



**Minnesota Pollution
Control Agency**

520 Lafayette Road North
St. Paul, MN 55155-4194

AQDMP-01
Air Quality Dispersion Modeling Protocol (AQDMP)
Protocol Form for Criteria Pollutant Modeling

Doc Type: Air Dispersion Modeling

Guidance Information on Page 13

Instructions: Permit applicants required to conduct air dispersion modeling should submit two paper copies of the completed Air Quality Dispersion Modeling Protocol form (AQDMP-01), the Air Quality Dispersion Modeling Protocol Spreadsheet (AQDMPS-01), and all accompanying files to:

Air Quality Permit Document Coordinator
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Applicants may also submit an electronic version in addition to the two paper copies.

Electronic copies of the forms and accompanying files should be sent to: AirModeling.PCA@state.mn.us.

Facility Information

AQ file no.: _____ AQ facility/permit ID no.: _____ Today's date (mm/dd/yyyy): _____
Three-letter modeling facility ID (ex., XEK = Xcel Energy Allen S. King, MEC = Mankato Energy Center, etc.): _____
Facility name: _____
Facility street address: _____
City: _____ County: _____
State: _____ Zip code: _____ Elevation at facility: _____ m
Facility contact: _____ Protocol prepared by: _____
Facility contact phone: _____ Preparer phone: _____
Facility contact e-mail address: _____ Preparer e-mail address: _____
Latitude, Longitude of facility (Decimal degrees to **four** decimal places): _____ N, _____ W
UTM coordinates of facility (NAD83, zone 15 extended **ONLY**): x = _____ m East, y = _____ m North

Files to accompany protocol

Use the checkboxes to indicate that the following **required** files are included with the completed protocol form.
Please **do not use** spaces or special characters in the file names and pathways.

- ☐ 1. Sample AERMOD input files for **each** modeled criteria pollutant (*.inp, *.adi, *.ami)
***Note:** Input file should include receptor grid and building downwash (if applicable)
- ☐ 2. BPIPRM input file (*.bpi)
- ☐ 3. Elevation files for input into AERMAP (*.tif (NED files), *.dem(s))
- ☐ 4. Background data files with concentrations for each applicable pollutant (annual, seasonal, monthly, daily, etc.)
- ☐ 5. AQDMPS-01 spreadsheet
- ☐ 6. **Optional**, but recommended, files and supporting documents – Please list below:
Examples include: sample AERMOD output files (with “CO RUNORNOT NOT”), SMS Spreadsheet, images and figures, SIL analysis and/or paved roads fugitive dust modeling output files, etc.

Section A. Purpose for Air Dispersion Modeling and Related Information

1. What is the purpose for conducting the ambient air dispersion modeling? (check all that apply)
- ☐ Permit requirement ☐ EAW ☐ EIS ☐ SIP ☐ PSD
- ☐ Other – please explain: _____

- a. If EAW and/or EIS are selected, please specify the regulatory trigger for modeling (ex., air emissions increase of 250 TPY, 25 MW operating capacity or design, petition, voluntary, etc. – see Minn. R. ch. 4410 for more information) and the name of MPCA EAW staff consulted with (N/A if not applicable or if no EAW staff were consulted):

MPCA EAW staff name(s): _____ Date of consultation (mm/dd/yyyy): _____

***Note:** If EAW and/or EIS are to be performed and air modeling will be conducted, cumulative effects will need to be addressed, as per the CARD decision. Please then select “NAAQS/MAAQS” in question 8 (A.8). Contact the Environmental Review Unit Supervisor (currently Craig Affeldt) for any questions regarding applicability and requirements.

2. Were MPCA air dispersion modeling staff consulted while completing this form? ☐ Yes ☐ No

- a. If yes, please provide the following consultation information:

MPCA modeling staff name(s): _____ Date of consultation (mm/dd/yyyy): _____

Topic of consultation: _____

3. What type of air emission permit does this facility currently hold?

☐ No current permit ☐ Federal (Title V/Part 70) ☐ State ☐ State Registration ☐ Capped ☐ General
☐ Other: _____

4. Will you be applying for a permit or a permit amendment for the project? ☐ Yes ☐ No

5. Please provide a project title and a description of the proposed project:

a. Project title (10 words or less): _____

b. Project description (50 words or less): _____

6. Is the proposed project subject to PSD? ☐ Yes ☐ No

a. If yes, list pollutants: _____

b. Is this facility considered a major source for PSD? ☐ Yes ☐ No

7. Has the PSD minor source baseline been set for: _____ County? ☐ Yes ☐ No

- a. If yes, for which pollutant(s) and the year(s) it was set (check all that apply)?

☐ NO₂ _____ ☐ PM₁₀ _____ ☐ PM_{2.5} _____ ☐ SO₂ _____

PSD major source baseline (*PM_{2.5} trigger date will be on Oct. 20, 2011, 1 year after F.R. publication date.*)

☒ NO₂ 1988 ☒ PM₁₀ 1975 ☒ PM_{2.5} 2010 ☒ SO₂ 1975

8. What type of analysis will be conducted? (check all that apply)

☐ NAAQS/MAAQS ☐ PSD Class II Increments ☐ PSD Class I Increments ☐ SIL Analysis ☐ Screening
☐ Other: _____

9. Additional information for this section that was not included above (if not applicable, place N/A in field):

Section B. EPA Pre-Processors and EPA Post-Processors

1. Will AERMAP be used? ☐ Yes ☐ No

If no, please explain: _____

- a. What version of AERMAP is proposed to be used: [Select from list]

If other, please explain: _____

- b. What type of elevation data will be used:

☐ NED 1/3 arc second ☐ NED 1 arc second ☐ DEM 7.5 min ☐ DEM 1.0 degree

☐ Other - Please describe: _____

All UTM coordinates must be in NAD83, Zone 15 Extended (not NAD27).

