

APPENDIX G

SAMPLE CALPUFF CONTROL FILE

Burns & McDonnell - Domain 1 - 184x212, 1.5 km resolution
 with MM4 data and observations, 1990, BCKNH3=0.5ppb, size distribution for pm10
 Receptors in Hercules Glades W, Upper Buffalo W, Boiler

 Run title (3 lines) -----

CALPUFF MODEL CONTROL FILE

INPUT GROUP: 0 -- Input and Output File Names

```

-----
Default Name  Type          File Name
-----
CALMET.DAT   input        * METDAT =          *
or
ISCMET.DAT   input        * ISCDAT =          *
or
PLMMET.DAT   input        * PLMDAT =          *
or
PROFILE.DAT  input        * PRFDAT =          *
SURFACE.DAT  input        * SFCDAT =          *
RESTARTB.DAT input        * RSTARTB=          *
-----
CALPUFF.LST  output       ! PUFLST =boiler-90.lst  !
CONC.DAT     output       ! CONDAT =boiler-90.con  !
DFLX.DAT     output       ! DFDAT =boiler-90.dry  !
WFLX.DAT     output       ! WFDAT =boiler-90.wet  !
-----
VISB.DAT     output       ! VISDAT =boiler-90.vis  !
RESTARTE.DAT output       ! RSTARTE=boiler-90.res  !
-----

```

Emission Files

```

-----
PTEMARB.DAT  input        * PTDAT =          *
VOLEMARB.DAT input        * VOLDAT =          *
BAEMARB.DAT  input        * ARDAT =          *
LNEMARB.DAT  input        * LNDAT =          *
-----

```

Other Files

```

-----
OZONE.DAT    input        ! OZDAT =../..data/ozbm90.dat  !
VD.DAT       input        * VDDAT =          *
CHEM.DAT     input        * CHEMDAT=          *
H2O2.DAT     input        * H2O2DAT=          *
HILL.DAT     input        * HILDAT=          *
HILLRCT.DAT  input        * RCTDAT=          *
COASTLN.DAT  input        * CSTDAT=          *
FLUXBDY.DAT  input        * BDYDAT=          *
BCON.DAT     input        * BCNDAT=          *
DEBUG.DAT    output       * DEBUG =          *
MASSFLX.DAT  output       * FLXDAT=          *
MASSBAL.DAT  output       * BALDAT=          *
FOG.DAT      output       * FOGDAT=          *
-----

```

All file names will be converted to lower case if LCFILES = T
 Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
 T = lower case ! LCFILES = T !
 F = UPPER CASE

NOTE: (1) file/path names can be up to 70 characters in length

Provision for multiple input files

```

-----
Number of CALMET.DAT files for run (NMETDAT)
Default: 1           ! NMETDAT = 3 !

Number of PTEMARB.DAT files for run (NPTDAT)
Default: 0           ! NPTDAT = 0 !
-----

```

Number of BAEMARB.DAT files for run (NARDAT)
Default: 0 ! NARDAT = 0 !

Number of VOLEMARB.DAT files for run (NVOLDAT)
Default: 0 ! NVOLDAT = 0 !

!END!

Subgroup (0a)

The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name	Type	File Name		
01	input	! METDAT=../calmet/met90-1.dat	!	!END!
02	input	! METDAT=../calmet/met90-2.dat	!	!END!
03	input	! METDAT=../calmet/met90-3.dat	!	!END!

INPUT GROUP: 1 -- General run control parameters

Option to run all periods found
in the met. file (METRUN) Default: 0 ! METRUN = 0 !

METRUN = 0 - Run period explicitly defined below
METRUN = 1 - Run all periods in met. file

Starting date: Year (IBYR) -- No default ! IBYR = 1990 !
(used only if Month (IBMO) -- No default ! IBMO = 1 !
METRUN = 0) Day (IBDY) -- No default ! IDBY = 1 !
Hour (IBHR) -- No default ! IBHR = 1 !

Base time zone (XBTZ) -- No default ! XBTZ = 6.0 !
PST = 8., MST = 7.
CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default ! IRLG = 8760 !

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 11 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 9 !

Flag to stop run after
SETUP phase (ITEST) Default: 2 ! ITEST = 2 !
(Used to allow checking
of the model inputs, files, etc.)
ITEST = 1 - STOPS program after SETUP phase
ITEST = 2 - Continues with execution of program
after SETUP

Restart Configuration:

Control flag (MRESTART) Default: 0 ! MRESTART = 2 !

0 = Do not read or write a restart file
1 = Read a restart file at the beginning of
the run
2 = Write a restart file during run
3 = Read a restart file at beginning of run
and write a restart file during run

Number of periods in Restart
output cycle (NRESPD) Default: 0 ! NRESPD = 480 !

0 = File written only at last period
>0 = File updated every NRESPD periods

Meteorological Data Format (METFM)
Default: 1 ! METFM = 1 !

METFM = 1 - CALMET binary file (CALMET.MET)
METFM = 2 - ISC ASCII file (ISCMET.MET)
METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
Averaging Time (minutes) (AVET) Default: 60.0 ! AVET = 60. !
PG Averaging Time (minutes) (PGTIME) Default: 60.0 ! PGTIME = 60. !

