```
CALPUFF.INP     2.0           File version record
Nuovo Pignone
Diffusionale 2020 SCENARIO FUTURO
ALEA ENERG LT5

---------- 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 =..\08122018\cmetnp08.dat  !

   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 =NP_futuro_LT5.TXT  !
CONC.DAT      output   ! CONDAT =NP_futuro_LT5.CON    !
DFLX.DAT      output   * DFDAT  =           *
WFLX.DAT      output   * WFDAT  =           *

VISB.DAT      output   * VISDAT =           *
TK2D.DAT      output   * T2DDAT =           *
RHO2D.DAT     output   * RHODAT =           *
RESTARTE.DAT  output   * RSTARTE=           *
--------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =           *
VOLEMARB.DAT  input    * VOLDAT =           *
BAEMARB.DAT   input    * ARDAT  =           *
LNEMARB.DAT   input    * LNDAT  =           *
--------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =           *
VD.DAT        input    * VDDAT  =           *
CHEM.DAT      input    * CHEMDAT=           *
AUX           input    ! AUXEXT =AUX     !
(Extension added to METDAT filename(s) for files
 with auxiliary 2D and 3D data)
```

```
H2O2.DAT     input    * H2O2DAT=          *
NH3Z.DAT     input    * NH3ZDAT=          *
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= FUT_mass_LT5.txt    !
FOG.DAT      output   * FOGDAT=           *
RISE.DAT     output   * RISDAT=           *
---------------------------------------------------------------------------
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 = F !
       F = UPPER CASE
NOTE: (1) file/path names can be up to 132 characters in length


Provision for multiple input files
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   Number of Modeling Domains (NMETDOM)
                       Default: 1      ! NMETDOM =   1   !

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

   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)
-------------

  Provide a name for each CALMET domain if NMETDOM > 1
  Enter NMETDOM lines.
                       a,b
Default Name           Domain Name
------------           ------------
 none              * DOMAIN1=    *   *END*
 none              * DOMAIN2=    *   *END*
 none              * DOMAIN3=    *   *END*
```

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

Enter NMETDAT lines, 1 line for each file name.

Default Name	Type	a,c,d	File Name
none	input	*	METDAT1= * *END*
none	input	*	METDAT2= * *END*
none	input	*	METDAT3= * *END*

---

a

The name for each CALMET domain and each CALMET.DAT file is treated as a separate input subgroup and therefore must end with an input group terminator.

b

Use DOMAIN1= to assign the name for the outermost CALMET domain.
Use DOMAIN2= to assign the name for the next inner CALMET domain.
Use DOMAIN3= to assign the name for the next inner CALMET domain, etc.

When inner domains with equal resolution (grid-cell size) overlap, the data from the FIRST such domain in the list will be used if all other criteria for choosing the controlling grid domain are inconclusive.

c

Use METDAT1= to assign the file names for the outermost CALMET domain.
Use METDAT2= to assign the file names for the next inner CALMET domain.
Use METDAT3= to assign the file names for the next inner CALMET domain, etc.

d

The filenames for each domain must be provided in sequential order

---

Subgroup (0b)

The following PTEMARB.DAT filenames are processed if NPTDAT>0
(Each file contains a subset of the sources, for the entire simulation)

Default Name	Type	File Name
none	input	* PTDAT= * *END*

Subgroup (0c)