2. Will BPIP-PRIME version 04274 be used? ☐ Yes ☐ No

If no, please explain: _____

Tiering of buildings must follow MPCA's modeling guidance from section 6 of the Oct. 2004 "MPCA Air Dispersion Modeling Guidance For Minnesota Title V Modeling Requirements And Federal Prevention of Significant Deterioration (PSD) Requirements (Version 2.2)."

3. Will MPCA pre-processed AERMET data be used? ☐ Yes ☐ No If yes, proceed to question 4.

Note – MPCA's pre-processed meteorological data with AERMET incorporates the following details:

- AERSURFACE version 08009 is used to determine surface characteristics using 1992 LULC data.
- Yearly-averaged moisture conditions (wet, dry, or average) based on historical ranks are accounted for in AERSURFACE to aid in the determination of Bowen ratio values.
- Default 1.0 km radius for surface roughness and 10 km by 10 km domain for albedo and Bowen ratio used in AERSURFACE

- a. If **no**, will on-site meteorological data be processed and used? ☐ Yes ☐ No

**If no, skip to question 4 and provide additional information in question 5.*

- b. If **yes** to question a, please answer the following questions.

- i. Will AERSURFACE be used to determine surface characteristics around the meteorological tower? (Default is "Yes") ☐ Yes ☐ No

- ii. What version of AERSURFACE is proposed to be used: [Select from list]

- iii. What LULC data will be used? [Select from list]

If other, please explain: _____

- iv. Will yearly-averaged moisture conditions (wet, dry, or average) based on historical ranks be accounted for in AERSURFACE (for the Bowen Ratio)? (Default is "Yes") ☐ Yes ☐ No

- v. Will the default 1.0 km radius for surface roughness, and 10 km by 10 km domain for albedo and Bowen ratio be used? (Default is "Yes") ☐ Yes ☐ No

If no, please explain: _____

4. Are any **EPA** post-processors (such as LEADPOST) proposed to be used in the analysis? ☐ Yes ☐ No

- a. If yes, what post-processor(s) and version(s): _____

5. Are any user-developed pre-processors or post-processors proposed to be used in the analysis? ☐ Yes ☐ No

- a. If yes, what pre-processors or post-processors, and describe their functions: _____

6. Additional information for this section that was not included above (if not applicable, place N/A in field): _____

Section C. Model Selection and Options (Key CO Pathway Inputs)

1. Identify the air dispersion model and version proposed to be used in the analysis: [Select from list]

- a. If other, please list: _____

2. What criteria pollutants are required and will be modeled (check all that apply)?

☐ CO ☐ NO₂ ☐ PM_{2.5} ☐ PM₁₀ ☐ SO₂ ☐ Pb ☐ H₂S ☐ Other: _____

*Please refer to **Tables App.1 and App.2 in the Appendix** for averaging times and form of standard for each criteria pollutant(s). Refer to the most recent version of the EPA's AERMOD User's Guide for correct pollutant IDs to use. Use EPA's most recent modeling guidance' methods for PM_{2.5}.*

3. What model options (CO pathway keywords) are proposed to be used in the analysis for the source under review (check all that apply)? (See Tables B-1 and B-2 of the "AERMOD User's Guide, Addendum for Version 11103")

☐ Regulatory Default - list pollutants: _____

☐ Non-Default - List pollutants: _____

☐ Concentration ☐ Rural ☐ Urban ☐ ELEV ☐ FLAT

☐ Other(s) not listed: _____

- a. If Urban, please specify population area, population, and surface roughness radius:
Population area: _____ Population: _____ Surface roughness height: 1.0 km
- b. If Non-Regulatory Default, please specify non-default options: N/A
4. Will alternative air dispersion models and/or methods, as specified by Appendix W, be applied (e.g., parallel version(s) of model, PVMRM, OLM, secondary formation, etc.)? ☐ Yes ☐ No
- If yes, please explain: _____
- a. If yes, will approval be required by MPCA and/or EPA Region V air modeling staff? ☐ Yes ☐ No
If yes, please select: ☐ MPCA (State-only action) ☐ EPA Region V (PSD/SIP action)
If no, please explain: _____
5. If NO₂ is required to be analyzed for the one-hour and annual NAAQS, what tier methodology(s) is proposed?
☐ N/A, NO₂ not required (skip to question 6)
☐ Tier 1 (100% NO_x to NO₂ conversion, most conservative)
☐ Tier 2 (Default ambient ratio of 0.80, or an appropriate ratio value)
☐ Tier 3 (OLM, requires justification and approval by MPCA and/or EPA Region 5)
☐ Tier 3 (PVMRM, requires justification and approval by MPCA and/or EPA Region 5)
- a. If Tier 2, please provide the ambient ratio proposed (**default = 0.80**): _____
- b. If Tier 3 is anticipated to demonstrate compliance in the modeling analysis (OLM or PVMRM), please provide the following details now to expedite MPCA's review:
- In-stack ratio of NO₂/NO_x (NO2STACK) (**default=0.50**): _____
 - Equilibrium ratio (NO2EQUIL) (**default=0.90**): _____
- c. If Tier 3 is anticipated, please provide details below regarding **MPCA-generated** ozone values (in µg/m³)
(Please check all option(s) proposed to be used):
☐ MPCA-generated O₃ values will be used
☐ MPCA-generated values will NOT be used (proceed to question d)
- ☐ CO OZONEFIL (hourly):
1. O3FileName: _____
2. File creation date: _____
3. FORTRAN subroutine: _____
 - ☐ CO O3VALUES O3flag: SEASON OZONUNIT: ☐ PPB ☐ PPM ☒ UG/M3
Note: MPCA O3flag uses SEASON as a default, as well as OZONUNIT set to UG/M3.
1. Please input the O3values (i=1,n) for the O3flag specified above (C.5.c.ii):
Example: For "CO O3VALUES SEASON", n=4 values (winter #, spring #, summer #, fall #)