!END!

INPUT GROUP: 2 -- Technical options

Vertical distribution used in the
near field (MGAUSS) Default: 1 ! MGAUSS = 1 !
0 = uniform
1 = Gaussian

Terrain adjustment method
(MCTADJ) Default: 3 ! MCTADJ = 3 !
0 = no adjustment
1 = ISC-type of terrain adjustment
2 = simple, CALPUFF-type of terrain
adjustment
3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG) Default: 0 ! MCTSG = 0 !
0 = not modeled
1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG) Default: 0 ! MSLUG = 0 !
0 = no
1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS) Default: 1 ! MTRANS = 1 !
0 = no (i.e., final rise only)
1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP) Default: 1 ! MTIP = 1 !
0 = no (i.e., no stack tip downwash)
1 = yes (i.e., use stack tip downwash)

Method used to simulate building
downwash? (MBDW) Default: 1 ! MBDW = 1 !
1 = ISC method
2 = PRIME method

Vertical wind shear modeled above
stack top? (MSHEAR) Default: 0 ! MSHEAR = 0 !
0 = no (i.e., vertical wind shear not modeled)
1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT) Default: 0 ! MSPLIT = 0 !
0 = no (i.e., puffs not split)
1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM) Default: 1 ! MCHEM = 1 !
0 = chemical transformation not modeled
1 = transformation rates computed internally (MESOPUFF II scheme)
2 = user-specified transformation rates used
3 = transformation rates computed internally (RIVAD/ARM3 scheme)
4 = secondary organic aerosol formation computed (MESOPUFF II scheme for OH)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates adjusted for aqueous phase reactions

Wet removal modeled ? (MWET) Default: 1 ! MWET = 1 !
0 = no
1 = yes

Dry deposition modeled ? (MDRY) Default: 1 ! MDRY = 1 !
0 = no
1 = yes
(dry deposition method specified for each species in Input Group 3)

Method used to compute dispersion coefficients (MDISP) Default: 3 ! MDISP = 3 !
1 = dispersion coefficients computed from measured values of turbulence, sigma v, sigma w
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.
5 = CTDM sigmas used for stable and neutral conditions. For unstable conditions, sigmas are computed as in MDISP = 3, described above. MDISP = 5 assumes that measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5) Default: 3 ! MTURBVW = 0 !
1 = use sigma-v or sigma-theta measurements from PROFILE.DAT to compute sigma-y (valid for METFM = 1, 2, 3, 4)
2 = use sigma-w measurements from PROFILE.DAT to compute sigma-z (valid for METFM = 1, 2, 3, 4)
3 = use both sigma-(v/theta) and sigma-w from PROFILE.DAT to compute sigma-y and sigma-z (valid for METFM = 1, 2, 3, 4)
4 = use sigma-theta measurements from PLMMET.DAT to compute sigma-y (valid only if METFM = 3)

Back-up method used to compute dispersion when measured turbulence data are missing (MDISP2) Default: 3 ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated

sigma v, sigma w using micrometeorological variables
(u*, w*, L, etc.)

3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas

4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness? Default: 0 ! MROUGH = 0 !
(MROUGH)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTL = 1 !
elevated inversion?
(MPARTL)
0 = no
1 = yes

Strength of temperature inversion Default: 0 ! MTINV = 0 !
provided in PROFILE.DAT extended records?
(MTINV)
0 = no (computed from measured/default gradients)
1 = yes

PDF used for dispersion under convective conditions? Default: 0 ! MPDF = 0 !
(MPDF)
0 = no
1 = yes

Sub-Grid TIBL module used for shore line? Default: 0 ! MSGTIBL = 0 !
(MSGTIBL)
0 = no
1 = yes

Boundary conditions (concentration) modeled? Default: 0 ! MBCON = 0 !
(MBCON)
0 = no
1 = yes, using formatted BCON.DAT file
2 = yes, using unformatted CONC.DAT file

Analyses of fogging and icing impacts due to emissions from arrays of mechanically-forced cooling towers can be performed using CALPUFF in conjunction with a cooling tower emissions processor (CTEMISS) and its associated postprocessors. Hourly emissions of water vapor and temperature from each cooling tower cell are computed for the current cell configuration and ambient conditions by CTEMISS. CALPUFF models the dispersion of these emissions and provides cloud information in a specialized format for further analysis. Output to FOG.DAT is provided in either 'plume mode' or 'receptor mode' format.

Configure for FOG Model output? Default: 0 ! MFOG = 0 !
(MFOG)
0 = no
1 = yes - report results in PLUME Mode format
2 = yes - report results in RECEPTOR Mode format

Test options specified to see if they conform to regulatory values? (MREG) Default: 1 ! MREG = 0 !
0 = NO checks are made
1 = Technical options must conform to USEPA Long Range Transport (LRT) guidance

```

METFM      1 or 2
AVET       60. (min)
PGTIME     60. (min)
MGAUSS     1
MCTADJ     3
MTRANS     1
MTIP       1
MCHEM      1 or 3 (if modeling SOx, NOx)
MWET       1
MDRY       1
MDISP      2 or 3
MPDF       0 if MDISP=3
           1 if MDISP=2
MROUGH     0
MPARTL     1
SYTDEP    550. (m)
MHFTSZ     0

```

!END!

