|  |  |
| --- | --- |
| Minnesota Pollution Control Agency (MPCA), 520 Lafayette Road North, St. Paul, MN 55155-4194 | AQDM-06  Air Quality Dispersion Modeling (AQDM) report form  *Doc Type: Air Dispersion Modeling* |

## **Acronym list on page 7.**

**Instructions for permit applicants:** For air dispersion modeling conducted to support a permit amendment, a copy of the completed Air Quality Dispersion Modeling report form (AQDM-06) and all accompanying electronic files must be included in each required copy of the permit application. Follow the instructions for submitting the permit application located at <https://www.pca.state.mn.us/business-with-us/air-permit-application-forms>.

**Instructions for other modeling submittals:** For air dispersion modeling conducted for a permit or compliance requirement or special project that doesn’t require a permit amendment, submit a “pdf” copy of the Air Quality Dispersion Modeling report form (AQDM-06) and accompanying modeling files on electronic media, such as a compact disc (CD) or USB drive, to:

Air Quality Permit Document Coordinator

Minnesota Pollution Control Agency

520 Lafayette Road North

St. Paul, MN 55155-4194

Is this Modeling Report in support of a Permit Application:  Yes  No

Facility information

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tempo AI ID number: | | | |  | | | | AQ facility/permit ID number: | | | | |  | | | | | Today’s date: | | | |  | | | |
|  | | | | | | | | | | | | | | | | | | | | | | *(mm/dd/yyyy)* | | | |
| Facility name: | |  | | | | | | | | | | | | | | | | | | | | | | | |
| Facility street address: | | | | | |  | | | | | | | | | | | | | | | | | | | |
| City: |  | | | | | | | | County: | |  | | | | Zip code: | | | | |  | | | State: | | MN |
| Facility contact: | | |  | | | | | | | | | Report prepared by: | | | | |  | | | | | | | | |
| Facility contact phone: | | | | |  | | | | | | | Preparer phone: | | | |  | | | | | | | | | |
| Facility contact email address: | | | | | | |  | | | | | Preparer email address: | | | | | | |  | | | | | | |
| \*UTM coordinates of facility (NAD83, zone 15 extended **only**): | | | | | | | | | | x = | | | | m East, | | | | | | | y = | | | m North | |
| *\*This should be the central location of the facility/source.* | | | | | | | | | | | | | | | | | | | | | | | | | |

**These results are associated with** (check all that apply):

|  |  |
| --- | --- |
|  | AERA or Dispersion/Deposition modeling for air toxics |
|  | Environmental assessment worksheet |
|  | Environmental impact statement |
|  | Modeling information request |
|  | Modeling Impacts from animal feedlots |
|  | Siting an air monitoring station |
|  | Siting a meteorological station |
|  | Permit condition |
|  | Permit modification |
|  | Prevention of significant deterioration |
|  | Screening modeling |
|  | Special project |
|  | State implementation plan |

Project description

|  |
| --- |
|  |

Files to accompany modeling results

Use the checkboxes to indicate the files that are included with the modeling report.

|  |  |
| --- | --- |
| 1. | AERMOD files:  SIA input (\*.inp, \*.adi, \*.ami)  SIA output (\*.out, \*.ado, \*.amo)  SIA plot (\*.plt)  SIA post (\*.pst)  CIA input (\*.inp, \*.adi, \*.ami)  CIA output (\*.out, \*.ado, \*.amo)  CIA plot (\*.plt)  CIA post (\*.pst)  CIA culpability (MAXDCONT) (\*.dat, \*.txt)  Other (\*.emi, \*evi, etc.) |
| 2. | AERMET files:  Surface (\*.sfc)  Profile (\*.pfl) |
| 3. | BPIP-PRIME files:  Input (\*.bpi, \*.pip)  Output (\*.bpo)  Summary (\*.sum) |
| 4. | AERMAP files:  Terrain (\*.tif)  Input (\*.inp, \*.ami)  Output (\*.out)  Receptor (\*.rou)  Source (\*.sou) |
| 5. | Background data files:  Background concentrations and supporting calculations (annual, seasonal, monthly, etc.)  Supporting ambient monitoring data |
| 6. | Modeling results figures:  Figures (\*.jpeg, \*.pdf)  GIS maps (\*.shp) |
| 7. | AQDM-02 spreadsheet: *(Indicate/highlight changes from approved protocol.)* |
| 8. | Source impact analysis results (AQDM-11) |
| 9. | Hourly O3 file |
| 10. | General Public Preclusion Plan (GPPP) |
| 11. | AERA forms |
| 12. | Other files and supporting documents: |
|  |  |

