IOWA DEPARTMENT OF NATURAL RESOURCES

FORM MD: NON-PSD MODELING DETERMINATION FORM

Please see instructions on page three (3) of this form.

Company Name: _____

SECTION 1: PROJECT EMISSIONS

1. Pollutant / Averaging Period		2. Total Net Change in Emissions from Project			3. Significant Emission Rate (SER)	4. Check box if net change is ≥ corresponding SER (Modeling is required)
		2a. Total Increase	2b. Total Decrease	2c. Net Change		
PM_{10}	24-hour	lb/hr -	lb/hr =	lb/hr	3.42 lb/hr	☐
$PM_{2.5}$	24-hour	lb/hr -	lb/hr =	lb/hr	2.28 lb/hr	☐
	Annual	ton/yr -	ton/yr =	ton/yr	10 ton/yr	☐
NO_2*	1-hour**	lb/hr -	lb/hr =	lb/hr	9.13 lb/hr	☐
	Annual	ton/yr -	ton/yr =	ton/yr	40 ton/yr	☐
SO_2	1-hour**	lb/hr -	lb/hr =	lb/hr	9.13 lb/hr	☐
	3-hour	lb/hr -	lb/hr =	lb/hr	9.13 lb/hr	☐
CO	1-hour	lb/hr -	lb/hr =	lb/hr	22.8 lb/hr	☐
	8-hour					

*NO_2 emissions should be expressed as total NO_X.

**Emissions from intermittent sources may be omitted for 1-hour NO_2 and 1-hour SO_2. Intermittent sources are those that operate randomly, and for 500 hr/yr or less. A source is still considered intermittent if test/maintenance is not random as long as it occurs between 9 am and 4 pm.

SECTION 2: AVAILABILITY OF AIR RESOURCES

Skip this section if the project is for a new facility or a portable plant. Otherwise, complete this section for each pollutant / averaging period with a net change (2c) in Section 1 greater than zero.

5. Pollutant / Averaging Period		6. Air Resources Currently Being Used (Visit http://www.iowadnr.gov/AAR if unknown)			7. Modeling Determination Threshold (MDT) (NAAQS – SIL)	8. Check if total is ≥ corresponding MDT (Modeling is required)
		6a. Modeled Concentration ($\mu g/m^3$)	6b. Current Background ($\mu g/m^3$)	6c. Total ($\mu g/m^3$)		
PM_{10}	24-hour	+	=		145	☐
$PM_{2.5}$	24-hour	+	=		33.8	☐
	Annual	+	=		11.7	☐
NO_2	1-hour	+	=		180.5	☐
	Annual	+	=		99	☐
SO_2	1-hour	+	=		188.1	☐
	3-hour	+	=		1,275	☐
CO	1-hour	+	=		38,000	☐
	8-hour	+	=		9,500	☐

SECTION 3: MODELING DETERMINATION

9. Check each box if modeling is required in either Section 1 or Section 2. (Modeling is required for these pollutants / averaging periods)	
PM_{10}	☐ 24-hour
$PM_{2.5}$	☐ 24-hour ☐ Annual
NO_2	☐ 1-hour ☐ Annual
SO_2	☐ 1-hour ☐ 3-hour
CO	☐ 1-hour ☐ 8-hour

11. Who Will Conduct the Modeling Analysis?

All applicants have the option to prepare and submit a complete dispersion modeling analysis per DNR's "Air Dispersion Modeling Guidelines for Non-PSD, Pre-Construction Permit Applications" and the "Dispersion Modeling Checklist for Non-PSD Projects." If modeling will be submitted to the DNR, a significant impact analysis should be conducted for each pollutant requiring modeling. This analysis should include only the current project. If the project will cause predicted concentrations that exceed any Significant Impact Level (SIL), a comprehensive modeling analysis should be conducted for the applicable pollutant(s). The comprehensive analysis must demonstrate that the project will not cause or contribute to any predicted exceedances of the NAAQS. Refer to the Modeling Guidelines for additional details. Submitted modeling analyses will be reviewed by the DNR for accuracy and completeness.

Alternatively, the DNR will conduct the initial modeling analysis if the applicant requests it. The DNR may request that the applicant conduct a revised modeling analysis if the initial analysis indicates that extensive project design changes will be necessary in order to meet the NAAQS. When this occurs the DNR will provide the applicant with a summary of the initial modeling analysis along with all associated modeling files.

For major sources (defined in 567 IAC—24.100), time that the DNR spends reviewing or conducting the modeling analysis in support of the permit application will be subject to the current major source application fee. For non-major sources, the modeling analysis is included in the minor source application fee.

☐ **I will submit the modeling analysis for the DNR's review**

Include Form MI-1 (plot plan) in the permit application or the modeling analysis report. Applicants can also provide Form MI-2 (source characteristics), or equivalent, which may help expedite the analysis. If Form MI-2 is not provided the DNR will use the most current available information for sources that are not part of the project. Applicants may contact the DNR to request the most recent modeling files to use as a starting point.