 - ☐ CO OZONEVAL (monitored value): 75 O3Units: ☐ UG/M3 ☒ PPB ☐ PPM
Note: MPCA OZONEVAL uses 75 PPB as a default.
- d. If Tier 3 is anticipated, please provide details below regarding **user-generated** ozone values
(Please check all option(s) proposed to be used):
☐ User-generated O₃ values will be used
☐ User-generated values will NOT be used (proceed to question e)
- ☐ CO OZONEFIL (hourly):
1. O3FileName: _____
2. O3Units: ☐ UG/M3 ☐ PPM ☐ PPB
3. O3Format: _____
 - ☐ CO O3VALUES O3flag: _____ OZONUNIT: ☐ PPB ☐ PPM ☐ UG/M3
Note: O3flag can be defined as ANNUAL, SEASON, MONTH, etc. PPB is the AERMOD default for OZONUNIT. See Table B-2, Appendix B, of the "AERMOD User's Guide, Addendum for Version 11103".
1. Please input the O3values (i=1,n) for the O3flag specified above (C.5.d.ii):
Example: For "CO O3VALUES SEASON", n=4 values (winter #, spring #, summer #, fall #)

 - ☐ CO OZONEVAL (monitored value): _____ O3Units: ☐ UG/M3 ☐ PPB ☐ PPM
Note: UG/M3 is the AERMOD default for OZONEVAL O3units.

- e. Is EPA approval needed for the modeling protocol (e.g., Tier 3 NO₂)? *Tier 3 NO₂ methodologies that require approval by Region 5 modeling staff need to have said approval before submission of this form and attach approval.*

☐ Yes – PSD/SIP permit action ☐ No – State-only action

6. Are the following criteria from Appendix W, section 3.2.2, paragraph (e), met in this protocol? ☐ Yes ☐ No

If no, please explain: _____

- e. *“Finally, for condition (3) in paragraph (b) of this subsection...an alternative refined model may be used provided that:*

- i. *The model has received a scientific peer review;*
- ii. *The model can be demonstrated to be applicable to the problem on a theoretical basis;*
- iii. *The data bases which are necessary to perform the analysis are available and adequate;*
- iv. *Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates; and*
- v. *A protocol on methods and procedures to be followed has been established.”*

7. Additional information for this section that was not included above (including justification for non-default options, additional CO pathway keywords not mentioned above, or additional values listed in 5a or 5b):

Section D. Emission Source Characterizations and Parameters (Key SO Pathway Inputs)

Include and list the facility's modeling parameters for all source types in the MPCA's *Modeling Parameters Spreadsheet* (Form AQDMPS-01). For background sources listed within SO Pathway, please see Section I.

1. Please indicate which of the following source characterizations are present at your facility and will be included for modeling analysis (check all that apply):

“Yes” = Source-type present and will model; “N/A” = Source-type not present; “No” = Source-type present but will not model.

a. **Point sources:**

☐ Yes ☐ N/A ☐ No-please explain: _____

- i. Are any of the point sources capped and/or horizontal stacks (see guidance in section 6.1, AERMOD Implementation Guide (03/19/2009)) and, if yes, accounted for in the following?

☐ No ☐ Yes – exit velocity(s) = 0.001 m/s ☐ Yes – Non-Default POINTCAP and /or POINTHOR*

**Please provide justification for use of non-default option in question b, below.*

- ii. Additional information for this subsection (if not applicable, place N/A in field):

b. **Volume sources:**

☐ Yes ☐ N/A ☐ No-please explain: _____

Tip: Please refer to Figure App.1 in the appendix on calculating the lateral and vertical dimensions.

- i. Will there be any volume source(s) overlapping or within 1.0 meters of any receptors?

☐ No ☐ Yes*

**Volume source should then be converted to an area source of commensurate size (per section 6.2 of EPA's AERMOD Implementation Guide (03/19/2009)) or be further refined.*

- ii. Additional information for this subsection (if not applicable, place N/A in field):

c. **Area sources** (includes AREACIRC and AREAPOLY):

☐ Yes ☐ N/A ☐ No-please explain: _____

- i. Additional information for this subsection (if not applicable, place N/A in field):

d. **Open pit sources:**

☐ Yes ☐ N/A ☐ No-please explain: _____

i. Additional information for this subsection (if not applicable, place N/A in field):

2. Are fugitive emissions emitted from the source, and if yes, will they be accounted for in the modeling analysis? (Examples of fugitive emissions include but are not limited to: traffic on paved and/or unpaved roads, stockpiles of various materials, wind erosion, loadout, unloading, etc.)

(Yes = fugitive emissions are emitted AND will be included in modeling analysis; N/A = no fugitive emissions are emitted; No = fugitive emissions are emitted and will NOT be included in modeling analysis)

☐ Yes ☐ N/A ☐ No-please explain*: _____

** Please provide justification for excluding any fugitive emission sources within the modeling.*

- a. If yes, please list the facilities' fugitive sources: _____

Note: If modeling for paved road fugitive dust, please read and complete Section E.

