Completing Quantitative PM Hot-spot Analyses: 3-Day Course Handout Packet

Revised January 30, 2018

Completing Quantitative PM Hot-spot Analyses: 3-Day Course Agenda

Day 1	
8:00a – 8:30a	Course Introduction/Logistics
8:30a – 9:45a	Module 1: General Requirements and Analysis Overview
9:45a – 10:00a	Break
10:00a – 12:00p	Module 2: Using MOVES at the Project Level
12:00p – 1:00p	Lunch Break
1:00p – 3:00p	Module 2: Using MOVES at the Project Level (cont'd) (Including mini-MOVES run)
3:00p – 3:15p	Break
3:15p – 5:00p	Module 2: Using MOVES in the Example Analysis
Day 2	
8:00a – 9:45a	Module 3: Selecting an Air Quality Model, Data Inputs, and Receptors
9:45a – 10:00a	Break
10:00a – 12:00p	Module 4: Using AERMOD for PM Hot-Spot Analyses
12:00p – 1:00p	Lunch Break
1:00p – 3:00p	Module 4: Using AERMOD for PM Hot-Spot Analyses (cont'd) (Including mini-AERMOD run)
3:00p – 3:15p	Break
3:15p – 5:00p	Module 4: Using AERMOD in the Example Analysis
Day 3	
8:00a – 9:10a	Module 6: Determining Background Concentrations
9:10a – 10:00a	Module 7: Calculating Design Values (DVs) and Determining Conformity
10:00a – 10:15a	Break
10:15a – 11:00a	Module 7: Calculating Design Values and Determining Conformity (cont'd) (Including DV calculations for Example Analysis)
11:00a – 12:00p	Course Wrap Up and Questions

Revised April 13, 2018

Completing Quantitative PM Hot-spot Analyses: 3-Day Course
Acronym List

AADT	annual average daily traffic
ADT	average daily traffic
AERMOD	American Meteorological Society/EPA Regulatory MODel
AQ	air quality
AVFT	Alternative Vehicle Fuels and Technologies (a MOVES panel)
CAA	Clean Air Act
CFR	Code of Federal Regulations
CNG	compressed natural gas
CO	carbon monoxide
CTM	chemical transport model
DOT	U.S. Department of Transportation
DV	design value
EF	emission factor
EMFAC	EMission FACtors model (California)
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HCM	Highway Capacity Manual
HD	heavy duty
HOV	high-occupancy vehicle
HPMS	Highway Performance Monitoring System
I/M	inspection and maintenance
LD	light duty
LDV	light duty vehicle
LOS	level of service
MATS	Modeled Attainment Test Software (EPA)
MOVES	MOtor Vehicle Emission Simulator
MPO	metropolitan planning organization
NAAQS	National Ambient Air Quality Standard(s)
NEPA	National Environmental Policy Act
NWS	National Weather Service
OAQPS	Office of Air Quality Planning and Standards (EPA)
OTAQ	Office of Transportation and Air Quality (EPA)
PDM	Project Data Manager (a MOVES function)
PM	particulate matter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
RFS	Renewable Fuel Standard
RVP	Reid Vapor Pressure
SCRAM	Support Center for Regulatory Atmospheric Modeling (EPA)
SIP	state (air quality) implementation plan
TMIP	Travel Model Improvement Program
V/C ratio	volume/capacity ratio
VHT	vehicle hours traveled
VPH	vehicles per hour
VMT	vehicle miles traveled
VSP	vehicle specific power

What year or years might be analyzed in a hot-spot analysis?

Assumptions for Exercises

- All three cases are projects of local air quality concern
- Cases are illustrative only
- Cases do not include additional information about the project or interagency consultation that would be used in an actual PM hot-spot analysis

Guidance Recap (Guidance reference: Section 2.8)

Need to choose an analysis year or years within the transportation plan during when:

- Peak emissions from the project are expected
- A new or worsened violation would most likely occur due to cumulative impacts of project and background concentrations

Need to consider the following future factors:

- Changes in vehicle fleets
- Changes in traffic volumes, speeds, and VMT
- Expected trends in background concentrations in the project area and the impacts of any nearby sources (e.g., those affected by the project)

Case 1: New Interchange

- A new interchange connecting a 4-lane principle arterial with a 6-lane freeway through entrance/exit ramps to provide truck access to local warehouses and other business
- Project will be completed October 2022
- Distribution centers and warehouses will be locating on the arterial and in place by 2023
- Air quality in the area has been improving
- No nearby sources need to be included in air quality modeling

What factors influence the analysis year(s)?