☐ **I request that the DNR conducts the initial modeling analysis**

Include Form MI-1 (plot plan) with the permit application. Applicants may choose to also provide Form MI-2 (source characteristics), or equivalent, which may help expedite the analysis. If Form MI-2 is not provided the DNR will use the most current available information for sources that are not part of the project (if necessary).

TIPS FOR WHEN MODELING IS NOT REQUIRED

Even if modeling is not required it is still important to consider the potential impact of the project on the air quality resources in the area. Future projects may trigger a comprehensive modeling analysis in which the sources in this project would need to be included. Designing the sources to comply with the National Ambient Air Quality Standards (NAAQS) now can help prevent modifications at a later date. The following tips will help minimize the impact on the air quality resources in your area:

- Use pollution controls to reduce overall emissions.
- Build stacks with vertical, unobstructed-type discharges. Hinged stacks, hexagonal stacks, and stack-in-a-stack style rain guards are considered unobstructed-type discharges.
- Locate stacks as far as possible from the facility's property boundary.
- Build stacks as tall as possible.

Some applicants may find it beneficial to perform a modeling analysis even if they are not required to submit it with the permit application. Doing so will help ensure that the chosen design complies with the NAAQS. In addition, having an up-to-date comprehensive model on file can help applicants plan for, and thus expedite, future projects. Modeling analyses that are conducted outside the scope of the requirements listed in this form do not need to be submitted to the DNR, and should not be used to complete the Availability of Air Resources section of this form.

Instructions for Form MD: Non-PSD Modeling Determination Form

This form is optional

- This form will help determine whether an air dispersion modeling analysis will be required for non-PSD construction permit projects (including non-PSD projects at PSD-major facilities). This procedure is used for both newly installed construction permit projects and for modifications to previous projects.
- Some unique circumstances not addressed by Form MD may trigger a modeling review. These include, but are not limited to:
  - Projects located at facilities associated with non-attainment or maintenance areas for the pollutant(s) in question;
  - New facilities locating in an already industrialized area where a majority of the air quality resource is already being utilized;
  - New or modified portable plants;
  - New sources with lead emissions, or increases in lead emissions from existing sources;
  - Relaxation of permit limits or requirements originally established to protect the NAAQS;
  - Changes to source location, stack design or facility layout; or
  - Direct ozone emissions.
- The DNR will review each project to determine the need for modeling outside the scope of Form MD. For assistance determining if additional modeling may be required for your project contact the Construction Permit Helpline at 1-877-AIR-IOWA, or call the DNR at 515-725-8200 and ask to speak to a member of the Air Quality Bureau's dispersion modeling team.

Understanding Form MD Information: Each number provides an explanation for the corresponding field on the form.

Company Name: This is useful if application pages become separated.

Section 1 - Project Emissions:

1. **Pollutant:** the pollutants to be evaluated for potential modeling, including:
   - **PM_{10}** Particulate matter with an aerodynamic diameter of ten microns or less, as measured by an EPA-approved reference method
   - **$PM_{2.5}$** Particulate matter with an aerodynamic diameter of 2.5 microns or less, as measured by an EPA-approved reference method
   - **NO_2** Nitrogen dioxide, a subset of NO_X or all oxides of nitrogen
   - **SO_2** Sulfur dioxide
   - **CO** Carbon monoxide

   Averaging Period: the period of time over which the average concentration of a pollutant is calculated. The averaging period(s) for given pollutants are set by EPA when NAAQS are developed, and range from 1-hour (acute) to annual (chronic).

2. **Total Net Change in Emissions for the Project:** Determine the total net change in emissions due to this project. You may exclude emission units exempt from permitting (IAC 567—22.1(2)). To calculate the net change:

   2a. **Total Increase**

   Add together the following for each pollutant:

   i. For equipment ***proposed to be installed*** as a part of this application or for ***existing equipment that should already have had a construction permit*** and is being permitted as a part of this application the increase in emissions is:
      - The requested emission limit or maximum calculated emission rate. These numbers can be found on Form EC, plus,

   ii. For equipment that ***already has a permit*** and is being modified as a part of this application or for ***equipment that did not previously need a permit*** (e.g. previously used a permit exemption or was not required to be permitted) and is being permitted as a part of this application, the increase in emissions is determined from one of the three options below:
      - If requesting an increase in the permitted emission limit, use the difference between the current permitted emission limit and the new requested emission limit. The requested emission limit can be found on the Form EU or Form EC. The previously permitted emission limit can be found in the existing construction permit.
      - If the equipment currently has a permit and was previously modeled at the permitted emission limit and no change is requested to the limit as a part of the application, the applicant may assume zero increase in emissions for that equipment. The applicant can determine if the equipment was previously modeled and the emission rate at which it was modeled by reviewing the "Emission Limits" section of the existing construction permit.

- If none of the above apply, use the difference in the best estimate of emissions at the maximum rated capacity of the equipment both ***before*** the change and ***after*** the change requested in the application. These numbers may be found on Form EC. If not calculated on the Form EC in this manner, they may need to be calculated separately for this form.

