Modeling Protocol Template
Version 6/5/2020

This template may be used to develop the modeling protocol. The format provided here is only a recommendation. It contains all normal topics that should be covered, but there could be unique information about a specific project that may need to be added.

The DNR's goal is to review and respond to all modeling protocols within two weeks (10 business days), including the development of source inventories if applicable. Unique situtations that may cause delays are described herein.

If you have questions please contact the Iowa Department of Natural Resources at 515-725-8200, and ask to speak to the Dispersion Modeling Lead Worker.

<Date>

Dispersion Modeling Lead Worker
Iowa Department of Natural Resources
502 E. 9th St.
Des Moines IA 50319

RE: PSD Dispersion Modeling Protocol for <facility name/location/description>

Dear Lead Worker:

<Introduction, project description (including which pollutants are subject to pre-construction review)>

PRE-CONSTRUCTION MONITORING

<Discuss whether pre-construction monitoring will be required for this project (based on the monitoring *de minimis* levels in Table 1 of the "Air Dispersion Modeling Guidelines For PSD Projects"). If pre-construction monitoring is required, state whether the facility will be conducting their own monitoring or if data from an existing monitor will be used. Should the applicant elect to use existing ambient monitoring data, justification of the suitability and representativeness of the existing monitoring data should be provided. In some cases it may be necessary for the DNR to review the results of the preliminary modeling analysis in order to determine the appropriateness of the proposed monitoring data. If this is the case, and no such analysis has been submitted, the acceptability of the proposed monitoring data will not be addressed in the DNR's response to the protocol. Note that a net emissions increase of greater than 100 tpy of VOC emissions triggers the requirement to conduct pre-construction ozone monitoring.>

MODELING METHODOLOGY

DISPERSION MODEL
Air dispersion modeling will be performed using the latest version of AERMOD, version <enter latest version here>.

SOURCE CHARACTERIZATION
<Provide description of sources included in the analysis (including ancillary sources), scenarios to be modeled (including varying operational load analyses, etc.), any operating restrictions that will be incorporated in the modeling analyses, specifically state what methods will be used to model indoor venting units and all fugitive sources including haul roads, etc.>

RECEPTOR GRIDS
<Description of receptors included in analysis. At a minimum, receptors should include a Cartesian grid with receptors spaced as follows:

50 m along the ambient air boundary
50 m extending from the ambient air boundary to 0.5 km
100 m extending from 0.5 km to 1.5 km
250 m extending from 1.5 km to 3 km
500 m extending from 3 km to 5 km

Please note the ambient air boundary is the part of the property where public access is precluded. Additional receptors, spaced at 1000 meters, may be necessary beyond 5 killometers from the source. Concentrations should clearly be decreasing near the edge of the receptor grid. If not, additional receptors should be added; fine grids (50-meter) should be placed over the area of maximum concentration to ensure that the true maximum concentration is identified.>

<Please describe the method that will be used to preclude public access from the protions of the property being excluded from ambient air.>

<Discussion of terrain elevations such as:

Basis for imported elevations (National Elevation Dataset (NED), other data, source, etc.)
Discussion of AERMAP processing>

AERMAP is the terrain preprocessor to AERMOD that processes DEM files that are compatible with AERMOD.

BUILDING DOWNWASH
<Discussion of buildings and structures included in analysis, method for determining downwash parameters, version of executable used, etc.>
The Building Profile Input Program (BPIP) is used to calculate whether a stack is subject to wake effects and the building downwash effects.

METEOROLOGICAL DATA
<Specify meteorological data used in analysis, profile base elevation, etc. If proposing to use prognostic data provide an explanation of how the data will be obtained and processed, as well as justification for using the data.>
The meteorological dataset was processed using the latest version of the EPA meteorological pre-processor AERMET.

MODELING ANALYSIS

<Pollutants subject to PSD should be modeled and the results compared to the significant monitoring concentrations and significant impact levels (SILs). These levels are listed in the "Air Dispersion Modeling Guidelines For PSD Projects" in Tables 1 and 2, respectively. >

<If any of the modeled concentrations resulting from the proposed project are above the SILs then the significant impact area should be determined and a full impact analysis conducted. The significant impact area is a circular area with a radius extending from the source to the most distant point where the predicted concentrations equal or exceed the SILs, or a receptor distance of 50 kilometers, whichever is less. See guidance provided in "Air Dispersion Modeling Guidelines for PSD Projects" for determination of the significant impact area. The full impact analysis is required to compare the modeled concentrations to the National Ambient Air Quality Standards (NAAQS) and the Class II PSD increments for the pollutants and averaging periods for which the SILs are exceeded. The NAAQS and Class II PSD increments are listed in the "Air Dispersion Modeling Guidelines for PSD Projects".