INPUT GROUP: 3a, 3b -- Species list

Subgroup (3a)

The following species are modeled:

```

! CSPEC =      SO2 !      !END!
! CSPEC =      SO4 !      !END!
! CSPEC =      NOX !      !END!
! CSPEC =      HNO3 !     !END!
! CSPEC =      NO3 !      !END!
! CSPEC =      PM0005 !    !END!
! CSPEC =      PM0010 !    !END!
! CSPEC =      PM0015 !    !END!
! CSPEC =      PM0020 !    !END!
! CSPEC =      PM0025 !    !END!
! CSPEC =      PM0100 !    !END!

```

SPECIES NAME (Limit: 12 Characters in length)	MODELED (0=NO, 1=YES)	EMITTED (0=NO, 1=YES)	Dry DEPOSITED (0=NO, 1=COMPUTED-GAS 2=COMPUTED-PARTICLE 3=USER-SPECIFIED)	OUTPUT GROUP NUMBER (0=NONE, 1=1st CGRUP, 2=2nd CGRUP, 3= etc.)
! SO2 =	1,	1,	1,	0 !
! SO4 =	1,	1,	2,	0 !
! NOX =	1,	1,	1,	0 !
! HNO3 =	1,	0,	1,	0 !
! NO3 =	1,	0,	2,	0 !
! PM0005 =	1,	1,	2,	1 !
! PM0010 =	1,	1,	2,	1 !
! PM0015 =	1,	1,	2,	1 !
! PM0020 =	1,	1,	2,	1 !
! PM0025 =	1,	1,	2,	1 !
! PM0100 =	1,	1,	2,	1 !

!END!

Subgroup (3b)

The following names are used for Species-Groups in which results for certain species are combined (added) prior to output. The

35.9 N Latitude = 35.9N
118.7 E Longitude = 118.7E

Datum-region

The Datum-Region for the coordinates is identified by a character string. Many mapping products currently available use the model of the Earth known as the World Geodetic System 1984 (WGS-84). Other local models may be in use, and their selection in CALMET will make its output consistent with local mapping products. The list of Datum-Regions with official transformation parameters is provided by the National Imagery and Mapping Agency (NIMA).

NIMA Datum - Regions(Examples)

WGS-84 WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
NAS-C NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
NAR-C NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
NWS-84 NWS 6370KM Radius, Sphere
ESR-S ESRI REFERENCE 6371KM Radius, Sphere

Datum-region for output coordinates
(DATUM) Default: WGS-84 ! DATUM = NAR-C !

METEOROLOGICAL Grid:

Rectangular grid defined for projection PMAP,
with X the Easting and Y the Northing coordinate

No. X grid cells (NX)	No default	! NX = 184 !
No. Y grid cells (NY)	No default	! NY = 212 !
No. vertical layers (NZ)	No default	! NZ = 10 !
Grid spacing (DGRIDKM)	No default	! DGRIDKM = 1.5 !
	Units: km	
Cell face heights (ZFACE(nz+1))	No defaults	
	Units: m	
! ZFACE = 0., 20., 40., 80., 160., 320., 640., 1000., 1500., 2200., 3000. !		
Reference Coordinates of SOUTHWEST corner of grid cell(1, 1):		
X coordinate (XORIGKM)	No default	! XORIGKM = -168. !
Y coordinate (YORIGKM)	No default	! YORIGKM = -134. !
	Units: km	

COMPUTATIONAL Grid:

The computational grid is identical to or a subset of the MET. grid. The lower left (LL) corner of the computational grid is at grid point (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid. The grid spacing of the computational grid is the same as the MET. grid.

X index of LL corner (IBCOMP)	No default	! IBCOMP = 1 !
(1 <= IBCOMP <= NX)		
Y index of LL corner (JBCOMP)	No default	! JBCOMP = 1 !
(1 <= JBCOMP <= NY)		
X index of UR corner (IECOMP)	No default	! IECOMP = 184 !
(1 <= IECOMP <= NX)		

Y index of UR corner (JECOMP) No default ! JECOMP = 212 !
 (1 <= JECOMP <= NY)

SAMPLING Grid (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid. The sampling grid must be identical to or a subset of the computational grid. It may be a nested grid inside the computational grid. The grid spacing of the sampling grid is DGRIDKM/MESH DN.

Logical flag indicating if gridded
 receptors are used (LSAMP) Default: T ! LSAMP = F !
 (T=yes, F=no)

X index of LL corner (IBSAMP) No default ! IBSAMP = 1 !
 (IBCOMP <= IBSAMP <= IECOMP)

Y index of LL corner (JBSAMP) No default ! JBSAMP = 1 !
 (JBCOMP <= JBSAMP <= JECOMP)

X index of UR corner (IESAMP) No default ! IESAMP = 17 !
 (IBCOMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP) No default ! JESAMP = 17 !
 (JBCOMP <= JESAMP <= JECOMP)

Nesting factor of the sampling
 grid (MESH DN) Default: 1 ! MESH DN = 1 !
 (MESH DN is an integer >= 1)

!END!

