POLK COUNTY AIR QUALITY DIVISION
AIR DISPERSION MODELING
EVALUATION CHECKLIST

1. GENERAL INFORMATION

Submittal Date:

Facility Name:

Project Number:

Note: Leave project number blank if unknown.

2. DISPERSION MODEL SELECTION AND OPTIONS

a. Which model is being used?

☐ AERMOD Version 9.65

☐ Other Model (include name and version):

b. Regulatory default options selected?

☐ Yes

☐ No Provide justification for the selection of each non-regulatory default option. Non - regulatory default options selected without the prior approval of the Polk County modeling staff may result in rejection of the modeling analysis if the justification provided is not acceptable to the Polk County modeling staff.

c. Was the urban modeling option utilized?

☐ Yes This option is generally not used in Iowa. If this option is used, provide an explanation of the reason why it was used, as well as a detailed description of each urban area, the surface parameters, and a list of the sources assigned to each area.

☐ No

d. Pollutants modeled (mark as applicable):

☐ PM_{10}

☐ NO_X

☐ SO_2

☐ CO

☐ Lead

☐ Other:

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.

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.

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 emission rate scaling factors used in the modeling analysis?

☐ Yes Include a discussion in the modeling analysis report of how the emission scalars were developed. In addition, identify those scalars that should be included in an enforceable permit provision, such as restricted hours of operation or is typical of a physical plant limitation.

☐ No

f. Are annual or daily operating restrictions being requested?

☐ Yes Apply the guidance outlined in the POLK COUNTY's "Air Dispersion Modeling Guidelines for Non-PSD Pre-Construction Permit Projects." Include all calculations in the modeling analysis report.

☐ 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. Buildings

Include all downwash structures in the modeling analysis, including structures not located on the facility's property if applicable.

j. 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).

k. Do the source base elevations match the base elevations of the building in/on/near which they are located?

☐ Yes

☐ No In most cases, the base elevation of a stack should match the base elevation of the building on which it is located. If not, provide justification for the inconsistency.

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.

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.

Table 1. Meteorological Stations and Elevations.

Meteorological Data Set	**Period of Record**	**Surface Station ID**	**Station Elevation** (meters)
☐ Des Moines	2000 – 2004	14933	291.7

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 2?

☐ Yes List Pollutant(s): PM_{10}

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.

Table 2. Significant Impact Levels and National Ambient Air Quality Standards.

Pollutant	**Averaging Period**	**Significant Impact**	**National Ambient Air**

		Levels ($\mu g/m^3$)	Quality Standards ($\mu g/m^3$)
NO_X	Annual	1	100[A] (NO_2)
SO_2	3-hour	25	1,300[B]
	24-hour	5	365[B]
	Annual	1	80[A]
PM_{10}	24-hour	5	150[C]
	Annual	1	50[A]
CO	1-hour	2,000	40,000[B]
	8-hour	500	10,000[B]
Pb	Calendar quarter	N/A	1.5[A]

[A] Never to be exceeded.
[B] Not to be exceeded more than once per year.
[C] Standard is attained when the expected number of exceedances is less than or equal to 1.

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 to the modeled values and check that the resulting predicted cumulative impact(s) are less than the applicable NAAQS (Table 2). Indicate the locations of the nearby sources on a map of the area.

☐ No Add the appropriate background concentration(s) from Table 3 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 2).

Table 3. Regional Background Values*.

Pollutant	Averaging Period	Background Concentration Value ($\mu g/m^3$)
NO_X	Annual	11
SO_2	All	20
PM_{10}	24-hr	45
	Annual	22
CO	1-hr	Assume the CO background value equals zero for both averaging periods.
	8-hr	
Pb	Calendar quarter	Assume the Pb background value equals zero.

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 2.)

☐ 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