The following BAEMARB.DAT filenames are processed if NARDAT>0
(Each file contains a subset of the sources, for the entire simulation)

```
Default Name  Type         File Name
------------  ----         ---------
 none         input      * ARDAT=     *   *END*


-------------
Subgroup (0d)
-------------

  The following VOLEMARB.DAT filenames are processed if NVOLDAT>0
  (Each file contains a subset of the sources, for the entire simulation)

Default Name  Type         File Name
------------  ----         ---------
 none         input      * VOLDAT=     *   *END*


------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

   Option to run all periods found
   in the met. file     (METRUN)   Default: 0      ! METRUN =   1  !

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

    Starting date:    Year   (IBYR)  --    No default   ! IBYR  =  2008  !
                      Month  (IBMO)  --    No default   ! IBMO  =  1  !
                      Day    (IBDY)  --    No default   ! IBDY  =  2  !
    Starting time:    Hour   (IBHR)  --    No default   ! IBHR  =  3  !
                      Minute (IBMIN) --    No default   ! IBMIN =  0  !
                      Second (IBSEC) --    No default   ! IBSEC =  0  !

    Ending date:      Year   (IEYR)  --    No default   ! IEYR  =  2008  !
                      Month  (IEMO)  --    No default   ! IEMO  =  12  !
                      Day    (IEDY)  --    No default   ! IEDY  =  31  !
    Ending time:      Hour   (IEHR)  --    No default   ! IEHR  =  23  !
                      Minute (IEMIN) --    No default   ! IEMIN =  0  !
                      Second (IESEC) --    No default   ! IESEC =  0  !

    (These are only used if METRUN = 0)

    Base time zone:         (ABTZ)  --    No default   ! ABTZ= UTC+0000 !
     (character*8)
    The modeling domain may span multiple time zones.  ABTZ defines the
    base time zone used for the entire simulation.  This must match the
    base time zone of the meteorological data.
    Examples:
      Los Angeles, USA         = UTC-0800
      New York, USA            = UTC-0500
```

Santiago, Chile = UTC-0400
Greenwich Mean Time (GMT) = UTC+0000
Rome, Italy = UTC+0100
Cape Town, S.Africa = UTC+0200
Sydney, Australia = UTC+1000

Length of modeling time-step (seconds)
Equal to update period in the primary
meteorological data files, or an
integer fraction of it (1/2, 1/3 ...)
Must be no larger than 1 hour
(NSECDT) Default:3600 ! NSECDT = 3600 !
Units: seconds

Number of chemical species (NSPEC)
Default: 5 ! NSPEC = 2 !

Number of chemical species
to be emitted (NSE) Default: 3 ! NSE = 2 !

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 = 0 !

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 = 0 !

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)

METFM = 5 - AERMET tower file (PROFILE.DAT) and
surface parameters file (SURFACE.DAT)

Meteorological Profile Data Format (MPRFFM)
(used only for METFM = 1, 2, 3)
Default: 1 ! MPRFFM = 1 !

MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
MPRFFM = 2 - AERMET tower file (PROFILE.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. !

Output units for binary concentration and flux files
written in Dataset v2.2 or later formats
(IOUTU) Default: 1 ! IOUTU = 1 !
1 = mass - g/m3 (conc) or g/m2/s (dep)
2 = odour - odour_units (conc)
3 = radiation - Bq/m3 (conc) or Bq/m2/s (dep)

Output Dataset format for binary concentration
and flux files (e.g., CONC.DAT)
(IOVERS) Default: 2 ! IOVERS = 2 !
1 = Dataset Version 2.1
2 = Dataset Version 2.2

!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 slugs? (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 compute plume rise for
point sources not subject to building
downwash? (MRISE) Default: 1 ! MRISE = 1 !
1 = Briggs plume rise
2 = Numerical plume rise

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

Vertical wind shear modeled above
stack top (modified Briggs plume rise)?
(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 = 0 !
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)
5 = user-specified half-life with or

without transfer to child species
6 = transformation rates computed internally (Updated RIVAD scheme with ISORROPIA equilibrium)
7 = transformation rates computed internally (Updated RIVAD scheme with ISORROPIA equilibrium and CalTech SOA)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 6, or 7) Default: 0 ! MAQCHEM = 0 !
0 = aqueous phase transformation not modeled
1 = transformation rates and wet scavenging coefficients adjusted for in-cloud aqueous phase reactions (adapted from RADM cloud model implementation in CMAQ/SCICHEM)

Liquid Water Content flag (MLWC)
(Used only if MAQCHEM = 1) Default: 1 ! MLWC = 1 !
0 = water content estimated from cloud cover and presence of precipitation
1 = gridded cloud water data read from CALMET water content output files (filenames are the CALMET.DAT names PLUS the extension AUXEXT provided in Input Group 0)

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

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

Gravitational settling (plume tilt) modeled ? (MTILT) Default: 0 ! MTILT = 0 !
0 = no
1 = yes
(puff center falls at the gravitational settling velocity for 1 particle species)

