

3. SOURCE INFORMATION

a. Emission rates.

- All sources that are being permitted as part of the current project must be modeled at their proposed allowable emission rates. The modeled allowable emission rates must match the construction permit forms. Otherwise, the permits will include a limit based on the modeled emission rate.
- If facility-wide modeling is required, existing sources may be modeled at their potential or actual emission rates. If used, actual emission rates must be supported by one or more of the acceptable methods listed in the DNR's "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Projects".

b. Fugitive emissions.

- All emissions which can be reasonably captured and vented to the atmosphere must be included in the modeling analysis. True fugitive emissions, such as haul roads and storage piles, may be excluded from the analysis, unless the department has reason to believe that they are the cause of a NAAQS violation.

c. Internally-Vented Emissions

- Emissions that are vented inside of a building should be modeled as a volume source or a series of volume sources based on the guidance found in the dispersion model user guide. Alternatively, the DNR has created a spreadsheet that can be used to automatically determine the volume source dimensions to use when modeling internal emissions. The tool is available on the Air Quality Bureau's website at www.iowacleanair.com. The applicant may use an alternative method for modeling internally venting sources with prior approval.

d. Are any sources being permitted to operate at variable loads (i.e. 50% or 75% capacity)?

- Yes If the source(s) permit will include conditions for operation at variable loads, loads such as 50 and 75 percent of design capacity should also be modeled. The load causing the highest predicted concentration, in addition to the design load, should be included in the refined modeling. Alternatively, the lowest temperature and exit velocity, and highest emission rate expected to occur at any load can be combined to produce a conservative estimate without requiring an analysis of multiple operating loads.
- No

e. Are daily or annual operating restrictions, or variations due to physical plant limitations included in the modeling analysis?

- Yes Apply the guidance outlined in the DNR's "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Projects" or "DNR Suggested Methodology for Modeling Restricted Hours of Operation" as applicable, and include a summary of the method(s) used along with all calculations in the modeling analysis report. Any such variation or restriction used in the modeling analysis will be included in the permit as an enforceable limit.
- No

- g. Are there any stacks with horizontal, downward, or obstructed vertical discharges?
- Yes Model these stacks with an exhaust gas exit velocity of 0.001 m/s and the actual stack tip diameter.
- No
- h. Have the exhaust gases from several existing stacks been combined (merged) into one stack?
- Yes Credit for 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.
- No
- i. Were source and building base elevations based on plant survey data?
- Yes
- No AERMAP-derived base elevations may be used when survey data are not available, but care should be taken to use elevations that are as accurate as possible.
- j. Buildings
- Include all downwash structures in the modeling analysis, including structures not located on the facility's property if applicable. Downwash structures outside of 5L may be excluded from the analysis. (Note: "L" is defined as the lesser of the height or maximum projected width for a particular tier or structure.) 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. Perform a building downwash analysis using the latest version of the Building Profile Input Program (BPIP-PRIME) after determining the source and building base elevations.
- k. Good Engineering Practice (GEP) stack heights
- All proposed and/or existing stack height(s) greater than the formula good engineering practice (GEP) stack height(s) should be modeled using a stack height equal to the formula GEP stack height(s).

4. RECEPTOR AND TERRAIN INFORMATION

- a. Receptor spacing.
- Observe the following receptor spacing requirements:
- No more than 50 meter spacing along property lines.
 - No more than 50 meter spacing if located within approximately 0.5 kilometers of the property line.
 - No more than 100-meter spacing between 0.5 and 1.5 kilometers from the property line.
 - No more than 250-meter spacing between 1.5 and 3.0 kilometers from the property line.
 - No more than 500-meter spacing beyond 3.0 kilometers from the property line.
- Note: Utilizing receptors with spacing different from that specified above will not be accepted by the DNR modeling staff unless approved in advance. In all cases, it is the applicant's responsibility to ensure that the receptor spatial coverage and density is adequate enough to determine the worst-case predicted ground-level concentrations in off-property areas not controlled by the applicant.

b. Extent of receptor grid(s)

- The receptor grid(s) must extend at least 500 meters from the property line, and should capture all nearby terrain features that exceed the height of the tallest stack being modeled.
- Predicted concentrations must be decreasing near the edges of the receptor grid(s).

c. Ambient Air

- Within the extent of the receptor grid(s), receptors must be included in all areas not owned or controlled by the applicant, and areas to which the public has regular access. Public facilities, such as universities and business parks must include receptors on all parts of the property to which the public has access.