2b. **Total Decrease**
Some projects may not have decreases or you may not want to quantify the decreases, in which case please put "zero" in this column. You may skip this section if the increases calculated do not exceed the Significant Emission Rate (SER – see #3 for definition). Decreases to permitted emission limits without actual emissions reductions cannot be counted as decreases in this section.

Add together the following for each pollutant:

i) For equipment which is being ***removed*** as a part of this application the decrease in emissions is:
- The permitted emission limit from the equipment being removed if previously modeled at the permitted emission limit. These numbers can be found in your existing construction permit, or
- The best estimate of emissions at the maximum rated capacity of the equipment if not previously modeled, or if no permitted emission limit exists. These numbers most likely will need to be calculated separately for this form, **plus**,

ii) For existing equipment that is being ***modified to decrease emissions*** as a part of this application:
- The difference in the best estimate of emissions at the maximum rated capacity of the equipment both ***before*** the change and ***after*** the change requested in the application. These numbers may be found on Form EC. If not calculated on the Form EC in this manner, they may need to be calculated separately for this form.

2c. **Net Change:** Subtract the emission rates in Column 2b from the emission rates in Column 2a to get the net change for each pollutant.

3. **Significant Emission Rate (SER):** A quantity of emissions more likely to cause concentrations that threaten the NAAQS. If the project's emission rate for any pollutant is greater than or equal to the SER, modeling is required for that pollutant.

4. **Check Box if net change is ≥ corresponding SER:** If the box is checked, it means the NAAQS is more likely to be exceeded by the project, and modeling is required.

Section 2 - Availability of Air Resources:
If this application is for a new facility or a portable plant you may skip this section. Due to the nature of these types of facilities, it is necessary for the DNR to determine the availability of air resources when the application is processed. Otherwise, calculate the Availability of Air Resources for each pollutant / averaging period with a net change (2c) in Section 1 (Project Emissions) that is ***greater*** than zero. Pollutant / averaging periods without a net increase in emissions should be left blank. Unique situations requiring a modeling analysis in the absence of an emission increase will be reviewed on a case-by-case basis.

5. **Pollutant / Averaging Period:** See Item 1, above, for definitions.

6. **Air Resources Currently Being Used:**
For each pollutant with a net change greater than zero in the **Project Emissions** section, it is important to calculate the air resource currently used in your project's geographic area to determine if the NAAQS are threatened.

6a. **Modeled Concentration:**
Fill in the modeled concentration from the most recent comprehensive modeling analysis for each pollutant and averaging period listed. The most recent Availability of Air Resources (AAR) Summary for your facility may be used for this purpose. To request a copy of the AAR Summary visit http://www.iowadnr.gov/AAR. If previous comprehensive modeling does not exist for an individual pollutant or averaging period leave it blank.

6b. **Current Background:**
The background includes naturally-occurring and human-produced pollutants that exist in the absence of the industrial emissions being evaluated as part of this project. The background concentration will change over time and must be reevaluated whenever an analysis is conducted. It is important to use current background concentrations when completing this form. These can be found on the DNR's background concentration webpage. Default background values can be used on this form without justification. Alternatively, applicants can propose site-specific background concentrations. If using a site-specific background concentration, attach justification for the chosen value(s) to this form. The most recent data from a

previously-approved site-specific background monitor may be used without additional justification. The DNR's dispersion modeling team will review site-specific background concentrations used on this form (major sources will be subject to the current hourly rate for dispersion modeling for this review). In some cases, a time-varying background will be used in a modeling analysis. Time-varying background concentrations are those that fluctuate based on the time of year or time of day. These time-varying background concentrations are included in the modeled concentration and cannot be updated without reevaluating the modeling analysis. If a time-varying background was included in the modeled concentration (7a), leave the background concentration blank.

6c. **Total:**
Add together the modeled concentration (6a) and the current background concentration (6b) to determine the total concentration prior to the project.

7. **Modeling Determination Threshold (MDT):** The MDT is equal to the NAAQS minus one Significant Impact Level (SIL). This is the threshold at which the NAAQS is considered to be threatened. A modeling analysis must be conducted to ensure the project will either result in a concentration less than the SIL, or that comprehensive modeling of the entire area will result in concentrations less than the NAAQS.

8. **Check if total is ≥ corresponding MDT.** Check the box for each pollutant / averaging period with a total greater than or equal to the corresponding MDT.

Section 3 - Modeling Determination:

9. **Check each box if modeling is required in either Section 1 or Section 2:** Check the box for each pollutant / averaging period for which modeling is required in either Section 1 (Project Emissions) or Section 2 (Availability of Air Resources) of this form. A modeling analysis is required for each checked pollutant / averaging period. For example: if modeling is indicated for 24-hour $PM_{2.5}$ but not annual $PM_{2.5}$, then modeling is only required for 24-hour $PM_{2.5}$.

10. **Who Will Conduct the Modeling Analysis?:** If any pollutant / averaging period require a modeling analysis (10), check the box in this section indicating if you will be submitting the analysis or are requesting that the DNR conduct it. This section also provides clarification on next steps for how modeling can be facilitated. If you have any questions about modeling, contact the DNR at 515-725-8200 and ask to speak to a member of the Air Quality Bureau's dispersion modeling team.