What are potential analysis year(s)?

Case 2: Highway Expansion

- An existing 4-lane arterial (2 lanes in each direction) is to be expanded to 8 lanes (4 each direction) from its end point at a shipping port to an interstate a few miles away
- Purpose is to accommodate a 50% increase in truck round trips to the port projected to result from increased future activity at the port
- Project will be completed October 2020
- Port authority's financial forecasts show the port's volume will continue to rise until the 4th quarter of 2025
- Truck traffic anticipated to rise to keep pace with increasing port activity

What factors influence the analysis year(s)?

What are potential analysis year(s)?

Case 3: New Bus Terminal

- A new bus terminal is planned that will be approved now and built in two phases:
- Phase I will be completed September 2022 and will comprise the terminal building and be able to accommodate 50 buses at one time
- Phase II will be completed in June 2024 and include another 50 bus bays
- Terminal will operate from 6 am to 10 pm and will generate 2 bus trips per hour per bay
- Transit operator will initially operate terminal with existing diesel buses
- Has committed to replace diesels with CNG buses beginning 2024 – Will replace 10 per year
- Area missed its 2016 attainment date; has been given extension to 2021

What factors influence the analysis year(s)?

What are potential analysis year(s)?

Introduction to MYSQL Workbench Syntax

A Tip Sheet for MOVES Users

Syntax	Function	Example
SELECT	Selects one or more data fields, separated by commas. A "*" following the SELECT command indicates "all fields"	SELECT sourceTypeID, activity
SUM	Adds up the data in the field indicated in parentheses and creates a new field for the results (note required spacing)	SUM(activity)
AS	Used with the SUM command to name the new field containing the results of the SUM command (optional).	AS grams
FROM	Indicates the database and table the SELECT command is pulling from. Database and table must be separated by period.	FROM co_2015_out.movesoutput
WHERE	Used to specify the value(s) of the field to be selected.	WHERE sourceTypeID=21
AND	Used to specify more than one field when using the WHERE command.	WHERE sourceTypeID=21 AND dayID=2
GROUP BY	Groups data together by the field indicated.	GROUP BY movesRunID
ORDER BY	Specifies the order of data presented in the field(s) following the command (e.g., will rank data high to low).	ORDER BY pollutantID

Tips:

- Syntax must be used in the order given above. Not all commands are needed to complete a query.
- To identify the table to be queried from, the syntax is database name followed by "." and the table name.
- Commas must be used to separate multiple fields following a command
- AS command is useful to name a new fields created with the SUM command
- When using a SUM command, all fields that were selected that are not summed should be included in the GROUP BY command
- See the MOVES User Guide for more details

Examples of Simple Queries:

```
SELECT * FROM lake_2015_training_out.movesactivityoutput;
```

Selects data from all field columns from the movesactivityoutput table of the Lake_2015_training_out database.

```
SELECT *, SUM(emissionQuant) FROM lake_2015_training_out.movesoutput
GROUP BY movesRunID;
```

Selects all field columns from the movesoutput table and adds up the emissionQuant field across all source types, pollutant types, etc. Groups the results by movesRunID. ***The non-grouped and non-summed fields here are not useful, so this is an example of a poorly structured query.***

```
SELECT movesRunID, SUM(emissionquant) FROM lake_2015_training_out.movesoutput
GROUP BY movesRunID;
```

Same as above, but only selects the useful columns (movesRunID and summed emissionQuant) instead of all data.

```
SELECT movesRunID, SUM(emissionQuant) FROM lake_2015_training_out.movesoutput
WHERE pollutantID=1
GROUP BY movesRunID;
```

Same result as above, but only adds up emissions quantity for pollutantID 1 (total gaseous hydrocarbons)

```
SELECT movesRunID, pollutantID, processID, SUM(emissionQuant) AS grams
FROM lake_2015_training_out.movesoutput
WHERE pollutantID=1
GROUP BY movesRunID, pollutantID, processID
ORDER BY movesRunID;
```

Sums the emissions quantity in a new field named "grams" for pollutantID 1 and groups the results by movesRunID, pollutantID, and processID. This will produce rows for each process selected in each run and orders query results by movesRunID (all run 1 results will be listed in a row before run 2 results, etc.)