Section 1. Modeling protocol

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | This AQDM report is based on a protocol that has been: | | |
|  | Approved  Conditionally approved \*MPCA approval date (mm/dd/yyyy): | |  |
|  |  | *\*This is the date given on AQDM-04 form* | |
| 2. | Does this modeling submittal **completely** follow the approved protocol?  Yes  No | | |
|  | If yes, proceed to Section 3.  If no, proceed to Section 2. | | |

Section 2. Changes to approved/conditionally approved modeling protocol

**Table 1: Protocol changes** (Please indicate which sections in the approved/conditionally approved protocol have been changed.)

|  |  |
| --- | --- |
| **Modeling protocol by sections** | |
| **Section name** | **Change/No change** |
| Modeling purpose |  |
| Terrain |  |
| Buildings |  |
| Model selection and options |  |
| Point sources |  |
| Volume sources |  |
| Area sources |  |
| Area source coordinates |  |
| Receptors |  |
| Meteorological data |  |
| Source impact analysis |  |
| Background values |  |
| Nearby sources |  |
| Pollutant based considerations |  |
| Attachments |  |
| AERA forms |  |

Section 2.1: Detailed changes to modeling protocol

Please provide specific information corresponding to the sections in Table 1 where changes are indicated. If you consulted with the MPCA regarding these proposed changes, document the date of the consultation.

## **Modeling purpose**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Terrain**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Buildings**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Model selection and options**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Point sources**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Volume sources**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Area sources**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Area source coordinates**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Receptors**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Meteorological data**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Source impact analysis**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Background values**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Nearby sources**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Pollutant-based considerations**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **Attachments**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

## **AERA forms**

|  |  |  |
| --- | --- | --- |
| MPCA consultation:  Yes  No Date (mm/dd/yyyy): |  |  |
| Describe changes: | | |

Section 3. Modeling results

**Table 2: Pollutants and averaging periods** (Check all the boxes for each pollutant and averaging period(s) modeled.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pollutant** | **Averaging period** | **Source Impact Analysis** | **Cumulative Impact Analysis** | | **Increment** |
| **NAAQS** | **MAAQS** |
| **CO** | 1-hr |  |  |  |  |
| 8-hr |  |  |  |  |
| **Lead** | Rolling 3 mo. Avg | - |  |  |  |
| **NO2** | 1-hr |  |  |  | - |
| Annual |  |  |  |  |
| **SO2** | 1-hr |  |  |  | - |
| 3-hr |  |  |  |  |
| 24-hr |  | - |  |  |
| Annual |  | - |  |  |
| **PM10** | 24-hr |  |  |  |  |
| Annual |  | - | - |  |
| **PM2.5** | 24-hr |  |  |  |  |
| Annual |  |  |  |  |
| **Ozone** | 8-hr |  |  |  | - |

**Table 3: SIA modeling results** (Provide the SIA results along with the percent of the SIL.)

| **Pollutant** | **Averaging period** | **SIL**  **(ug/m3)** | **Total modeled concentration (H1H)**  **(ug/m3)** | **Percent of SIL**  **(%)** |
| --- | --- | --- | --- | --- |
| **NO2** | 1-hr | 7.52 |  |  |
| Annual | 1 |  |  |
| **SO2** | 1-hr | 7.86 |  |  |
| 3-hr | 25 |  |  |
| 24-hr | 5 |  |  |
| Annual | 1 |  |  |
| **PM10** | 24-hr | 5 |  |  |
| Annual | 1 |  |  |
| **PM2.5** | 24-hr | 1.2 |  |  |
| Annual | 0.3 |  |  |
| **CO** | 1-hr | 2000 |  |  |
| 8-hr | 500 |  |  |
| **Ozone** | 8-hr | 1 ppb | ppb |  |