- b. Will the Standardized Mobile Source (SMS) Spreadsheet be used to determine emissions due to paved and/or unpaved roads (unpaved spreadsheets under development)? ☐ Yes ☐ No

3. Will all insignificant activities emitted from the source for PM₁₀ (with emissions over 0.1 lb/hr), PM_{2.5} (with emissions over 0.02 lb/hr), or other pollutants be accounted for in the modeling?

☐ Yes ☐ N/A ☐ No-please explain*: _____

** Please provide justification for excluding any insignificant activities within the modeling.*

Scale for other pollutants. For example, $(0.1 \text{ lb/hr}) / (150 \mu\text{g}/\text{m}^3) = (X \text{ lb/hr}) / (35 \mu\text{g}/\text{m}^3)$, where $X = 0.02 \text{ lb/hr}$.

Refer to guidance in section 10 of the Oct. 2004 "MPCA Air Dispersion Modeling Guidance For Minnesota Title V Modeling Requirements And Federal Prevention of Significant Deterioration (PSD) Requirements (Version 2.2)"

4. Are intermittent emissions sources present at the facility? ☐ Yes ☐ No – Skip to question 5.

- a. If yes, please provide detail on the types and operations of the intermittent emission source(s) (include the source IDs, any regular uses, testing frequencies, emergency uses, peaking vs. non-peaking units, days and hours of operation or testing, etc.):

- b. If yes to question 4, will intermittent emission sources be included in the modeling analysis?

☐ Yes – please list the source ID(s): _____

☐ No – please list the source ID(s): _____

- i. If no, please provide explanation for not including in the modeling analysis: _____

5. Does your facility have alternative operating scenarios? ☐ Yes ☐ No

- a. If yes, will multiple operating scenarios be modeled?

☐ Yes - # of scenarios to be modeled: _____ ☐ No – most conservative scenario will be modeled

- b. If yes to 5a above, please describe the operating scenarios and the differences between them:

Note: If multiple scenarios will be modeled, please list the scenarios in the AQDMPS-01 spreadsheet.

6. Will emission factors/scalars (SO EMISFACT) be used to demonstrate compliance in the air dispersion modeling analysis?

☐ Yes ☐ No

- a. If yes, describe for which sources and the types of emission factors/scalars that will be applied:

7. Will hourly emission file(s) be used for this analysis (HOUREMIS)? ☐ Yes* ☐ No

**If yes, please provide the hourly emission file(s) with the submittal of this form and list file in question 6 under the "Files To Accompany Protocol" section.*

8. Please list the anticipated source groups (SRCGROUP) that will be used in the modeling analysis:

***Tip:** For NAAQS modeling, please include for source groups:

"SO SRCGROUP ALL BACKGROUND", "SO SRCGROUP BKG BACKGROUND", "SO SRCGROUP FAR 1-99999999".

9. Will NO₂/NO_x ratios be used for OLM or PVMRM options? ☐ N/A ☐ Yes ☐ No

10. Will "OLMGROUP ALL" be used for the OLM option? ☐ N/A ☐ Yes ☐ No
11. Will all applicable PSD increment consuming and/or expanding sources be modeled for your source?
☐ Yes ☐ No-please explain (SIL-only, NAAQS-only, etc.): _____
12. Additional information for this section that was not included above (if not applicable, place N/A in field): _____

Section E. Paved Roads Fugitive Dust

Current MPCA policy regarding modeling of paved road fugitive dust emissions, in support of air quality permitting or environmental review, recommends that:

New facilities or facilities undergoing physical expansions will not be required to model paved road fugitive dust emissions if a facilities' predicted ambient impacts for PM₁₀ and PM_{2.5} are less than a specified percent of the NAAQS and/or PSD Class II Increment. Physical expansions do not include increases in emission limits.

This policy does not apply to modeling that supports permitting in maintenance areas or the development of State Implementation Plans. Exceptions to the policy can and will occur. Please see the MPCA air modeling webpage for policy.

If paved road fugitive dust emissions are proposed to be included in your modeling analysis and you did **not** answer "Neither" to question 1b, MPCA guidance recommends that the source in question first model its' facility (**without** including paved road fugitive dust emissions) plus nearby sources plus background (i.e., FAC w/o paved roads + nearby source impacts + background impacts). Results then can be recorded using Table E-01 below for PM₁₀ and PM_{2.5}. If your facility has multiple paved roads operating scenarios, results recorded in Table E-01 must reflect the most conservative scenario.

1. Does your facility have paved road fugitive dust emissions for **PM₁₀** and **PM_{2.5}**?
☐ Yes ☐ No – Please continue to the next section (F)
 - a. Will your facility include paved road fugitive dust emissions in the modeling analysis? ☐ Yes ☐ No
 - b. Is your facility either a new facility or an existing facility undergoing a physical expansion?
☐ New facility ☐ Existing w/ phys. expan. ☐ Neither*
If neither, policy does not apply. Please answer questions 2 – 5, and proceed to the next section (F) **without filling in Table E-01.*
 - c. If yes to question 1 and no to question 1a, please provide justification for not including paved road fugitives:

2. How many vehicles per day drive on and off your facility's property? (Provide the maximum number from all scenarios.)
 Employee traffic and parking: _____ Third-party truck traffic: _____
3. Does your facility have multiple operating scenarios for traffic on your property (i.e., seasonal traffic changes)?
☐ Yes ☐ No
 - a. If yes, please provide additional details for the operating scenarios, such as changes in traffic counts, types of vehicles, silt loadings, cleaning frequencies, etc.