MOVES Decoder 20150319

Source Type - sourcetypeid

ID	sourcetypename
11	Motorcycle
21	Passenger Car
31	Passenger Truck
32	Light Commercial Truck
41	Intercity Bus
42	Transit Bus
43	School Bus
51	Refuse Truck
52	Single Unit Short-haul Truck
53	Single Unit Long-haul Truck
54	Motor Home
61	Combination Short-haul Truck
62	Combination Long-haul Truck

Road Type - roadtypeid

ID	roaddesc
1	Off-Network
2	Rural Restricted
3	Rural Unrestricted
4	Urban Restricted
5	Urban Unrestricted
6	Rural Restricted w/o ramps
7	Urban Restricted w/o ramps
8	Rural Restricted Ramps
9	Urban Restricted Ramps

Process - processid

ID	processName
1	Running Exhaust
2	Start Exhaust
9	Brakewear
10	Tirewear
11	Evap Permeation
12	Evap Fuel Vapor Venting
13	Evap Fuel Leaks
15	Crankcase Running Exhaust
16	Crankcase Start Exhaust
17	Crankcase Extended Idle Exhaust
18	Refueling Displacement Vapor Loss
19	Refueling Spillage Loss
90	Extended Idle Exhaust
91	Auxiliary Power Exhaust
99	Well-to-Pump

Activity - activityTypeID

ID	Activity Description
1	Distance traveled
2	Source Hours
3	Extended Idle Hours
4	Source Hours Operating
5	Source Hours Parked
6	Population
7	Starts
9	Average Horsepower
10	Fraction Retrofitted
11	Number Units Retrofitted
12	Load Factor
13	Hotelling Diesel Aux
14	Hotelling Battery or AC
15	Hotelling All Engines Off

Fuel Type - fuelTypeID

ID	regClassName
1	gas
2	diesel
3	CNG
4	LPG
5	E-85
9	electricity

Operating Mode - OpMode ID

101	Soak Time <6 minutes
102	6 minutes <= Soak Time < 30 minutes
103	30 minutes <= Soak Time < 60 minutes
104	60 minutes <= Soak Time < 90 minutes
105	90 minutes <= Soak Time < 120 minutes
106	120 minutes <= Soak Time < 360 minutes
107	360 minutes <= Soak Time < 720 minutes
108	720 minutes <= Soak Time
200	Extended Idling
201	Auxilary Power Units Use
203	Battery Power
204	Engine Off

Day - dayID

ID	dayName
2	Weekend
5	Weekdays

Regulatory Class - regClassID

ID	regClassName	regClassDesc
0	Doesn't Matter	Doesn't Matter
10	MC	Motorcycles
20	LDV	Light Duty Vehicles
30	LDT	Light Duty Trucks
40	LHD <= 10K	Class 2b Trucks w/ 2 Axles & 4 Tires (8,500 lbs < GVWR <= 10,000 lbs)
41	LHD<=14k	Class 2b Trucks w/ 2 Axles & at least 6 Tires or Class 3 Trucks (8,500 lbs < GVWR <= 14,000 lb
42	LHD45	Light Heavy Duty (14K lbs < GVWR <= 19.5K lbs)
46	MHD	Medium Heavy Duty (19.5K lbs < GVWR < =33K lbs)
47	HHD	Heavy Heavy Duty (GVWR > 33K lbs)
48	Urban Bus	Urban Bus (see CFR Sec. 86.091_2)