**Table 4: CIA modeling results** (Enter modeling results along with the percent of standard.)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Pollutant** | **Averaging period** | **NAAQS**  **(ug/m3)** | **MAAQS**  **(ug/m3)** | **Total modeled concentration (includes background and nearby sources)**  **(ug/m3)** | **Percent of standard (%)** | |
| **NAAQS** | **MAAQS** |
| **CO** | 1-hr | 40,071.5 | 40,071.5 |  |  |  |
| 8-hr | 10,304.1 | 10,304.1 |  |  |  |
| **Lead** | Rolling 3 mo. Avg | 0.15 | 0.15 |  |  |  |
| **NO2** | 1-hr | 188.0 | 188.0 |  |  |  |
| Annual | 99.7 | 99.7 |  |  |  |
| **SO2** | 1-hr | 196.4 | 196.4 |  |  |  |
| 3-hr | 1309.3 | 1309.3 |  |  |  |
| 24-hr | 366.6 | 366.6 |  |  |  |
| Annual | 78.6 | 78.6 |  |  |  |
| **PM10** | 24-hr | 150.0 | 150.0 |  |  |  |
| **PM2.5** | 24-hr | 35.0 | 35.0 |  |  |  |
| Annual | 9.0 | 12.0 |  |  |  |
| **Ozone** | 8-hr | 137.3  (70 ppb) | 137 |  |  |  |

**Table 5: Increment modeling results** (Provide the increment modeling results along with the percent of increment.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pollutant** | **Averaging period** | **Class II increment**  **(ug/m3)** | **Total modeled concentration**  **(includes other increment sources)**  **(ug/m3)** | **Percent of increment**  **(%)** |
| **NO2** | 1-hr | **-** | **-** | **-** |
| Annual | 25 |  |  |
| **SO2** | 1-hr | **-** | **-** | **-** |
| 3-hr | 512 |  |  |
| 24-hr | 91 |  |  |
| Annual | 20 |  |  |
| **PM10** | 24-hr | 30 |  |  |
| Annual | 17 |  |  |
| **PM2.5** | 24-hr | 9 |  |  |
| Annual | 4 |  |  |

**Table 6: Culpability analysis results** (If results in Table 4 show a modeled exceedance of the NAAQS/MAAQS, document the results of the culpability analysis here.)

| **Pollutant** | **Averaging period** | **Exceedance** | | **Facility Contribution** | **Nearby Source(s) Contribution** |
| --- | --- | --- | --- | --- | --- |
| **NAAQS** | **MAAQS** |
| **CO** | 1-hr |  |  |  |  |
| 8-hr |  |  |  |  |
| **Lead** | Rolling 3 mo. Avg |  |  |  |  |
| **NO2** | 1-hr |  |  |  |  |
| Annual |  |  |  |  |
| **SO2** | 1-hr |  |  |  |  |
| 3-hr |  |  |  |  |
| 24-hr | - |  |  |  |
| Annual | - |  |  |  |
| **PM10** | 24-hr |  |  |  |  |
| **PM2.5** | 24-hr |  |  |  |  |
| Annual |  |  |  |  |

Section 4. Discussion

Enter any discussion, comments, or relevant findings from the modeling demonstration results provided above. Please note that this document is the administrative record for the modeling demonstration. No other forms or reports should be used to convey the final modeling demonstration results without prior written permission from the MPCA Risk Evaluation and Air Modeling Unit. Attachments may be provided to supplement the Report as needed.

Section 5. Modeling results figures/maps

Insert a figure or map showing the facility emission sources, receptors, and the location of the modeled maximum concentration(s) for each applicable pollutant, corresponding averaging periods, and operating scenarios.

[Paste here]

**Acronyms**

|  |  |
| --- | --- |
| AERA | Air Emissions Risk Analysis |
| AERMAP | AERMOD Terrain Preprocessor |
| AERMET | AERMOD Meteorological Preprocessor |
| AERMOD | AMS/EPA Regulatory Model |
| AI | Agency Interest |
| AQ | Air Quality |
| AQDM | Air Quality Dispersion Modeling |
| BPIP-PRIME | Building Profile Input Program for PRIME |
| CIA | Cumulative Impact Analysis |
| CO | Carbon Monoxide |
| EPA | U.S. Environmental Protection Agency |
| MAAQS | Minnesota State Ambient Air Quality Standard |
| MPCA | Minnesota Pollution Control Agency |
| NAAQS | National Ambient Air Quality Standard |
| NO2 | Nitrogen Dioxide |
| Pb | Lead |
| PM10 | Particulate matter less than 10 µm in diameter |
| PM2.5 | Particulate matter less than 2.5 µm in diameter |
| ppb | Parts per billion |
| PRIME | Plume Rise Model Enhancements |
| PSD | Prevention of Significant Deterioration Program |
| REAM | Risk Evaluation and Air Modeling |
| SIA | Source Impact Analysis |
| SIL | Significant Impact Level |
| SO2 | Sulfur Dioxide |
| SIP | State Implementation Plan |
| μg/m3 | Micrograms per cubic meter |
| UTM | Universal Transverse Mercator |