4. Will you be using the most recent version of the MPCA's Standardized Mobile Source (SMS) spreadsheet to determine paved road fugitive dust emissions and source parameters?
☐ Yes* ☐ No **If yes, please submit SMS with this modeling protocol form and indicate on the cover page of this form.*
5. Additional information for this section that was not included above or below (if not applicable, place N/A in field): _____

Note: Modeling output files must be submitted, if completing Table E-01.

Table E-01 (Use max modeled concentrations from all operating scenarios)

	Averaging Period	NAAQS ($\mu\text{g}/\text{m}^3$)	Modeled NAAQS Impact Concentrations w/ Background and Nearby Sources ($\mu\text{g}/\text{m}^3$)	% of NAAQS/MAAQS	PSD Class II Increments ($\mu\text{g}/\text{m}^3$)	Modeled Class II Increment Impact Concentrations ($\mu\text{g}/\text{m}^3$)	% of Class II Increments
PM ₁₀	24-hour	150		0.00%	30		0.00%
	Annual	50		0.00%	17		0.00%
PM _{2.5}	24-hour	35		0.00%	9		0.00%
	Annual	15		0.00%	4		0.00%

Table E-02 indicates the resultant category(s) for your facility, based on the % of the standard(s) for PM₁₀ and PM_{2.5} (see results in columns “% of NAAQS” and “% of Class II Increments” in Table E-01 above). This uses the highest % from all averaging periods for each pollutant and standard. The category descriptions are provided in Table E-03. Answers to question 2 above will help determine permit conditions if modeled concentrations result in a category 2 designation.

Table E-02

	NAAQS				PSD Class II Increments			
	NAAQS/MAAQS Result(s) w/ Background and Nearby Sources (%)	Cat. 1	Cat. 2	Cat. 3	PSD Class II Result(s) (%)	Cat. 1	Cat. 2	Cat. 3
PM ₁₀	0.00%	# < 60%	60% < # < 95%	95% < #	0.00%	# < 35%	35% < # < 75%	75% < #
PM _{2.5}	0.00%	# < 80%	80% < # < 95%	95% < #	0.00%	# < 40%	40% < # < 80%	80% < #

Table E-03

Cat 1:	Paved road fugitive emissions not required to be modeled, and no paved road fugitive dust permit conditions. Requirements in Minn. Rule 7011.150 apply.
Cat 2:	Paved road fugitive emissions not required to be modeled, with paved road fugitive dust permit conditions determined by levels of traffic at the facility.
Cat 3:	Paved road fugitive emissions are required to be modeled, with site-specific paved road fugitive dust permit conditions. Re-modeling and/or addition of paved road fugitive emissions source group required.

Section F. Receptors (RE Pathway)

Please refer to guidance from Table 4 and 5 of the October 2004 “MPCA Air Dispersion Modeling Guidance For Minnesota Title V Modeling Requirements And Federal Prevention of Significant Deterioration (PSD) Requirements (Version 2.2)”, as well as federal guidance.

- What type of receptor grid will be used? [Select from list]
 - If other, or a combination, please describe: _____
 - Will grid be converted to discrete Cartesian? ☐ Yes ☐ No ☐ N/A – already discrete Cartesian
- How many receptors in total will be included in the receptor grid? _____ receptors
- What will be the grid dimensions? (Ex., radius of 10 km, 5 km by 5 km, etc.) _____
- What is the proposed spacing of receptors for...?
 - Inside the property boundary(s): _____ meters
 - On the fenceline(s): _____ meters
 - On the property line(s): _____ meters
 - Beyond the property line(s): _____ meters
- Will FLAGPOLE receptors be included in the receptor grid?
(N/A = No high-rise structures w/ ambient air within 3 miles of source; No = High-rise structures w/ ambient air exist within 3 miles of source, but will not include in receptor grid.)
☐ Yes ☐ N/A ☐ No – Please continue to the next question (6)
- Additional information for this section that was not included above (if not applicable, place N/A in field): _____

Section G. Meteorological Data (ME Pathway)

Note: If modeling with more than one meteorological data set (i.e., portable facility), please list in question 8 the information requested in questions 1-4 for the additional data sets.

1. What meteorological surface station is proposed for use? Please indicate the station name, the state the surface station is located in, and the three letter call sign/identifier. (Ex.: Minneapolis/St. Paul Int'l Arpt; MN; MSP) Or check the box to indicate that on-site surface meteorological data will be used instead of NWS surface meteorological data.

Surface station name: _____ State: _____ Three-letter call sign/identifier: _____

☐ Onsite surface data

2. What meteorological upper air station is proposed for use? Please indicate the station name, the state the surface station is located in, and the three letter call sign/identifier. (Ex.: Chanhassen; MN; MPX)

Upper air station name: _____ State: _____ Three-letter call sign/identifier: _____

3. What consecutive 5- year period will be used? _____ to _____
4. Were the proposed AERMET files pre-processed by MPCA staff?

☐ Yes ☐ No

- a. If yes, please provide the name of the met data zip file that was received or obtained from the MPCA and the date it was obtained:

Name: _____ .zip Date (mm/dd/yyyy): _____

- b. Please indicate what version of AERMET will be used: [Select from list]

If other, please explain: _____

5. Will on-site meteorological data be used, instead of NWS meteorological data processed by MPCA staff?

☐ Yes ☐ No

Note: If site-specific meteorological data will be collected and used, please follow the federal guidance (EPA's), as specified in section 8.3 and section 8.3.3.2 (QA/QC) of 40 CFR Part 51 dated 11/09/2005 (Appendix W).

- a. If site-specific surface meteorological data will be collected and used, where will the **location** of the meteorological tower be set (city and state, coordinates, etc.)?