Pollutant - pollutantid

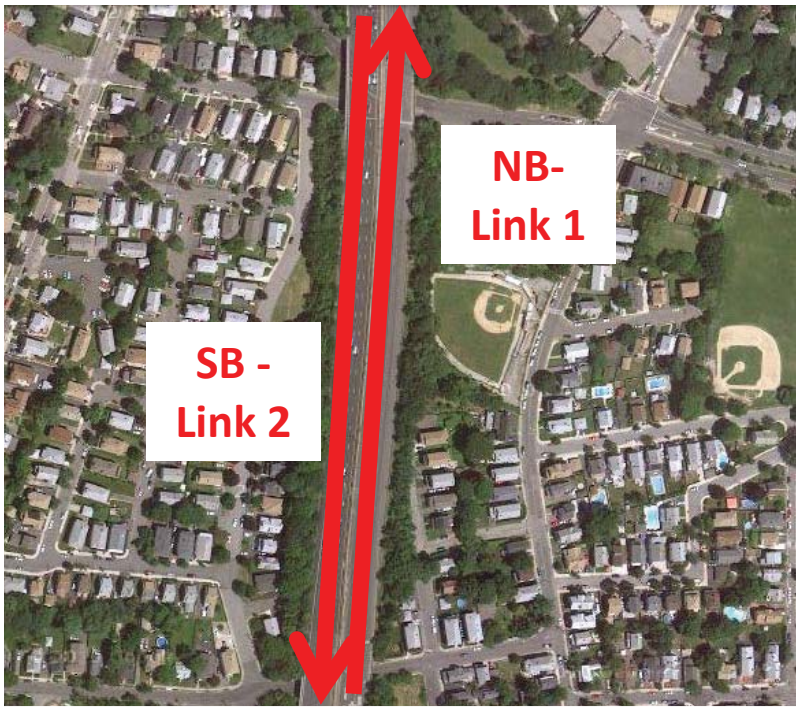
ID	pollutantname	ID	pollutantname
1	Total Gaseous Hydrocarbons	79	Non-Methane Hydrocarbons
2	Carbon Monoxide (CO)	80	Non-Methane Organic Gases
3	Oxides of Nitrogen (NOx)		
5	Methane (CH4)	81	Fluorene particle
6	Nitrous Oxide (N2O)	82	Indeno(1,2,3,c,d)pyrene particle
		83	Phenanthrene particle
20	Benzene	84	Pyrene particle
21	Ethanol		
22	MTBE	86	Total Organic Gases
23	Naphthalene particle	87	Volatile Organic Compounds
24	1,3-Butadiene	88	NonHAPTOG
25	Formaldehyde		
26	Acetaldehyde	90	Atmospheric CO2
27	Acrolein	91	Total Energy Consumption
		92	Petroleum Energy Consumption
30	Ammonia (NH3)	93	Fossil Fuel Energy Consumption
31	Sulfur Dioxide (SO2)	98	CO2 Equivalent
32	Nitrogen Oxide (NO)	99	Brake Specific Fuel Consumption (BSFC)
33	Nitrogen Dioxide (NO2)		
34	Nitrous Acid (HONO)	100	Primary Exhaust PM10 - Total
35	Nitrate (NO3)	106	Primary PM10 - Brakewear Particulate
36	Ammonium (NH4)	107	Primary PM10 - Tirewear Particulate
		110	Primary Exhaust PM2.5 - Total
40	2,2,4-Trimethylpentane	111	Organic Carbon
41	Ethyl Benzene	112	Elemental Carbon
42	Hexane	115	Sulfate Particulate
43	Propionaldehyde	116	Primary PM2.5 - Brakewear Particulate
44	Styrene	117	Primary PM2.5 - Tirewear Particulate
45	Toluene	118	Composite - NonECPM
46	Xylene	119	H2O (aerosol)
		120	Primary PM2.5 - NonECNonSO4PM
51	Chloride	121	CMAQ5.0 Unspeciated (PMOTHR)
52	Sodium	122	Non-carbon Organic Matter (NCOM)
53	Potassium		
54	Magnesium	168	Dibenzo(a,h)anthracene gas
55	Calcium	169	Fluoranthene gas
56	Titanium	170	Acenaphthene gas
57	Silicon	171	Acenaphthylene gas
58	Aluminum	172	Anthracene gas
59	Iron	173	Benz(a)anthracene gas
60	Mercury Elemental Gaseous	174	Benzo(a)pyrene gas
61	Mercury Divalent Gaseous	175	Benzo(b)fluoranthene gas
62	Mercury Particulate	176	Benzo(g,h,i)perylene gas
63	Arsenic Compounds	177	Benzo(k)fluoranthene gas
65	Chromium 6+	178	Chrysene gas
66	Manganese Compounds		
67	Nickel Compounds	181	Fluorene gas
68	Dibenzo(a,h)anthracene particle	182	Indeno(1,2,3,c,d)pyrene gas
69	Fluoranthene particle	183	Phenanthrene gas
70	Acenaphthene particle	184	Pyrene gas
71	Acenaphthylene particle	185	Naphthalene gas
72	Anthracene particle		
73	Benz(a)anthracene particle		
74	Benzo(a)pyrene particle		
75	Benzo(b)fluoranthene particle		
76	Benzo(g,h,i)perylene particle		
77	Benzo(k)fluoranthene particle		
78	Chrysene particle		

MOVES
Motor Vehicle Emission Simulator

Completing Quantitative PM Hot-spot Analyses Course
MOVES Mini-Run Information

A Simple, Hypothetical PM_{10} MOVES Highway-only Analysis

Project consists of a two-lane highway in Washtenaw County, Michigan
Analysis period is July 2016, and the hour to be modeled is 12 a.m.- 1 a.m.



