the grid. If there is a significant terrain rise near the edge of the grid, the grid should be extended to include the area of terrain rise.

3. The most recent version of AERMAP should be used to import terrain and source elevations from the National Elevation Dataset (NED). County-sized NED data files are available on the Department's elevation data webpage.

4. All terrain that would intersect a line projected at a 10% slope from each and every receptor must be included in the AERMAP domain. If elevations are not used, please provide justification in the modeling report.

5. By definition, "ambient air" is the portion of the atmosphere, external to buildings to which the general public has access [567 IAC rule 20.2]. Therefore facilities where the general public has access to the property (academic institutions, government buildings, hospitals, and business parks) must be modeled with receptors placed on the property of the facility.

6. Receptors may be excluded from the modeling analysis, with the department's prior approval, for on-property easements, such as railways, provided that the facility owner or operator is willing to ensure public access to the right-of-way or easement is precluded. Permit applicants who obtain permission from the department to exclude on-property easement receptors from the modeling analysis must document in the modeling analysis report submitted to the department how public access is, or will be, precluded. Public roads or highways will continue to be modeled as ambient air.

Meteorological Data

Five years of meteorological data must be used. The department currently maintains five year data sets for 19 National Weather Service (NWS) station locations for the period from 2005 through 2009. Applicants can obtain meteorological data suitable for use in the AERMOD model from the Department's meteorological data webpage.

The website also contains a summary of the meteorological data that are appropriate for use in each Iowa County, as well as the representivity analysis that was conducted to determine the appropriate meteorological stations.

Background Values

1. Appropriate default background values must be added to modeled concentrations when a NAAQS analysis is being conducted unless an alternative approach specified in 2 or 3 below is used. Current statewide default background values are listed below in Table 4.

2. Applicants may use local monitoring data, if available, instead of the statewide default background values, to determine more refined estimates of background values. Guidance for determining refined estimates of background values from local monitoring data can be found in 40 CFR Part 51, Appendix W, section 8.2. If refined values are used, provide a detailed explanation in the modeling report of how the background value(s) were derived, the data considered, and the resulting values used for department review and approval.

3. For $PM_{2.5}$ modeling, the paired sums method may be used for determination of the 24-hour impacts. Applicants can obtain daily PM2.5 background files formatted for use in AERMOD from the Department's background data webpage. When using the paired sums data model the highest-eighth-high averaged over five years instead of the maximum concentration. If the paired sums method is being considered for NO_2 sources, the applicant should contact DNR for guidance.

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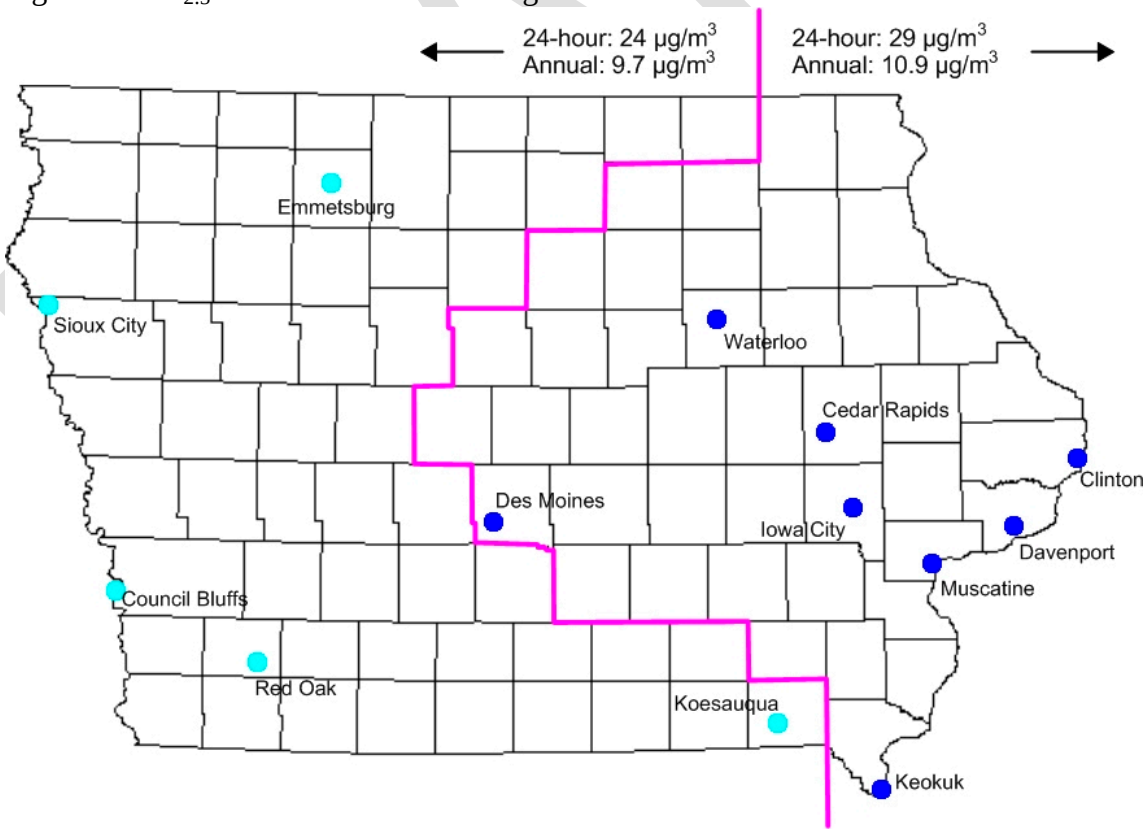
Table 4: Statewide Default Background Values

Pollutant	**Averaging Period**	**Background Concentration Value** ($\mu g/m^3$)
NO_2	1-hr Annual	75 15
SO_2	1-hr 3-hr 24-hr Annual	32 27 9 1
$PM_{2.5}$	24-hr[a] Annual[a]	29 (east) / 24 (west) 10.9 (east) / 9.7 (west)
PM_{10}	24-hr	53
CO	1-hr 8-hr	1,600 1,000
Pb	3-month rolling average	Assume background value equals zero.

[a] Refer to Figure 1 below for the division of West and East counties

Figure 1: $PM_{2.5}$ Statewide Default Background Values



Modeled Violations

Any source that significantly contributes (using the PSD levels of significance listed in Table 1) to a modeled violation of the NAAQS in ambient air cannot be permitted unless an equivalent ambient impact reduction is demonstrated at the modeled non-attainment receptors. If predicted exceedances of the NAAQS are modeled and the modeled impact from the source(s) does not exceed the PSD levels of significance at the receptors and for the time periods the modeled exceedances occur, the new permits(s) shall not be denied for modeling reasons. [567 IAC subrule 33.3(20)]

Modeling Data Submittal Requirements

1. A summary of the air dispersion model inputs, methodology, and results relative to all applicable standards and guidelines should be submitted. Include all dispersion model, BPIP-PRIME, and AERMAP input and output files on a CD or DVD.

2. It is imperative that the air dispersion modeling checklist for non-PSD construction permit applications, as well as the Modeling Information forms MI-1 (Plot Plan Requirements) and MI-2 (Emission Point Characteristics) or equivalent are submitted with the construction permit application or the modeling analysis. The checklist is designed to help applicants avoid common dispersion modeling errors, and can help prevent revisions to the modeling analysis. Including a hard copy and an electronic copy of form MI-1 may significantly decrease the amount of time taken to conduct the modeling analysis. Plot plans created from modeling files and aerial photographs are not acceptable. Failure to submit the Modeling Information forms MI-1 and MI-2 will likely result in delay of the project.

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