Restrictions:
- MDRY = 1
- NSPEC = 1 (must be particle species as well)
- sg = 0 GEOMETRIC STANDARD DEVIATION in Group 8 is set to zero for a single particle diameter

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 = 3 !
1 = use sigma-v or sigma-theta measurements
from PROFILE.DAT to compute sigma-y
(valid for METFM = 1, 2, 3, 4, 5)
2 = use sigma-w measurements
from PROFILE.DAT to compute sigma-z
(valid for METFM = 1, 2, 3, 4, 5)
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, 5)
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.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY) Default: 0 ! MTAULY = 0 !
0 = Draxler default 617.284 (s)
1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
10 < Direct user input (s) -- e.g., 306.9

[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV) Default: 0 ! MTAUADV = 0 !
0 = No turbulence advection
1 = Computed (OPTION NOT IMPLEMENTED)
10 < Direct user input (s) -- e.g., 800

Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB) Default: 1 ! MCTURB = 1 !
1 = Standard CALPUFF subroutines
2 = AERMOD subroutines

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 modeled for
point sources?
(MPARTL)
0 = no
1 = yes

Partial plume penetration of Default: 1 ! MPARTLBA = 1 !
elevated inversion modeled for
buoyant area sources?
(MPARTLBA)
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

Note: MBCON > 0 requires that the last species modeled
be 'BCON'. Mass is placed in species BCON when
generating boundary condition puffs so that clean
air entering the modeling domain can be simulated
in the same way as polluted air. Specify zero
emission of species BCON for all regular sources.

Individual source contributions saved?
Default: 0 ! MSOURCE = 0 !
(MSOURCE)
0 = no
1 = yes

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
MRISE 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
MPARTLBA 0
SYTDEP 550. (m)
MHFTSZ 0
SVMIN 0.5 (m/s)

!END!

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

Subgroup (3a)

The following species are modeled:

! CSPEC = NOX ! !END!
! CSPEC = CO ! !END!

SPECIES NAME (Limit: 12 Characters in length)	MODELED (0=NO, 1=YES)	Dry EMITTED (0=NO, 1=YES)	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.)
! NOX =	1,	1,	0,	0 !
! CO =	1,	1,	0,	0 !

!END!

Note: The last species in (3a) must be 'BCON' when using the boundary condition option (MBCON > 0). Species BCON should typically be modeled as inert (no chem transformation or removal).

Subgroup (3b)

The following names are used for Species-Groups in which results
for certain species are combined (added) prior to output. The
CGRUP name will be used as the species name in output files.
Use this feature to model specific particle-size distributions
by treating each size-range as a separate species.
Order must be consistent with 3(a) above.

INPUT GROUP: 4 -- Map Projection and Grid control parameters

Projection for all (X,Y):

Map projection
(PMAP) Default: UTM ! PMAP = UTM !

UTM : Universal Transverse Mercator
TTM : Tangential Transverse Mercator
LCC : Lambert Conformal Conic
PS : Polar Stereographic
EM : Equatorial Mercator
LAZA : Lambert Azimuthal Equal Area

False Easting and Northing (km) at the projection origin
(Used only if PMAP= TTM, LCC, or LAZA)
(FEAST) Default=0.0 ! FEAST = 0.000 !
(FNORTH) Default=0.0 ! FNORTH = 0.000 !

UTM zone (1 to 60)
(Used only if PMAP=UTM)
(IUTMZN) No Default ! IUTMZN = 32 !

Hemisphere for UTM projection?
(Used only if PMAP=UTM)
(UTMHEM) Default: N ! UTMHEM = N !
N : Northern hemisphere projection
S : Southern hemisphere projection

Latitude and Longitude (decimal degrees) of projection origin
(Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
(RLAT0) No Default ! RLAT0 = 0N !
(RLON0) No Default ! RLON0 = 0E !