INPUT GROUP: 5 -- Output Options

FILE	* DEFAULT VALUE	* VALUE THIS RUN
----	-----	-----
Concentrations (ICON)	1	! ICON = 1 !
Dry Fluxes (IDRY)	1	! IDRY = 1 !
Wet Fluxes (IWET)	1	! IWET = 1 !
Relative Humidity (IVIS)	1	! IVIS = 1 !
(relative humidity file is required for visibility analysis)		
Use data compression option in output file? (LCOMPRS)	Default: T	! LCOMPRS = T !

*
 0 = Do not create file, 1 = create file

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

Mass flux across specified boundaries
 for selected species reported hourly?
 (IMFLX) Default: 0 ! IMFLX = 0 !
 0 = no
 1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
 are specified in Input Group 0)

Mass balance for each species reported hourly?
 (IMBAL) Default: 0 ! IMBAL = 0 !
 0 = no
 1 = yes (MASSBAL.DAT filename is specified in Input Group 0)

LINE PRINTER OUTPUT OPTIONS:

Print concentrations (ICPRT) Default: 0 ! ICPRT = 0 !
 Print dry fluxes (IDPRT) Default: 0 ! IDPRT = 0 !
 Print wet fluxes (IWPRT) Default: 0 ! IWPRT = 0 !
 (0 = Do not print, 1 = Print)

Concentration print interval (ICFRQ) in hours Default: 1 ! ICFRQ = 1 !
 Dry flux print interval (IDFRQ) in hours Default: 1 ! IDFRQ = 1 !
 Wet flux print interval (IWFRQ) in hours Default: 1 ! IWFRQ = 1 !

Units for Line Printer Output (IPRTU) Default: 1 ! IPRTU = 3 !
 for Concentration for Deposition
 1 = g/m**3 g/m**2/s
 2 = mg/m**3 mg/m**2/s
 3 = ug/m**3 ug/m**2/s
 4 = ng/m**3 ng/m**2/s
 5 = Odour Units

Messages tracking progress of run written to the screen ?
 (IMESG) Default: 2 ! IMESG = 2 !
 0 = no
 1 = yes (advection step, puff ID)
 2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)

SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

SPECIES /GROUP		CONCENTRATIONS		DRY FLUXES		WET FLUXES	
DISK?	MASS FLUX	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?	PRINTED?	SAVED ON DISK?
!	SO2 =	0,	1,	0,	1,	0,	1,
0 !							
!	SO4 =	0,	1,	0,	1,	0,	1,
0 !							
!	NOX =	0,	1,	0,	1,	0,	1,
0 !							
!	HNO3 =	0,	1,	0,	1,	0,	1,
0 !							
!	NO3 =	0,	1,	0,	1,	0,	1,
0 !							
!	PMF =	0,	1,	0,	1,	0,	1,
0 !							

OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

Logical for debug output (LDEBUG) Default: F ! LDEBUG = F !
 First puff to track (IPFDEB) Default: 1 ! IPFDEB = 1 !
 Number of puffs to track

```

(NPFDEB)                                Default: 1      ! NPFDEB = 10  !
Met. period to start output
(NN1)                                    Default: 1      ! NN1 = 10  !
Met. period to end output
(NN2)                                    Default: 10     ! NN2 = 10  !
!END!

```

INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs

Subgroup (6a)

```

Number of terrain features (NHILL)      Default: 0      ! NHILL = 0  !
Number of special complex terrain
receptors (NCTREC)                      Default: 0      ! NCTREC = 0  !
Terrain and CTSG Receptor data for
CTSG hills input in CTDM format ?
(MHILL)                                  No Default     ! MHILL = 0  !
1 = Hill and Receptor data created
  by CTDM processors & read from
  HILL.DAT and HILLRCT.DAT files
2 = Hill data created by OPTHILL &
  input below in Subgroup (6b);
  Receptor data in Subgroup (6c)
Factor to convert horizontal dimensions
to meters (MHILL=1)                     Default: 1.0    ! XHILL2M = 0. !
Factor to convert vertical dimensions
to meters (MHILL=1)                     Default: 1.0    ! ZHILL2M = 0. !
X-origin of CTDM system relative to
CALPUFF coordinate system, in Kilometers (MHILL=1) No Default     ! XCTDMKM = 0.0E00 !
Y-origin of CTDM system relative to
CALPUFF coordinate system, in Kilometers (MHILL=1) No Default     ! YCTDMKM = 0.0E00 !

```

! END !