Two links, both with 0° grade:

- Northbound – Link 1
  - 1.25 miles in length
  - 765 vehicles in analysis hour
  - 62.5 mph average speed
  - 95% gasoline passenger cars, 5% diesel combination long-haul trucks
- Southbound – Link 2
  - 1.25 miles in length
  - 690 vehicles in analysis hour
  - 61.0 mph average speed
  - 95% gasoline passenger cars, 5% diesel combination long-haul trucks

- Road type is urban restricted.
- Only gasoline passenger cars and diesel combination long-haul trucks travel on this highway at this hour.
- Half of the cars and half of the trucks are less than one year old; the other half of the cars and trucks are between one and two years old.
- Average temperature for this hour is 78°F, relative humidity is 65%

Quick reference for AERMOD – Version 18081

SUMMARY OF CONTROL PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters
TITLEONE	Title1
TITLETWO	Title2
MODELOPT	DFAULT ALPHA BETA CONC DEPOS DDEP and/or WDEP AREADPLT FLAT and/or ELEV NOSTD NOCHKD or WARNCHKD NOWARN SCREEN SCIM or OLM or ARM2 FASTALL or FASTAREA DRYDPLT or NODRYDPLT WETDPLT or NOWETDPLT NOURBTRAN VECTORWS PSDCREDIT
AVERTIME	Time1 Time2 . . . TimeN MONTH PERIOD or ANNUAL
URBANOPT	UrbanID Urbpop (Urbname) (UrbRoughness) [For multiple urban areas] or Urbpop (Urbname) (UrbRoughness) [For single urban areas]
POLLUTID	Pollut (H1H or H2H or INC)
HALFLIFE	Haflif
DCAYCOEF	Decay
GASDEPDF	React F_Seas2 F_Seas5 (Refpoll)
GASDEPVD	Uservd
GDLANUSE	Sec1 Sec2 ... Sec36
GDSEASON	Jan Feb ... Dec
LOW_WIND	SVmin (WSmin) or SVmin WSmin (FRANmax)
NO2EQUIL	NO2Equil
NO2STACK	NO2Ratio
ARMRATIO	ARM2_Min ARM2_Max [for ARM2 Option]
O3SECTOR	StartSect1 StartSect2 . . . StartSectN, where N is ≤ 6
OZONEFIL	O3FileName (O3Units) (O3Format) [without O3SECTORs] or SECTn O3FileName (O3Units) (O3Format) [with O3SECTORs]
OZONEVAL	O3Value (O3Units) [without O3SECTORs] or SECTn O3Value (O3Units) [with O3SECTOR]
O3VALUES	O3Flag O3values(i), i=1,n) [without O3SECTORs] or SECTn O3Flag O3values(i), i=1,n) [with O3SECTORs]
OZONUNIT	(OzoneUnits)
FLAGPOLE	(Flagdf)

Keyword	Parameters
RUNORNOT	RUN or NOT
EVENTFIL	(Evfile) (Evopt)
SAVEFILE	(Savfil) (Dayinc) (Savfl2)
INITFILE	(Inifil)
MULTYEAR	(H6H) Savfil (Inifil)
DEBUGOPT	MODEL (Dbgfil) and/or METEOR (Dbmfil) and/or PRIME (Prmfil) and/or DEPOS and/or [AREA (AreaDbFil) or LINE (LineDbFil)] and/or [PVMRM (Dbpvfil) or OLM (OLMfil) or ARM2 (ARM2fil)]
ERRORFIL	(Errfil)