TTM : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience
LCC : RLON0 identifies central (true N/S) meridian of projection
RLAT0 selected for convenience

PS : RLON0 identifies central (grid N/S) meridian of projection
RLAT0 selected for convenience
EM : RLON0 identifies central meridian of projection
RLAT0 is REPLACED by 0.0N (Equator)
LAZA: RLON0 identifies longitude of tangent-point of mapping plane
RLAT0 identifies latitude of tangent-point of mapping plane

Matching parallel(s) of latitude (decimal degrees) for projection
(Used only if PMAP= LCC or PS)
(XLAT1) No Default ! XLAT1 = 0N !
(XLAT2) No Default ! XLAT2 = 0N !

LCC : Projection cone slices through Earth's surface at XLAT1 and XLAT2
PS : Projection plane slices through Earth at XLAT1
(XLAT2 is not used)

Note: Latitudes and longitudes should be positive, and include a
letter N,S,E, or W indicating north or south latitude, and
east or west longitude. For example,
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 = WGS-84 !

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 = 60 !

No. Y grid cells (NY) No default ! NY = 60 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 0.1 !
Units: km

Reference grid coordinate of
SOUTHWEST corner of grid cell (1,1)

X coordinate (XORIGKM) No default ! XORIGKM = 675.000 !
Y coordinate (YORIGKM) No default ! YORIGKM = 4850.000 !
Units: km

Vertical grid definition:

No. of vertical layers (NZ) No default ! NZ = 5 !

Cell face heights in arbitrary
vertical grid (ZFACE(NZ+1)) No defaults
Units: m
! ZFACE = 0.,20.,80.,150.,300.,600. !

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 = 60 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 60 !
(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/MESHDN.

Logical flag indicating if gridded
receptors are used (LSAMP) Default: T ! LSAMP = T !
(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 = 60 !
(IBCOMP <= IESAMP <= IECOMP)

Y index of UR corner (JESAMP) No default ! JESAMP = 60 !
(JBCOMP <= JESAMP <= JECOMP)

Nesting factor of the sampling
grid (MESHDN) Default: 1 ! MESHDN = 2 !
(MESHDN 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 = 0 !
Wet Fluxes (IWET)	1	! IWET = 0 !
2D Temperature (IT2D)	0	! IT2D = 0 !
2D Density (IRHO)	0	! IRHO = 0 !
Relative Humidity (IVIS) (relative humidity file is required for visibility analysis)	1	! IVIS = 0 !

Use data compression option in output file?
(LCOMPRS) Default: T ! LCOMPRS = T !

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

QA PLOT FILE OUTPUT OPTION:

Create a standard series of output files (e.g.
locations of sources, receptors, grids ...)
suitable for plotting?
(IQAPLOT) Default: 1 ! IQAPLOT = 1 !
0 = no
1 = yes

DIAGNOSTIC PUFF-TRACKING OUTPUT OPTION:

Puff locations and properties reported to
PFTRAK.DAT file for postprocessing?
(IPFTRAK) Default: 0 ! IPFTRAK = 0 !
0 = no
1 = yes, update puff output at end of each timestep
2 = yes, update puff output at end of each sampling step

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

Mass flux across specified boundaries
for selected species reported?
(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?
(IMBAL) Default: 0 ! IMBAL = 1 !
0 = no
1 = yes (MASSBAL.DAT filename is
specified in Input Group 0)

NUMERICAL RISE OUTPUT OPTION:

Create a file with plume properties for each rise
increment, for each model timestep?
This applies to sources modeled with numerical rise
and is limited to ONE source in the run.
(INRISE) Default: 0 ! INRISE = 0 !
0 = no
1 = yes (RISE.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 timesteps Default: 1 ! ICFRQ = 1 !
Dry flux print interval
(IDFRQ) in timesteps Default: 1 ! IDFRQ = 1 !
Wet flux print interval
(IWFRQ) in timesteps 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 ---- PRINTED?	SAVED ON DISK?	------ DRY FLUXES ------ PRINTED?	SAVED ON DISK?	------ WET FLUXES ------ PRINTED?	SAVED ON DISK?	-- MASS FLUX -- SAVED ON DISK?
! NOX =	0,	1,	0,	0,	0,	0,	0 !
! CO =	0,	1,	0,	0,	0,	0,	0 !