Subgroup (6b)

```

1 **
HILL information

HILL      XC      YC      THETAH  ZGRID  RELIEF  EXPO 1  EXPO 2  SCALE 1
SCALE 2   AMAX1   AMAX2
NO.       (km)    (km)
(m)       (m)     (m)
-----

```

Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

```

          XRCT      YRCT      ZRCT      XHH

```

(km) (km) (m)

```

-----
1
Description of Complex Terrain Variables:
  XC, YC = Coordinates of center of hill
  THETAH = Orientation of major axis of hill (clockwise from
           North)
  ZGRID  = Height of the 0 of the grid above mean sea
           level
  RELIEF = Height of the crest of the hill above the grid elevation
  EXPO 1 = Hill-shape exponent for the major axis
  EXPO 2 = Hill-shape exponent for the major axis
  SCALE 1 = Horizontal length scale along the major axis
  SCALE 2 = Horizontal length scale along the minor axis
  AMAX   = Maximum allowed axis length for the major axis
  BMAX   = Maximum allowed axis length for the major axis

  XRCT, YRCT = Coordinates of the complex terrain receptors
  ZRCT       = Height of the ground (MSL) at the complex terrain
               Receptor
  XHH       = Hill number associated with each complex terrain receptor
               (NOTE: MUST BE ENTERED AS A REAL NUMBER)
  
```

```

**
NOTE: DATA for each hill and CTSG receptor are treated as a separate
input subgroup and therefore must end with an input group terminator.
  
```

```

-----
INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
-----
  
```

SPECIES	DIFFUSIVITY	ALPHA STAR	REACTIVITY	MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT				
NAME	(cm**2/s)			(s/cm)
(dimensionless)				
! SO2 =	0.1509,	1000.,	8.,	0.,
0.04 !				
! NOX =	0.1656,	1.,	8.,	5.,
3.5 !				
! HNO3 =	0.1628,	1.,	18.,	0.,
0.00000008 !				
!END!				

```

-----
INPUT GROUP: 8 -- Size parameters for dry deposition of particles
-----
  
```

For SINGLE SPECIES, the mean and standard deviation are used to compute a deposition velocity for NINT (see group 9) size-ranges, and these are then averaged to obtain a mean deposition velocity.

For GROUPED SPECIES, the size distribution should be explicitly specified (by the 'species' in the group), and the standard deviation for each should be entered as 0. The model will then use the deposition velocity for the stated mean diameter.

SPECIES	GEOMETRIC MASS MEAN	GEOMETRIC STANDARD
NAME	DIAMETER	DEVIATION
	(microns)	(microns)

```

-----
!          SO4 =          0.48,          0.5  !
!          NO3 =          0.48,          0.5  !
!          PM0005 =        0.05,          0.   !
!          PM0010 =         0.1,          0.   !
!          PM0015 =        0.15,          0.   !
!          PM0020 =         0.2,          0.   !
!          PM0025 =        0.25,          0.   !
!          PM0100 =         1.,           0.   !

```

!END!

INPUT GROUP: 9 -- Miscellaneous dry deposition parameters

```

Reference cuticle resistance (s/cm)
(RCUTR)                      Default: 30    ! RCUTR = 30.0 !
Reference ground resistance (s/cm)
(RGR)                         Default: 10    ! RGR = 10.0 !
Reference pollutant reactivity
(REACTR)                       Default: 8     ! REACTR = 8.0 !

Number of particle-size intervals used to
evaluate effective particle deposition velocity
(NINT)                         Default: 9     ! NINT = 9 !

Vegetation state in unirrigated areas
(IVEG)                         Default: 1     ! IVEG = 1 !
IVEG=1 for active and unstressed vegetation
IVEG=2 for active and stressed vegetation
IVEG=3 for inactive vegetation

```

!END!

INPUT GROUP: 10 -- Wet Deposition Parameters

```

Scavenging Coefficient -- Units: (sec)**(-1)

Pollutant      Liquid Precip.      Frozen Precip.
-----
!          SO2 =          3.0E-05,          0.0E00 !
!          SO4 =          1.0E-04,          3.0E-05 !
!          HNO3 =         6.0E-05,          0.0E00 !
!          NO3 =          1.0E-04,          3.0E-05 !
!          PM0005 =        1.0E-04,          3.0E-05 !
!          PM0010 =        1.0E-04,          3.0E-05 !
!          PM0015 =        1.0E-04,          3.0E-05 !
!          PM0020 =        1.0E-04,          3.0E-05 !
!          PM0025 =        1.0E-04,          3.0E-05 !
!          PM0100 =        1.0E-04,          3.0E-05 !

```

!END!

INPUT GROUP: 11 -- Chemistry Parameters

```

Ozone data input option (MOZ)      Default: 1          ! MOZ = 1 !

```

(Used only if MCHEM = 1, 3, or 4)
 0 = use a monthly background ozone value
 1 = read hourly ozone concentrations from
 the OZONE.DAT data file

Monthly ozone concentrations
 (Used only if MCHEM = 1, 3, or 4 and
 MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
 (BCKO3) in ppb Default: 12*80.
 ! BCKO3 = 24.5, 31.2, 37.3, 41.4, 42.1, 47.3, 42.2, 44.6, 39.8, 33.5, 22.8, 22.3 !

Monthly ammonia concentrations
 (Used only if MCHEM = 1, or 3)
 (BCKNH3) in ppb Default: 12*10.
 ! BCKNH3 = 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50, 0.50 !

Nighttime SO2 loss rate (RNITE1)
 in percent/hour Default: 0.2 ! RNITE1 = .2 !

Nighttime NOx loss rate (RNITE2)
 in percent/hour Default: 2.0 ! RNITE2 = 2.0 !

Nighttime HNO3 formation rate (RNITE3)
 in percent/hour Default: 2.0 ! RNITE3 = 2.0 !