SUMMARY OF SOURCE PATHWAY KEYWORDS AND PARAMETERS

Keyword	**Parameters**
ELEVUNIT	METERS or FEET
LOCATION	SrcID Srctyp Xs Ys (Zs) [All except LINE or BUOYLINE source] or (FLAT) [for 'FLAT & ELEV' option] SrcID Srctyp Xs1 Ys1 Xs2 Ys2 (Zs) [LINE or BUOYLINE source]
SRCPARAM	SrcID Ptemis Stkhgt Stktmp Stkvel Stkdia [POINT,POINTCAP, POINTHOR source] Vlemis Relhgt Syinit Szinit [VOLUME source] Aremis Relhgt Xinit (Yinit) (Angle) (Szinit) [AREA source] Aremis Relhgt Nverts (Szinit) [AREAPOLY source] Aremis Relhgt Radius (Nverts) (Szinit) [AREACIRC source] Opemis Relhgt Xinit Yinit Pitvol (Angle) [OPENPIT source] BLemis Relhgt [BUOYLINE source]
BLPINPUT	blavgblen blavgbhgt blavgbwid blavglwid blavgbsep blavgfprm
BUILDHGT	SrcID (or SrcRange) Dsbh(i), i=1,36
BUILDLEN	SrcID (or SrcRange) Dsbl(i), i=1,36
BUILDWID	SrcID (or SrcRange) Dsbw(i), i=1,36
XBADJ	SrcID (or SrcRange) Xbadj(i), i=1,36
YBADJ	SrcID (or SrcRange) Ybadj(i), i=1,36
AREAVERT	SrcID Xv(1) Yv(1) Xv(2) Yv(2) ... Xv(i) Yv(i)
URBANSRC	UrbanID SrcID's and/or SrcRng's [For multiple urban areas] or SrcID's and/or SrcRng's [For single urban areas]
EMISFACT	SrcID (or SrcRange) Qflag Qfact(i), i=1,n
EMISUNIT	Emifac Emilbl Outlbl
CONCUNIT	Emifac Emilbl Conlbl
DEPOUNIT	Emifac Emilbl Deplbl
PARTDIAM	SrcID (or SrcRange) Pdiam(i), i=1,Npd
MASSFRAX	SrcID (or SrcRange) Phi(i), i=1,Npd
PARTDENS	SrcID (or SrcRange) Pdens(i), i=1,Npd
METHOD_2	SrcID (or SrcRange) FineMassFraction Dmm
GASDEPOS	SrcID (or SrcRange) Da Dw rcl Henry
NO2RATIO	SrcID (or SrcRange) NO2Ratio
HOUREMIS	Emifil SrcID's SrcRange's
BGSECTOR	StartSect1 StartSect2 . . . StartSectN, where N is ≤ 6
BACKGRND	BGflag BGvalue(i), i=1,n and/or [without BGSECTORs] HOURLY BGfilnam (BGformat) or SECTn BGflag BGvalue(i), i=1,n and/or [with BGSECTORs] SECTn HOURLY BGfilnam (BGformat)
BACKUNIT	BGunits
INCLUDED	Incfil
OLMGROUP	OLMGrpID SrcID's SrcRange's
PSDGROUP	PSDGrpID SrcID's SrcRange's

Keyword	Parameters
SRCGROUP	SrcGrpID SrcID's SrcRange's

SUMMARY OF RECEPTOR PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters
ELEVUNIT	METERS or FEET
GRIDCART	Netid STA XYINC Xinit Xnum Xdelta Yinit Ynum Ydelta, or XPNTS Gridx1 Gridx2 Gridx3 .... GridxN, and YPNTS Gridy1 Gridy2 Gridy3 .... GridyN ELEV Row Zelev1 Zelev2 Zelev3 ... ZelevN HILL Row Zhill1 Zhill2 Zhill3 ... ZhillN FLAG Row Zflag1 Zflag2 Zflag3 ... ZflagN END
GRIDPOLR	Netid STA ORIG Xinit Yinit, or ORIG Srcid DIST Ring1 Ring2 Ring3 ... RingN DDIR Dir1 Dir2 Dir3 ... DirN, or GDIR Dirnum Dirini Dirinc ELEV Dir Zelev1 Zelev2 Zelev3 ... ZelevN HILL Dir Zhill1 Zhill2 Zhill3 ... ZhillN FLAG Dir Zflag1 Zflag2 Zflag3 ... ZflagN END
DISCCART	Xcoord Ycoord (Zelev Zhill) (Zflag)
DISCPOLR	Srcid Dist Direct (Zelev Zhill) (Zflag)
EVALCART	Xcoord Ycoord Zelev Zhill Zflag Arcid (Name)
INCLUDED	RecIncFile