When a full impact analysis is needed, a separate source group should be included that represents the local facility cluster (a group of one or more contiguous facilities, which includes the applicant facility). The results from this source group should be included in the analysis report to provide additional detail regarding the portion of the total predicted concentration that is attributable to emission sources nearer to the project source(s).>

SOURCE INVENTORIES
<Once the extent of the significant impact area is determined, the DNR should be contacted. The DNR will provide an inventory of Iowa facilities that should be considered for the full impact analysis. The DNR will summarize which facilities are part of the local facility cluster described above.

The DNR will provide a list of emission sources at each facility in the inventory, along with the appropriate emission rates and source parameters. The DNR will provide model input files for facilities and pollutants that have been previously modeled, as available. If the impact or screening area extends into surrounding states, the DNR will coordinate with the appropriate agency to obtain an inventory of facilities in those states, and a list of sources at each.

If the extent of the significant impact area is known at the time the protocol is submitted, please provide that information in the protocol. The DNR will provide the inventory and source list concurrent with the modeling protocol response. The response may be delayed if it is necessary to coordinate with adjacent states.>

BACKGROUND VALUES

<Appropriate background values must be added to modeled concentrations when a NAAQS analysis is being conducted. Include a discussion of the chosen background concentrations. The background concentrations should be based on the pre-construction monitoring data if applicable. If pre-construction monitoring was waived due to concentrations less than the SMCs, the DNR maintains default background concentrations that can be used without justification. Applicants may also propose alternate background concentrations. Current default background concentrations, and guidance for proposing alternate background concentrations, are available on the [DNR's background data webpage](1)[1].

The background concentrations being proposed will determine the level of review necessary to approve them. Default backgrounds or background concentrations that are based on approvable pre-construction monitoring data will be reviewed within the normal 2-week protocol response period. Other backgrounds may require additional review, and may delay the DNR's response to the protocol.

If the review is expected to take a considerable amount of time the DNR may respond to the remainder of the protocol so that work may begin, and respond in regards to the background concentrations at a later date.>

SECONDARY FORMATION

<Per the Guideline for Air Quality Models (40 CFR Part 51, Appendix W) secondary formation of ozone and PM2.5 must be addressed as part of a PSD project. Appendix W outlines a two tier approach. Please provide information on how secondary formation will be addressed.>

ADDITIONAL IMPACTS ANALYSIS

<An additional impacts analysis must be conducted for all PSD projects. The additional impact analysis must address the following topics.>

GROWTH

<Discuss the impacts associated with growth resulting from the proposed project.>

SOILS AND VEGETATION

<The impacts on soils and vegetation of the proposed project must be considered. Discuss how those impacts will be quantified. Simply stating that the predicted impacts are below the applicable SILs or NAAQS is not adequate.>

VISIBILITY

<A Class II area visibility analysis must be conducted for sensitive areas as identified by the DNR. The DNR will determine the sensitive areas once the SIAs for the projects are established. State how the visibility analysis will be conducted (e.g. VISCREEN, etc.). While a visibility analysis is required for all projects subject to PSD, only emissions of particulate matter and nitrogen oxides need be considered. A visibility analysis must still be conducted for PSD projects that do not exceed the significant emission rates for particulate matter or nitrogen oxides. However, for projects with negligible emissions of both particulate matter and oxides of nitrogen, a simple statement of this fact will be sufficient to fulfill the visibility requirements of the additional impact analysis.

CLASS I AREA IMPACTS ANALYSIS

<All PSD projects for facilities that propose to locate within 100 kilometers of a Class I area and PSD projects for facilities proposing to locate at a distance greater than 100 kilometers from a Class I area, that are large enough that they may have an impact on a Class I area, must conduct a Class I area impact analysis. There are currently no Class I areas located within the state of Iowa or within 100 kilometers of Iowa's borders. During review of the submitted modeling protocol, the DNR will determine if the PSD project is large enough to require a Class I area impact analysis.>

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[1] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Background-Data

If you have any questions concerning this modeling protocol, or if you need additional information, please contact <name> at <phone number> or <email address>.

Sincerely,

<Company>

<Name>
<Title>

<Attachments?>