H2O2 data input option (MH2O2) Default: 1 ! MH2O2 = 1 !
 (Used only if MAQCHEM = 1)
 0 = use a monthly background H2O2 value
 1 = read hourly H2O2 concentrations from
 the H2O2.DAT data file

Monthly H2O2 concentrations
 (Used only if MAQCHEM = 1 and
 MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
 (BCKH2O2) in ppb Default: 12*1.
 ! BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !

--- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
 (used only if MCHEM = 4)

The SOA module uses monthly values of:
 Fine particulate concentration in ug/m³ (BCKPMF)
 Organic fraction of fine particulate (OFRAC)
 VOC / NOX ratio (after reaction) (VCNX)
 to characterize the air mass when computing
 the formation of SOA from VOC emissions.
 Typical values for several distinct air mass types are:

Month	1	2	3	4	5	6	7	8	9	10	11	12
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Clean Continental												
BCKPMF	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
OFRAC	.15	.15	.20	.20	.20	.20	.20	.20	.20	.20	.20	.15
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Clean Marine (surface)												
BCKPMF	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
OFRAC	.25	.25	.30	.30	.30	.30	.30	.30	.30	.30	.30	.25
VCNX	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.	50.
Urban - low biogenic (controls present)												
BCKPMF	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
OFRAC	.20	.20	.25	.25	.25	.25	.25	.25	.20	.20	.20	.20
VCNX	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
Urban - high biogenic (controls present)												
BCKPMF	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.	60.
OFRAC	.25	.25	.30	.30	.30	.55	.55	.55	.35	.35	.35	.25


```

(XLAIIN)                                Default: 3.0    ! XLAIIN = 3.0 !

Elevation above sea level (m)
(ELEVIN)                                Default: 0.0    ! ELEVIN = .0 !

Latitude (degrees) for met location
(XLATIN)                                Default: -999.  ! XLATIN = -999.0 !

Longitude (degrees) for met location
(XLONIN)                                Default: -999.  ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

Anemometer height (m) (Used only if METFM = 2,3)
(ANEMHT)                                Default: 10.    ! ANEMHT = 10.0 !

Form of lateral turbulence data in PROFILE.DAT file
(Used only if METFM = 4 or MTURBVW = 1 or 3)
(ISIGMAV)                               Default: 1      ! ISIGMAV = 1 !
    0 = read sigma-theta
    1 = read sigma-v

Choice of mixing heights (Used only if METFM = 4)
(IMIXCTDM)                              Default: 0      ! IMIXCTDM = 0 !
    0 = read PREDICTED mixing heights
    1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                               Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                  Default: 99     ! MXNEW = 99 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                  Default: 99     ! MXSAM = 99 !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                               Default: 2      ! NCOUNT = 2 !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                  Default: 1.0    ! SYMIN = 1.0 !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                  Default: 1.0    ! SZMIN = 1.0 !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))                 Default SVMIN : .50, .50, .50, .50, .50, .50
                                           Default SWMIN : .20, .12, .08, .06, .03, .016

                                           Stability Class :  A    B    C    D    E    F
                                           ---  ---  ---  ---  ---  ---
! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500,
0.500!
! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030,
0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and

```



```

Split is allowed only if last hour's mixing
height (m) exceeds a minimum value
(ZISPLIT)                               Default: 100.          ! ZISPLIT = 100.0 !

Split is allowed only if ratio of last hour's
mixing ht to the maximum mixing ht experienced
by the puff is less than a maximum value (this
postpones a split until a nocturnal layer develops)
(ROLDMAX)                               Default: 0.25         ! ROLDMAX = 0.25 !

HORIZONTAL SPLIT
-----

Number of puffs that result every time a puff
is split - nsplith=5 means that 1 puff splits
into 5
(NSPLITH)                               Default: 5            ! NSPLITH = 5 !

Minimum sigma-y (Grid Cells Units) of puff
before it may be split
(SYSPLITH)                              Default: 1.0         ! SYSPLITH = 1.0 !

Minimum puff elongation rate (SYSPLITH/hr) due to
wind shear, before it may be split
(SHSPPLITH)                             Default: 2.          ! SHSPPLITH = 2.0 !

Minimum concentration (g/m^3) of each
species in puff before it may be split
Enter array of NSPEC values; if a single value is
entered, it will be used for ALL species
(CNSPLITH)                              Default: 1.0E-07     ! CNSPLITH = 1.0E-07 !

Integration control variables -----

Fractional convergence criterion for numerical SLUG
sampling integration
(EPSSLUG)                               Default: 1.0e-04     ! EPSSLUG = 1.0E-04 !

Fractional convergence criterion for numerical AREA
source integration
(EPSAREA)                               Default: 1.0e-06     ! EPSAREA = 1.0E-06 !

Trajectory step-length (m) used for numerical rise
integration
(DSRISE)                                Default: 1.0         ! DSRISE = 1.0 !

Boundary Condition (BC) Puff control variables -----

Minimum height (m) to which BC puffs are mixed as they are emitted
(MBCON=2 ONLY). Actual height is reset to the current mixing height
at the release point if greater than this minimum.
(HTMINBC)                               Default: 500.        ! HTMINBC = 500.0 !

Search radius (in BC segment lengths) about a receptor for sampling
nearest BC puff. BC puffs are emitted with a spacing of one segment
length, so the search radius should be greater than 1.
(RSAMPBC)                               Default: 4.          ! RSAMPBC = 15.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC)                                Default: 1           ! MDEPBC = 0 !
  0 = Concentration is NOT adjusted for depletion
  1 = Adjust Concentration for depletion

!END!
-----

```

INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters

Subgroup (13a)

Number of point sources with parameters provided below (NPT1) No default ! NPT1 = 1 !