SUMMARY OF METEOROLOGY PATHWAY KEYWORDS AND PARAMETERS

Keyword	**Parameters**
SURFFILE	Sfcfil
PROFFILE	Profil
SURFDATA	Stanum Year (Name) (Xcoord Ycoord)
UAIRDATA	Stanum Year (Name) (Xcoord Ycoord)
SITEDATA	Stanum Year (Name) (Xcoord Ycoord)
PROFBASE	BaseElev (Units)
STARTEND	Strtyr Strtmn Strtdy (Strthr) Endyr Endmn Enddy (Endhr)
DAYRANGE	Range1 Range2 Range3 ... RangeN
SCIMBYHR	NRegStart NRegInt (SfcFilnam PflFilnam)
WDROTATE	Rotang
WINDCATS	Ws1 Ws2 Ws3 Ws4 Ws5

SUMMARY OF EVENT PATHWAY KEYWORDS AND PARAMETERS

Keyword	**Parameters**
EVENTPER	Evname Aveper Grpid Date
EVENTLOC	Evname XR= Xr YR= Yr (Zelev Zhill) (Zflag) or RNG= Rng DIR= Dir (Zelev Zhill) (Zflag)
INCLUDED	EventIncFile

Note: EVENT locations can be input as either discrete Cartesian receptors (XR=, YR=) or as discrete polar receptors (RNG=, DIR=). Events that are specified in the file generated by the AERMOD model (CO EVENTFIL card) are always given as discrete Cartesian coordinates. Discrete polar receptors are assumed to be relative to an origin of (0,0).

SUMMARY OF OUTPUT PATHWAY KEYWORDS AND PARAMETERS

Keyword	**Parameters**
RECTABLE	Aveper FIRST SECOND . . . SIXTH . . . TENTH and/or Aveper 1ST 2ND . . . 6TH . . . 10TH and/or Aveper 1 2 . . . 6 . . . 10 . . . *N* . . . 999
MAXTABLE	Aveper Maxnum
DAYTABLE	Avper1 Avper2 Avper3 . . .
MAXIFILE	Aveper GrpID Thresh Filnam (Funit)
POSTFILE	Aveper GrpID Format Filnam (Funit)
PLOTFILE	Aveper GrpID Hivalu Filnam (Funit) [Short Term values] Aveper GrpID Filnam (Funit) [PERIOD or ANNUAL averages]
TOXXFILE	Aveper Cutoff Filnam (Funit)
RANKFILE	Aveper Hinum Filnam (Funit)
EVALFILE	SrcID Filnam (Funit)
SEASONHR	GrpID FileName (FileUnit)
MAXDAILY	GrpID FileName (FileUnit)
MXDYBYYR	GrpID FileName (FileUnit)
MAXDCONT	GrpID UpperRank LowerRank FileName (FileUnit) or GrpID UpperRank THRESH ThreshValue FileName (FileUnit)
SUMMFILE	SummFileName
FILEFORM	EXP or FIX
NOHEADER	FileType1 FileType2 FileType3 . . . FileType*N* or ALL
EVENTOUT	SOCONT or DETAIL [EVENT Only]

AERMOD Mini-Run: A Simple, Hypothetical PM_{10} Highway-only Analysis

CO: Control File Information

- Flat terrain is appropriate
- Concentrations are to be modeled
- Highway is located in an urban area, population 100,000

SO: Source Information

Link	Desc.	(Xs1,Ys1)	(Xs2,Ys2)	Rel Hgt (m)	Szinit	Link Length (m)	Link Width (m)	Area (m^2)
1	NB Highway	(-833.0, -284.8)	(600.8, 1097.0)	1.3	1.2	2000	3	6000
2	SB Highway	(-836.7, -288.0)	(597.1, 1106.4)	1.3	1.2	2000	3	6000

Link	Description	Area (m2)	Emission Rate (grams/hour), from MOVES Run 2	Emission Rate (grams/sec)	Emissions Rate (grams/sec/m^2)
1	NB Highway	6000	9.876065	0.002743351	**4.57225E-07**
2	SB Highway	6000	9.089002	0.002524723	**4.20787E-07**

RE: Receptor Information

- Copy discrete receptors from external file: "receptors.txt" in Mini-AERMOD folder, and paste them into the input file

ME: Meteorological Information

- Surface File: msn00.sfc
- Profile File: msn00.pfl
- Surface ID: 14837
- Surface year: 2000
- Upper Air Data ID: 00014898
- Upper Air Data year: 2000
- Base Elevation: 0 meters

OU: Output Information

- Define output as a RECTABLE
- 24 hour average
- 6th highest

Revised 1/08/2018