Note: Species BCON (for MBCON > 0) does not need to be saved on disk.

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 = 1 !

Met. period to start output
(NN1) Default: 1 ! NN1 = 1 !

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 = 2 !
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 Default: 1.0 ! XHILL2M = 1.0 !
to meters (MHILL=1)

Factor to convert vertical dimensions Default: 1.0 ! ZHILL2M = 1.0 !
to meters (MHILL=1)

X-origin of CTDM system relative to No Default ! XCTDMKM = 0 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

Y-origin of CTDM system relative to No Default ! YCTDMKM = 0 !
CALPUFF coordinate system, in Kilometers (MHILL=1)

! 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)	(deg.)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)

Subgroup (6c)

COMPLEX TERRAIN RECEPTOR INFORMATION

XRCT (km)	YRCT (km)	ZRCT (m)	XHH

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 NAME	DIFFUSIVITY (cm**2/s)	ALPHA STAR	REACTIVITY (s/cm)	MESOPHYLL RESISTANCE (dimensionless)	HENRY'S LAW COEFFICIENT
! NOX =	.1656,	1.0,	8.0,	5.0,	3.5 !
! CO =	.186,	1.0,	2.0,	61.0,	44.0 !

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

!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.

!END!

INPUT GROUP: 11a, 11b -- Chemistry Parameters

Subgroup (11a)

Several parameters are needed for one or more of the chemical transformation mechanisms. Those used for each mechanism are:

Mechanism (MCHEM)	Z	3	3	3	3	1	2	3	2	2	F	C	X	Y
						M			B					
						A	B	R	R	R		C	B	N
					B		V	C	N	N	N	M	K	C	O		D
					C	M	G	K	I	I	I	H	H	K	F	V	E
				M	K	N	N	N	T	T	T	2	2	P	R	C	C
				O	O	H	H	H	E	E	E	O	O	M	A	N	A
0 None	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1 MESOPUFF II	X	X	.	.	X	X	X	X	.	.	.	.	.	.	.	.	.
2 User Rates	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3 RIVAD	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
4 SOA	X	X	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.
5 Radioactive Decay	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
6 RIVAD/ISORRPIA	X	X	X	X	X	X	.	.	X	X	.	.	.	.	.	.	.
7 RIVAD/ISORRPIA/SOA	X	X	X	X	X	X	.	.	X	X	X	X	.	.	.	.	.

Ozone data input option (MOZ) Default: 1 ! MOZ = 1 !
(Used only if MCHEM = 1, 3, 4, 6, or 7)
0 = use a monthly background ozone value
1 = read hourly ozone concentrations from
the OZONE.DAT data file

Monthly ozone concentrations in ppb (BCKO3)
(Used only if MCHEM = 1,3,4,6, or 7 and either

```
  MOZ = 0, or
  MOZ = 1 and all hourly O3 data missing)
                    Default: 12*80.
! BCKO3 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00 !

Ammonia data option (MNH3)      Default: 0        ! MNH3 =  0   !
(Used only if MCHEM = 6 or 7)
  0 = use monthly background ammonia values (BCKNH3) - no vertical variation
  1 = read monthly background ammonia values for each layer from
    the NH3Z.DAT data file

Ammonia vertical averaging option (MAVGNH3)
(Used only if MCHEM = 6 or 7, and MNH3 = 1)
  0 = use NH3 at puff center height (no averaging is done)
  1 = average NH3 values over vertical extent of puff
                    Default: 1        ! MAVGNH3 =  1   !

Monthly ammonia concentrations in ppb (BCKNH3)
(Used only if MCHEM = 1 or 3, or
      if MCHEM = 6 or 7, and MNH3 = 0)
                    Default: 12*10.
! BCKNH3 = 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00, 10.00 !

Nighttime SO2 loss rate in %/hour (RNITE1)
(Used only if MCHEM = 1, 6 or 7)
This rate is used only at night for MCHEM=1
and is added to the computed rate both day
and night for MCHEM=6,7 (heterogeneous reactions)
                    Default: 0.2        ! RNITE1 = .2 !

Nighttime NOx loss rate in %/hour (RNITE2)
(Used only if MCHEM = 1)
                    Default: 2.0        ! RNITE2 = 2.0 !

Nighttime HNO3 formation rate in %/hour (RNITE3)
(Used only if MCHEM = 1)
                    Default: 2.0        ! RNITE3 = 2.0 !

H2O2 data input option (MH2O2)    Default: 1        ! MH2O2 =  1   !
(Used only if MCHEM = 6 or 7, and MAQCHEM = 1)
  0 = use a monthly background H2O2 value
  1 = read hourly H2O2 concentrations from
    the H2O2.DAT data file

Monthly H2O2 concentrations in ppb (BCKH2O2)
(Used only if MQACHEM = 1 and either
  MH2O2 = 0 or
  MH2O2 = 1 and all hourly H2O2 data missing)
                    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) Options
```