Units used for point source emissions below (IPTU) Default: 1 ! IPTU = 1 !

- 1 = g/s
- 2 = kg/hr
- 3 = lb/hr
- 4 = tons/yr
- 5 = Odour Unit * m**3/s (vol. flux of odour compound)
- 6 = Odour Unit * m**3/min
- 7 = metric tons/yr

Number of source-species combinations with variable emissions scaling factors provided below in (13d) (NSPT1) Default: 0 ! NSPT1 = 0 !

Number of point sources with variable emission parameters provided in external file (NPT2) No default ! NPT2 = 0 !

(If NPT2 > 0, these point source emissions are read from the file: PTEMARB.DAT)

!END!

Subgroup (13b)

a
POINT SOURCE: CONSTANT DATA

b

c

Source No.	X Coordinate (km)	Y Coordinate (km)	Stack Height (m)	Base Elevation (m)	Stack Diameter (m)	Exit Vel. (m/s)	Exit Temp. (deg. K)	Bldg. Dwash	Emission Rates
1 ! SRCNAM = BOILER !									
1 ! X =	-7.938,	127.479,	156.36,	385.0,	4.27,	24.88,	347.0,	1.0,	41.2,
0.062,	27.46,								
	0.0E00,	0.0E00,	0.15,	0.25,	0.23,	0.15,	0.11,		0.11 !
1 ! FMFAC =		1.0 !							!END!

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

SRCNAM is a 12-character name for a source (No default)

X is an array holding the source data listed by the column headings (No default)

SIGYZI is an array holding the initial sigma-y and sigma-z (m) (Default: 0.,0.)

FMFAC is a vertical momentum flux factor (0. or 1.0) used to represent the effect of rain-caps or other physical configurations that reduce momentum rise associated with the actual exit velocity. (Default: 1.0 -- full momentum used)

b

0. = No building downwash modeled, 1. = downwash modeled
 NOTE: must be entered as a REAL number (i.e., with decimal point)

c

An emission rate must be entered for every pollutant modeled.
 Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

 Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. Effective building height, width, length and X/Y offset (in meters) every 10 degrees. LENGTH, XBADJ, and YBADJ are only needed for MBDW=2 (PRIME downwash option) ^a

```

1  ! SRCNAM = BOILER !
1  ! HEIGHT = 22.86, 33.58, 62.79, 62.79, 62.79, 62.79,
           62.79, 62.79, 62.79, 62.79, 62.79, 22.86,
           22.86, 22.86, 15.24, 15.24, 15.24, 24.38,
           24.38, 33.58, 62.79, 62.79, 62.79, 62.79,
           62.79, 62.79, 62.79, 62.79, 62.79, 22.86,
           22.86, 22.86, 15.24, 15.24, 15.24, 15.24!
1  ! WIDTH  = 39.62, 129.72, 94.17, 96.93, 96.74, 93.61,
           87.64, 82.84, 87.24, 88.99, 66.39, 42.65,
           42.4, 40.86, 23.67, 20.98, 19.44, 89.07,
           88.0, 129.72, 94.17, 96.93, 96.74, 93.61,
           87.64, 82.84, 87.24, 88.99, 66.39, 42.65,
           42.4, 40.86, 23.67, 20.98, 19.44, 22.1!
1  ! LENGTH = .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0!
1  ! XBADJ  = .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0!
1  ! YBADJ  = .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0,
           .0, .0, .0, .0, .0, .0!
!END!
  
```

a

Building height, width, length, and X/Y offset from the source are treated as a separate input subgroup for each source and therefore must end with an input group terminator. The X/Y offset is the position, relative to the stack, of the center of the upwind face of the projected building, with the x-axis pointing along the flow direction.

 Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission

rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:

(IVARY) Default: 0

0 =	Constant
1 =	Diurnal cycle (24 scaling factors: hours 1-24)
2 =	Monthly cycle (12 scaling factors: months 1-12)
3 =	Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
5 =	Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

a

Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

Subgroup (14a)

Number of polygon area sources with parameters specified below (NAR1) No default ! NAR1 = 0 !

Units used for area source emissions below (IARU) Default: 1 ! IARU = 1 !

1 =	g/m**2/s
2 =	kg/m**2/hr
3 =	lb/m**2/hr
4 =	tons/m**2/yr
5 =	Odour Unit * m/s (vol. flux/m**2 of odour compound)
6 =	Odour Unit * m/min
7 =	metric tons/m**2/yr

Number of source-species combinations with variable emissions scaling factors provided below in (14d) (NSAR1) Default: 0 ! NSAR1 = 0 !