Receptors may be excluded from an applicant's property and buildings. With the department's prior approval, receptors may also be excluded from 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.

d. Terrain elevations

- Terrain elevations must be applied by using the latest version of AERMAP.

e. AERMAP domain

- The domain used in AERMAP must encompass all significant terrain at or above a 10% slope from each and every receptor (the theoretical maximum distance at which terrain in Iowa could exceed a 10% slope is 3.6 km).

5. METEOROLOGICAL DATA

a. Meteorological station.

Mark the applicable box in Table 1 to indicate which meteorological data set was used in the modeling analysis. Refer to the meteorological station and data set map located on the DNR website at www.iowadnr.com/air/prof/tech/AERMODMetData.html to determine which meteorological data set to use in the modeling analysis.

Table 1. Meteorological Stations and Elevations.

Meteorological Data Set	Period of Record	Surface Station ID	Station Elevation (meters)
<input type="checkbox"/> Burlington	2000 – 2004	14931	210.9
<input type="checkbox"/> Cedar Rapids	2000 – 2004	14990	256.0
<input type="checkbox"/> Des Moines	2000 – 2004	14933	291.7
<input type="checkbox"/> Dubuque	2000 – 2004	94908	321.9
<input type="checkbox"/> Iowa City	1999 – 2003	14937	198.1
<input type="checkbox"/> Mason City	2000 – 2004	14940	363.9
<input type="checkbox"/> Moline	2000 – 2004	14923	180.4
<input type="checkbox"/> Omaha	2000 – 2004	14942	299.3
<input type="checkbox"/> Sioux City	2000 – 2004	14943	333.1
<input type="checkbox"/> Sioux Falls	2000 – 2004	14944	433.4
<input type="checkbox"/> Waterloo	2000 – 2004	94910	263.7
<input type="checkbox"/>			

b. Profile base elevation.

- The profile base elevation used in the modeling analysis must match the station elevation shown in Table 1.

6. DETERMINATION OF IMPACT ON AIR QUALITY

a. Do the maximum predicted impacts from the source(s) being permitted exceed the applicable significant impact levels listed in Table 1 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications"?

- Yes List Pollutant(s):

Facility-wide modeling is required for each pollutant whose concentration exceeds the applicable significant impact levels.

- No No further modeling is required. Go to Section 7.

b. Are there other sources at this facility, or nearby sources as defined in the modeling guidelines of the pollutant(s) in question?

- Yes List Pollutant(s):

Model the other sources of the pollutant(s) in question with the source(s) being permitted. Add the appropriate background concentration(s) from Table 3 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications" to the modeled values and check that the resulting predicted cumulative impact(s) are less than the applicable NAAQS (Table 1 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications"). Indicate the locations of the nearby sources on a map of the area.

- No List Pollutant(s):

Add the appropriate background concentration(s) from Table 3 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications" to the modeled values from the source(s) being permitted and check that the resulting predicted cumulative impact(s) are less than the applicable NAAQS (Table 1 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications").

c. Does the project have a significant contribution at any modeled non-attainment receptor(s) for the time period(s) that the violation(s) are predicted to occur? (Note: A significant contribution is defined as a predicted impact greater than the applicable significant impact level(s) provided in Table 1 of the "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Applications").

- Yes A source(s) that significantly contributes to a modeled violation of the NAAQS will not be permitted unless an equivalent ambient impact reduction is demonstrated at the modeled non-attainment receptor(s).

- No Go to Section 7 below.

7. MODELING DATA SUBMITTAL REQUIREMENTS

a. Modeling report.

- Include a discussion on the proposed operating scenarios and the methodology used to model them.
- For point sources, provide all assumptions, calculations, and figures necessary to justify the emission rates and stack parameter values used, if this information is not available in the permit application.
- For area, volume, and open-pit sources, provide all assumptions, calculations, and figures used to determine the emission rate, area, sides, rotation angles, heights of release, initial dispersion coefficients and volume (open-pit), if this information is not available in the permit application.
- Summarize and discuss in the modeling analysis report the modeling results relative to all applicable standards and guidelines.
- Ensure that the applicable information requested on the Form MI-1 is included in the modeling analysis report, if it has not been included in the permit application.
- Ensure that the applicable information requested on the Form MI-2 has been included in the modeling analysis report, if it has not been included in the permit application. Please use English units.

b. Electronic files.

- Include all dispersion model, BPIP-PRIME, and AERMAP input and output files on a CD or DVD.