(used only if MCHEM = 4 or 7)

The MCHEM = 4 SOA module uses monthly values of:
Fine particulate concentration in ug/m^3 (BCKPMF)
Organic fraction of fine particulate (OFRAC)
VOC / NOX ratio (after reaction) (VCNX)

The MCHEM = 7 SOA module uses monthly values of:
Fine particulate concentration in ug/m^3 (BCKPMF)
Organic fraction of fine particulate (OFRAC)

These characterize the air mass when computing
the formation of SOA from VOC emissions.
Typical values for several distinct air mass types are:

Month	1 Jan	2 Feb	3 Mar	4 Apr	5 May	6 Jun	7 Jul	8 Aug	9 Sep	10 Oct	11 Nov	12 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
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

Regional Plume

BCKPMF	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.	20.
OFRAC	.20	.20	.25	.35	.25	.40	.40	.40	.30	.30	.30	.20
VCNX	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.	15.

Urban - no controls present

BCKPMF	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
OFRAC	.30	.30	.35	.35	.35	.55	.55	.55	.35	.35	.35	.30
VCNX	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

Default: Clean Continental
! BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
! OFRAC = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
! VCNX = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !

--- End Data for SECONDARY ORGANIC AEROSOL (SOA) Option

Number of half-life decay specification blocks provided in Subgroup 11b
(Used only if MCHEM = 5)
(NDECAY) Default: 0 ! NDECAY = 0 !

!END!

Subgroup (11b)

Each species modeled may be assigned a decay half-life (sec), and the associated mass lost may be assigned to one or more other modeled species using a mass yield factor. This information is used only for MCHEM=5.

Provide NDECAY blocks assigning the half-life for a parent species and mass yield factors for each child species (if any) produced by the decay.
Set HALF_LIFE=0.0 for NO decay (infinite half-life).

```
                  a          b
    SPECIES     Half-Life   Mass Yield
     NAME         (sec)      Factor
    -------     ---------  ----------

  *  SPEC1  =   3600.,      -1.0  *   (Parent)
  *  SPEC2  =    -1.0,       0.0  *   (Child)
 *END*
```

---
a
Specify a half life that is greater than or equal to zero for 1 parent species in each block, and set the yield factor for this species to -1
b
Specify a yield factor that is greater than or equal to zero for 1 or more child species in each block, and set the half-life for each of these species to -1

NOTE: Assignments in each block are treated as a separate input
subgroup and therefore must end with an input group terminator.
If NDECAY=0, no assignments and input group terminators should appear.

INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---

Horizontal size of puff (m) beyond which
time-dependent dispersion equations (Heffter)
are used to determine sigma-y and

sigma-z (SYTDEP) Default: 550. ! SYTDEP = 5.5E02 !

Switch for using Heffter equation for sigma z
as above (0 = Not use Heffter; 1 = use Heffter
(MHFTSZ) Default: 0 ! MHFTSZ = 0 !

Stability class used to determine plume
growth rates for puffs above the boundary
layer (JSUP) Default: 5 ! JSUP = 5 !

Vertical dispersion constant for stable
conditions (k1 in Eqn. 2.7-3) (CONK1) Default: 0.01 ! CONK1 = .01 !

Vertical dispersion constant for neutral/
unstable conditions (k2 in Eqn. 2.7-4)
(CONK2) Default: 0.1 ! CONK2 = .1 !