N/A

- b. If site-specific meteorological data will be collected and used, what **year** of data is proposed to be used?

N/A

6. What justification(s) applies for the proposed surface and upper air stations identified above? (Check all that apply)

☐ Similar surface characteristics as meteorological tower ☐ Similar land use characteristics

☐ Similar wind patterns/characteristics ☐ Proximity to surface and/or upper air station(s)

☐ Other – Please describe: _____

- a. Please provide additional detail for your justifications: _____

7. Will wind speed categories be used?

☐ Yes ☐ No – Skip to question 8.

- a. If yes, please list the user-specified wind speed categories for the ME WINDCATS pathway:

- b. If yes, please list the user-specified wind speed emission factors for the SO EMISFACT WSPEED pathway:

8. Additional information for this section that was not included above (if not applicable, place N/A in field):

Section H. SIL Analysis and Results

1. Will a SIL analysis be conducted in conjunction with this project, in order to determine if a cumulative analysis is required?

☐ N/A – Proceed to the next section (I)

☐ No – Will not model against SILs and instead proceed directly to conducting a cumulative analysis

☐ Yes – List for which pollutants: _____

2. Extent of SIL receptor grid: _____ km

3. If a preliminary SIL analysis has been conducted for this project, it is optional but highly recommended that results be provided (in the Table H-01 below), as well as including corresponding model output files.

Table H-01, Class II Significant Impact Levels Modeling Results for:

Pollutant	Averaging Time	Modeled Impacts (H1H) ($\mu\text{g}/\text{m}^3$)	SILs ($\mu\text{g}/\text{m}^3$) *As of 10/26/2010	% of SIL	Exceed SIL?	Radius of Impact (If exceeds SIL)
SO ₂	1-hr		7.83	0.00%	(blank)	km
	3-hr		25	0.00%		
	24-hr		5	0.00%		
	Annual		1	0.00%		
PM ₁₀	24-hr		5	0.00%	(blank)	km
	Annual		1	0.00%		
PM _{2.5}	24-hr		1.2	0.00%	(blank)	km
	Annual		0.3	0.00%		
NO _x	1-hr		7.52	0.00%	(blank)	km
	Annual		1	0.00%		
CO	1-hr		2000	0.00%	(blank)	km
	8-hr		500	0.00%		

4. Additional information for this section that was not included above (if not applicable, place N/A in field):

Section I. Background Values

Please refer to pages 35-39 (Section 2.4) and Table B-4 of the "AERMOD User's Guide, Addendum for Version 11103" for guidance as well as the latest version of the MPCA's Air Dispersion Modeling Guidance for Title V and PSD.

***Contact MPCA air dispersion modeling staff for MPCA-generated products.**

1. Are background concentrations required for your analysis?

***Tip:** If "NAAQS/MAAQs" was selected in question A.8, the answer is "Yes".

☐ Yes – List pollutants required for: _____

☐ No – Please explain and proceed to question 4 (e.g., SIL analysis-only, etc.):

Note: All MPCA and user-generated background concentrations, including uniform and temporally varying concentrations, will need to be specified in the input file(s).

2. **Will MPCA-generated background concentrations (in $\mu\text{g}/\text{m}^3$) be used?**

☐ No ☐ Yes – List pollutants to be used for: _____

If yes, check MPCA-generated background concentrations option(s) to be used (check all that apply):

a. ☐ SO BACKGRND BGflag *Default for BGflag (question I.2.a.iii) for MPCA-generated is "SEASON"*

i. File name(s): _____

ii. File creation date(s): _____

iii. BGflag(s) – List all that apply: _____

b. ☐ SO BACKGRND HOURLY

i. File name(s): _____

ii. File creation date(s): _____

iii. FORTRAN subroutine: _____

Tip: Please include MPCA-generated background concentrations as an external file in the modeling input file. Ex., "SO INCLUDED BGflag filename" or "SO BACKGRND HOURLY hourlyfilename"

3. Will user-generated background concentrations be used?

☐ No ☐ Yes – List pollutants to be used for: _____

a. If yes, please provide a description below of the user-generated background concentration(s) and any considerations given to the methodology: _____

b. Background data sources (check all that apply): ☐ MPCA website ☐ EPA website

☐ Other – explain: _____

c. Examined monitors out to a distance of: _____ km

d. Monitors excluded and reasons why: _____

e. Facility characteristics:

i. Facility land use (industrial, residential, agricultural, cropland, mixed, etc.): _____

ii. Facility setting: ☐ Urban ☐ Suburban ☐ Rural _____

f. Ambient air monitor(s) characteristics:

i. Monitor land use (industrial, residential, agricultural, cropland, mixed, etc.): _____

ii. Monitor setting: ☐ Urban ☐ Suburban ☐ Rural _____

g. Form of background value(s) (maximum, 98th percentile, etc.): _____

h. Please check user-generated background concentrations option(s) to be used (check all that apply):