Number of buoyant polygon area sources with variable location and emission parameters (NAR2) No default ! NAR2 = 0 !
(If NAR2 > 0, ALL parameter data for these sources are read from the file: BAEMARB.DAT)

!END!

Subgroup (14b)

a
AREA SOURCE: CONSTANT DATA

b

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates
---------------	--------------------------	--------------------------	---------------------------	-------------------

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU (e.g. 1 for g/m**2/s).

Subgroup (14c)

COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON

Source No.	Ordered list of X followed by list of Y, grouped by source
---------------	--

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (14d)

a
AREA SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant
1 =	Diurnal cycle (24 scaling factors: hours 1-24)
2 =	Monthly cycle (12 scaling factors: months 1-12)
3 =	Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
5 =	Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

a
Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters

 Subgroup (15a)

Number of buoyant line sources
 with variable location and emission
 parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for
 these sources are read from the file: LNEARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 0 !

Units used for line source
 emissions below (ILNU) Default: 1 ! ILNU = 1 !
 1 = g/s
 2 = kg/hr
 3 = lb/hr
 4 = tons/yr
 5 = Odour Unit * m**3/s (vol. flux of odour compound)
 6 = Odour Unit * m**3/min
 7 = metric tons/yr

Number of source-species
 combinations with variable
 emissions scaling factors
 provided below in (15c) (NSLN1) Default: 0 ! NSLN1 = 0 !

Maximum number of segments used to model
 each line (MXNSEG) Default: 7 ! MXNSEG = 7 !

The following variables are required only if NLINES > 0. They are
 used in the buoyant line source plume rise calculations.

Number of distances at which
 transitional rise is computed Default: 6 ! NLRISE = 6 !
 Average building length (XL) No default ! XL = .0 !
 (in meters)
 Average building height (HBL) No default ! HBL = .0 !
 (in meters)
 Average building width (WBL) No default ! WBL = .0 !
 (in meters)
 Average line source width (WML) No default ! WML = .0 !
 (in meters)
 Average separation between buildings (DXL) No default ! DXL = .0 !
 (in meters)
 Average buoyancy parameter (FPRIMEL) No default ! FPRIMEL = .0 !
 (in m**4/s**3)

!END!

 Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

a	Source	Beg. X	Beg. Y	End. X	End. Y	Release	Base	Emission
	No.	Coordinate	Coordinate	Coordinate	Coordinate	Height	Elevation	Rates
		(km)	(km)	(km)	(km)	(m)	(m)	

a

Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b

An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by ILNTU (e.g. 1 for g/s).

Subgroup (15c)

a
BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 15b. Factors entered multiply the rates in 15b. Skip sources here that have constant emissions.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant
1 =	Diurnal cycle (24 scaling factors: hours 1-24)
2 =	Monthly cycle (12 scaling factors: months 1-12)
3 =	Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
5 =	Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

a

Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters

Subgroup (16a)

Number of volume sources with parameters provided in 16b,c (NVL1)	No default	!	NVL1 = 0	!
Units used for volume source emissions below in 16b (IVLU)	Default: 1	!	IVLU = 1	!
1 =	g/s			
2 =	kg/hr			
3 =	lb/hr			
4 =	tons/yr			
5 =	Odour Unit * m**3/s	(vol. flux of odour compound)		
6 =	Odour Unit * m**3/min			
7 =	metric tons/yr			

Number of source-species combinations with variable emissions scaling factors provided below in (16c) (NSVL1) Default: 0 ! NSVL1 = 0 !

Number of volume sources with variable location and emission parameters (NVL2) No default ! NVL2 = 0 !

(If NVL2 > 0, ALL parameter data for these sources are read from the VOLEMARB.DAT file(s))

!END!

Subgroup (16b)

a
VOLUME SOURCE: CONSTANT DATA

X	Y	Effect.	Base	Initial	Initial	b
Coordinate	Coordinate	Height	Elevation	Sigma y	Sigma z	Emission
(km)	(km)	(m)	(m)	(m)	(m)	Rates
-----	-----	-----	-----	-----	-----	-----

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IVLU (e.g. 1 for g/s).

Subgroup (16c)

a
VOLUME SOURCE: VARIABLE EMISSIONS DATA

Use this subgroup to describe temporal variations in the emission rates given in 16b. Factors entered multiply the rates in 16b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

0 =	Constant
1 =	Diurnal cycle (24 scaling factors: hours 1-24)
2 =	Monthly cycle (12 scaling factors: months 1-12)
3 =	Hour & Season (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB)
4 =	Speed & Stab. (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12)
5 =	Temperature (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+)

a

Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

 INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information

 Subgroup (17a)

Number of non-gridded receptors (NREC) No default ! NREC = 152 !

!END!

 Subgroup (17b)

a
 NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height Above Ground (m)	b
1 ! X =	31.644373,	72.383125,	274.000,	0.000!	!END!
2 ! X =	32.38892,	72.385864,	299.000,	0.000!	!END!
3 ! X =	33.133495,	72.388603,	328.000,	0.000!	!END!
151 ! X =	-9.394675,	-10.818974,	573.000,	0.000!	!END!
152 ! X =	-8.643092,	-10.819588,	609.000,	0.000!	!END!

 a
 Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
 Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.