Factor for determining Transition-point from
Schulman-Scire to Huber-Snyder Building Downwash
scheme (SS used for Hs < Hb + TBD * HL)
(TBD) Default: 0.5 ! TBD = .5 !
TBD < 0 ==> always use Huber-Snyder
TBD = 1.5 ==> always use Schulman-Scire
TBD = 0.5 ==> ISC Transition-point

Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2) Default: 10 ! IURB1 = 10 !
19 ! IURB2 = 19 !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4,5)

Land use category for modeling domain
(ILANDUIN) Default: 20 ! ILANDUIN = 20 !

Roughness length (m) for modeling domain
(Z0IN) Default: 0.25 ! Z0IN = .25 !

Leaf area index for modeling domain
(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 turbulance data in PROFILE.DAT file
(Used only if METFM = 4,5 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 !

Maximum sigma z (m) allowed to avoid
numerical problem in calculating virtual
time or distance. Cap should be large
enough to have no influence on normal events.
Enter a negative cap to disable.
(SZCAP_M) Default: 5.0e06 ! SZCAP_M = 5.0E06 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

---------- LAND ---------- --------- WATER ----------

```
  Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
           ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016

    ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
    ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 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
full adjustment is reached at CDIV(2)
(CDIV(2))                       Default: 0.0,0.0  ! CDIV = .0, .0 !

Search radius (number of cells) for nearest
land and water cells used in the subgrid
TIBL module
(NLUTIBL)                       Default: 4      ! NLUTIBL =  4  !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                        Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                        Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                        Default: 50.    ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                  Default   :
                      ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                  Wind Speed Class :  1     2     3     4     5
                               ---   ---   ---   ---   ---
                       ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                   Default   : ISC RURAL values
                      ISC RURAL : .07, .07, .10, .15, .35, .55
                      ISC URBAN : .15, .15, .20, .25, .30, .30

                   Stability Class :  A     B     C     D     E     F
                               ---   ---   ---   ---   ---   ---
                       ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
```

for stable classes E, F (degK/m)
(PTG0(2)) Default: 0.020, 0.035
! PTG0 = 0.020, 0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6)) Stability Class : A B C D E F
Default PPC : .50, .50, .50, .50, .35, .35
--- --- --- --- --- ---
! PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF) Default: 10. ! SL2PF = 10.0 !

Puff-splitting control variables ----------

VERTICAL SPLIT

Number of puffs that result every time a puff
is split - nsplit=2 means that 1 puff splits
into 2
(NSPLIT) Default: 3 ! NSPLIT = 3 !

Time(s) of a day when split puffs are eligible to
be split once again; this is typically set once
per day, around sunset before nocturnal shear develops.
24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
0=do not re-split 1=eligible for re-split
(IRESPLIT(24)) Default: Hour 17 = 1
! IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

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
(SHSPLITH) Default: 2. ! SHSPLITH = 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 (km) about a receptor for sampling nearest BC puff.
BC puffs are typically emitted with a spacing of one grid cell
length, so the search radius should be greater than DGRIDKM.
(RSAMPBC) Default: 10. ! RSAMPBC = 10.0 !

Near-Surface depletion adjustment to concentration profile used when
sampling BC puffs?
(MDEPBC) Default: 1 ! MDEPBC = 1 !
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 = 2 !
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
8 = Bq/s (Bq = becquerel = disintegrations/s)
9 = GBq/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 = LT5 !
1 ! X = 678.831519, 4852.389824587, 20.0, 49.4, 1.50, 27.817, 848.15, 1.0, 1.710, 1.425 !
1 ! ZPLTFM = .0 !
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)
ZPLTFM is the platform height (m) for sources influenced by an isolated
structure that has a significant open area between the surface
and the bulk of the structure, such as an offshore oil platform.
The Base Elevation is that of the surface (ground or ocean),
and the Stack Height is the release height above the Base (not
above the platform). Building heights entered in Subgroup 13c
must be those of the buildings on the platform, measured from
the platform deck. ZPLTFM is used only with MBDW=1 (ISC
downwash method) for sources with building downwash.
(Default: 0.0)

b
0. = No building downwash modeled
1. = Downwash modeled for buildings resting on the surface
2. = Downwash modeled for buildings raised above the surface (ZPLTFM > 0.)
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 a
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)
------ ---