☐ SO BACKGRND BGflag *(BGflag can be defined as ANNUAL, SEASON, MONTH, etc. See Table B-4, Appendix B, of the AERMOD User's Guide Addendum)*

i. File name(s): _____

ii. File creation date(s): _____

iii. BGflag(s) – List all that apply: _____

☐ SO BACKGRND HOURLY

i. File name(s): _____

4. Additional information for this section that was not included above (if not applicable, place N/A in field): _____

Section J. Nearby Sources

***Contact MPCA air dispersion modeling staff for MPCA-generated products.**

1. Will any nearby sources be modeled explicitly for the analysis?

☐ N/A ☐ No ☐ Yes – List pollutants required for: _____

2. Will MPCA-generated nearby sources be used for any of the criteria pollutants?

☐ N/A ☐ No ☐ Yes – List pollutants to be used for: _____

If yes, check MPCA-generated nearby sources option(s) to be used (check all that apply):

a. ☐ First-approximation representative (FAR) data

i. File name(s): _____

ii. Creation date(s): _____

iii. Distance(s) (DMAX) (km): CO: 50 NO₂: 50 PM₁₀: 50 PM_{2.5}: 50 SO₂: 50

iv. Scalar(s) (SMAX): CO: NO₂: PM₁₀: PM_{2.5}: SO₂:

iv. Coefficients for Coef. * D test(s): CO: NO₂: PM₁₀: PM_{2.5}: SO₂:

Tip: Please include MPCA-generated nearby sources as an external file in the modeling input file. Ex., "SO INCLUDED filename". Do not change the MPCA-generated source ID's (SrcID) of the nearby sources, or alter the files in any way without MPCA approval (ex., replacing FAR data with refined data).

b. ☐ Refined nearby source modeling

i. ☐ FAR sources replaced with refined modeling data (if checked, please list FAR ID's & FAC ID's)

- ii. ☐ Other refined nearby sources (if checked, please list FAC ID's)

3. **Will user-generated nearby sources be used for any of the criteria pollutants?**

☐ N/A ☐ No ☐ Yes – List pollutants to be used for: _____

If yes, please explain:

4. Additional information for this section that was not included above (if not applicable, place N/A in field):

Section K. Anticipated Outputs (OU Pathway)

*Please refer to Tables B-11 and B-12 of the "AERMOD User's Guide, Addendum for Version 11103".

1. Please list the plot file(s) (*.plt) that will be generated for each pollutant and averaging time combination (OU PLOTFILE) (Required for all modeled criteria pollutants):

Note: Plot files with combined averaging times for the same pollutant, and extensions such as *.grf, should be separated into individual *.plt files. For example, PM₁₀ should have at least two individual plot files: one for the 24-hour averaging period for source group ALL and a second for the annual averaging period for source group ALL. Group ALL should include BACKGRND if conducting NAAQS modeling (e.g., "SO SRCGROUP ALL BACKGRND").

2. Please list the keyword and parameters that will be used in the modeling output files for the keyword RECTABLE (Required) (Ex., "NO₂ = OU RECTABLE ALLAVE 1-8", "SO₂ = OU RECTABLE ALLAVE 1-4"):

3. Please list the keyword and parameters that will be used in the modeling output files for the keyword MAXTABLE (OU MAXTABLE Aveper Maxnum) (Maxnum=80) (Required):

4. Will source contribution (OU EVENTOUT SOCONT) or hourly contribution (OU EVENTOUT DETAIL) files be generated for event output files? (Required for PM₁₀ and CO):

☐ SOCONT ☐ DETAIL ☐ N/A (not modeling for PM₁₀ and/or CO)

5. Please specify the parameters for use with OU MAXDCONT (for use with 1-hour NO₂, 1-hour SO₂, and 24-hour PM_{2.5} only): (Required)

☐ 1-hour NO₂ – GrpID: Upper Rank: LowerRank or ThreshValue: FileName:

☐ 1-hour SO₂ – GrpID: Upper Rank: LowerRank or ThreshValue: FileName:

☐ 24-hour PM_{2.5} – GrpID: Upper Rank: LowerRank or ThreshValue: FileName:

6. Will output files of daily maximum 1-hour values for each processed day (OU MAXDAILY) be generated for this analysis (for 1-hour NO₂ and 1-hour SO₂ only)? (Optional)

☐ No ☐ Yes – for: ☐ 1-hour NO₂ and/or ☐ 1-hour SO₂

7. Will output files of daily maximum 1-hour values by year, for each processed year (OU MXDYBYR) be generated for this analysis (for 1-hour NO₂ and 1-hour SO₂ only)? (Optional)

☐ No ☐ Yes – for: ☐ 1-hour NO₂ and/or ☐ 1-hour SO₂

8. Other outputs to be generated (please specify the keyword and the parameter options):

9. Additional information for this section that was not included above (if not applicable, place N/A in field):

Appendix

Figure App.1

TABLE 3-1.		
SUMMARY OF SUGGESTED PROCEDURES FOR ESTIMATING INITIAL LATERAL DIMENSIONS σ_{yo} AND INITIAL VERTICAL DIMENSIONS σ_{zo} FOR VOLUME AND LINE SOURCES		
Type of Source	Procedure for Obtaining Initial Dimension	
(a) Initial Lateral Dimensions (σ_{yo})		
Single Volume Source	$\sigma_{yo} =$	length of side divided by 4.3
Line Source Represented by Adjacent Volume Sources (see Figure 1-8(a) in EPA, 1995)	$\sigma_{yo} =$	length of side divided by 2.15
Line Source Represented by Separated Volume Sources (see Figure 1-8(b) in EPA, 1995)	$\sigma_{yo} =$	center to center distance divided by 2.15
(b) Initial Vertical Dimensions (σ_{zo})		
Surface-Based Source ($h_s = 0$)	$\sigma_{zo} =$	vertical dimension of source divided by 2.15
Elevated Source ($h_s > 0$) on or Adjacent to a Building	$\sigma_{zo} =$	building height divided by 2.15
Elevated Source ($h_s > 0$) not on or Adjacent to a Building	$\sigma_{zo} =$	vertical dimension of source divided by 4.3

Table App.1 – Modeled Form of the NAAQS/MAAQs by Averaging Periods

Pollutant	1-hour	3-hour	8-hour	24-hour	Monthly	Annual
CO	H2H	-	H2H	-	-	-
NO ₂	98 th percentile of the daily max. 1-hour values	-	-	-	-	H1H
Pb	-	-	-	-	H1H	-
PM ₁₀	-	-	-	H6H of the multiyear values	-	H1H
PM _{2.5}	-	-	-	98 th percentile of daily max. 24-hour values	-	H1H
SO ₂	99 th percentile of the daily max. 1-hour values	H2H	-	H2H	-	H1H

Table App.2 – Modeled Form of PSD Increment by Averaging Periods

Pollutant	1-hour	3-hour	24-hour	Annual
NO ₂	-	-	-	H1H
PM ₁₀	-	-	H2H	H1H
PM _{2.5}	-	-	H2H*	H1H
SO ₂	-	H2H	H2H	H1H

Criteria pollutants modeled for SIL analyses should be modeled as H1H's.

Helpful Webpages, Documents/Guidance, and Modeling Tips

Please consult the following webpages and documents for the most current modeling guidance and recommendations when filling out this form:

- U.S. EPA's Support Center for Regulatory Atmospheric Modeling: <http://www.epa.gov/scram001/>
Please check the SCRAM webpage regularly for the most recent updates to guidance, models, and standards; especially, for modeling guidance related to: 24-hour PM_{2.5}, 1-hour NO₂, and 1-hour SO₂ NAAQS.
- U.S. EPA's 40 CFR Part 51 Appendix W: http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf
- U.S. EPA's AERMOD Implementation Guide: http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_implmtn_guide_19March2009.pdf
- U.S. EPA's AirData: <http://www.epa.gov/air/data/index.html>
- MPCA's Air Dispersion Modeling: <http://www.pca.state.mn.us/nwqh421>
- MPCA's Ambient Air Monitoring Network Plan: <http://www.pca.state.mn.us/mvri439>
- MPCA's Environmental Review: <http://www.pca.state.mn.us/xgqx692>
- USGS' National Map Seamless Viewer (NED data): <http://seamless.usgs.gov/website/seamless/viewer.htm>

For questions on this form, or data requests from MPCA air dispersion modeling staff, please send an e-mail to: AirModeling.PCA@state.mn.us. Please be sure to include with your questions or requests: the form ID (ADQMP-01), facility name and permit #, and contact information.

Questions can also be asked by calling one of the MPCA's air dispersion modeler's (phone numbers are listed on the MPCA's Air Dispersion Modeling webpage, link above).

Tip: Please be sure to use UTM Coordinates, NAD83, Zone 15 Extended for all locational data. Zone 14 will not be acceptable. This is to keep consistency between coordinates of all Minnesota sources.

Tip: For NAAQS modeling, please include the following source groups:

- SO SRCGROUP ALL BACKGROUND
- SO SRCGROUP BKG BACKGROUND
- SO SRCGROUP FAR 1-99999999
- SO SRCGROUP FAC [FAC sources]

Under-Development by MPCA Staff:

Procedures and data involving the following subject areas are under-development and therefore, MPCA air dispersion modeling staff should be contacted (via the email address above) to discuss data files, methods, and/or procedures for:

- Standardized Mobile Source (SMS) Spreadsheet
- Background concentration data
- Nearby sources
- Pre-processed AERMET meteorological data files
- Ozone data generated for Tier 3 NO₂ modeling

Acronyms

µg/m ³	Micrograms per cubic meter	NAAQS	National Ambient Air Quality Standard
AERMAP	AERMOD Terrain Preprocessor	NAD	North American Datum of 1983
AERMET	AERMOD Meteorological Preprocessor	NED	National Elevation Dataset
AERMINUTE	AERMOD 1-Minute ASOS Wind Data Processor	NO ₂	Nitrogen Dioxide
AERMOD	AMS/EPA Regulatory Model	NWS	National Weather Service
AERSURFACE	AERMOD Surface Characteristic Tool	OLM	Ozone Limiting Method
AQ	Air Quality	Pb	Lead
AQDMP-01	Air Quality Dispersion Modeling Protocol form	PM ₁₀	Particulate Matter less than 10 µm in size
AQDMPS-01	Air Quality Dispersion Modeling Protocol Spreadsheet	PM _{2.5}	Particulate Matter less than 2.5 µm in size
BIPI-PRIME	Building Profile Input Program for PRIME	POINTCAP	Capped-release point source (AERMOD beta, non-default)
CO	Carbon Monoxide	POINTHOR	Horizontal-release point source (AERMOD beta, non-default)
DEM	Digital Elevation Model	PPB	Parts Per Billion
EAW	Environmental Assessment Worksheet	PPM	Parts Per Million
EIS	Environmental Impact Statement	PRIME	Plume Rise Model Enhancements
EPA	U.S. Environmental Protection Agency	PSD	Prevention of Significant Deterioration Program
FAC	3-letter facility ID	PVMRM	Plume Volume Molar Ratio Method
FAR	First-Approximation Representative	SCRAM	Support Center for Regulatory Atmospheric Modeling
H1H	High-first-high value	SIL	Significant Impact Level
H2H	High-second-high value	SO ₂	Sulfur Dioxide
H6H	High-sixth-high value	SIP	State Implementation Plan
H ₂ S	Hydrogen Sulfide	SMS	Standardized Mobile Source
km	Kilometer	UG/M3	Micrograms per cubic meter (µg/m ³)
LULC	Land Use Land Cover	UTM	Universal Transverse Mercator
MAAQS	Minnesota State Ambient Air Quality Standard		
MPCA	Minnesota Pollution Control Agency		