1 ! SRCNAM = LT5 !

```
1   ! HEIGHT  =  12.0,   12.0,   12.0,   12.0,   12.0,   12.0,
             12.0,   12.0,   12.0,   12.0,   12.0,   12.0,
             12.0,   12.0,   12.0,   12.0,   12.0,   12.0,
             12.0,   12.0,   12.0,   12.0,   12.0,   12.0,
             12.0,   12.0,   12.0,   12.0,   12.0,   12.0,
             12.0,   12.0,   12.0,   12.0,   12.0,   12.0!
1   ! WIDTH  =  163.34,   147.06,   126.25,   101.75,   118.0,   139.5,
             156.5,   143.5,   176.5,   178.5,   175.5,   166.5,
             153.0,   165.75,   176.5,   181.25,   180.75,   174.69,
             163.36,   147.06,   126.25,   101.75,   117.75,   139.25,
             157.0,   143.5,   142.0,   136.0,   125.5,   111.5,
             94.25,   105.0,   120.25,   181.25,   180.75,   174.69!
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,
             .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,
             .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,
             .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)

---

a

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
- 8 = Bq/m**2/s (Bq = becquerel = disintegrations/s)
- 9 = GBq/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

a

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: LNEMARB.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
8 = Bq/s (Bq = becquerel = disintegrations/s)
9 = GBq/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) (in meters) No default ! XL = .0 !

Average building height (HBL) (in meters) No default ! HBL = .0 !

Average building width (WBL) (in meters) No default ! WBL = .0 !

Average line source width (WML) (in meters) No default ! WML = .0 !

Average separation between buildings (DXL) (in meters) No default ! DXL = .0 !

Average buoyancy parameter (FPRIMEL) (in m**4/s**3) No default ! FPRIMEL = .0 !

!END!

Subgroup (15b)

BUOYANT LINE SOURCE: CONSTANT DATA

Source No.	Beg. X Coordinate	Beg. Y Coordinate	End. X Coordinate	End. Y Coordinate	Release Height	Base Elevation[a]	Emission 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
8 = Bq/s (Bq = becquerel = disintegrations/s)
9 = GBq/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
---

b

X Coordinate (km)	Y Coordinate (km)	Effect. Height (m)	Base Elevation (m)	Initial Sigma y (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 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 = 13 !

!END!

Subgroup (17b)
---

a
NON-GRIDDED (DISCRETE) RECEPTOR DATA

Receptor No.	X Coordinate (km)	Y Coordinate (km)	Ground Elevation (m)	Height b Above Ground (m)

1 ! X = 678.80461541977, 4852.5415760296, 49.407923672969, 0.0 ! !END!
2 ! X = 678.42010825476, 4852.3242458928, 44.990786949077, 0.0 ! !END!
3 ! X = 678.9508953195, 4852.7965209977, 50.739922775653, 0.0 ! !END!

4 ! X = 678.8530956838, 4852.2688812776, 49.739922775653, 0.0 ! !END!
5 ! X = 678.8530956838, 4852.2688812776, 49.739922775653, 10.0 ! !END!
6 ! X = 678.8530956838, 4852.2688812776, 49.739922775653, 20.0 ! !END!

7 ! X = 678.89381247464, 4852.2118777704, 49.739922775653, 0.0 ! !END!
8 ! X = 678.89381247464, 4852.2118777704, 49.739922775653, 10.0 ! !END!
9 ! X = 678.89381247464, 4852.2118777704, 49.739922775653, 20.0 ! !END!

10 ! X =678.72482468213, 4852.7855050338, 48.621435970331, 0.0 ! !END!
11 ! X =678.78375753942, 4852.8337228261, 49.054011852439, 0.0 ! !END!

12 ! X =680.66262116541, 4851.3316166223, 55.740968665878, 0.0 ! !END!

13! X= 678.650085, 4852.46484, 46.7000008, 0.00000000E+00, 0.0 ! !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.