```
CALPUFF Input File
Cleco, Brame Energy Center, Rodemacher II (DSI+FF, 0.5 lb/MMBtu)
2003 Baseline, REV B


---------------- 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 =CMET.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 =CP_RODE_DSI_03B.LST  !
CONC.DAT      output   ! CONDAT =CP_RODE_DSI_03B.DAT     !
DFLX.DAT      output   ! DFDAT  =CP_RODE_DSI_03B.DRY     !
WFLX.DAT      output   ! WFDAT  =CP_RODE_DSI_03B.WET     !

VISB.DAT      output   ! VISDAT =CP_RODE_DSI_03B.VIS     !
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  =E:\LA Ozone Files (Trinity)\O3_2003_v3.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=CP_RODE_DSI_03B.FLX            !
MASSBAL.DAT   output   ! BALDAT=CP_RODE_DSI_03B.BAL            !
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 = F !
        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 =   12   !

    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
------------  ----          ---------
CALMET1.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met01.met!  !END!
CALMET2.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met02.met!  !END!
CALMET3.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met03.met!  !END!
CALMET4.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met04.met!  !END!
CALMET5.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met05.met!  !END!
CALMET6.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met06.met!  !END!
CALMET7.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met07.met!  !END!
CALMET8.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met08.met!  !END!
CALMET9.DAT   input    ! METDAT=E:\Refined CENRAP\2003\03met09.met!  !END!
CALMET10.DAT  input    ! METDAT=E:\Refined CENRAP\2003\03met10.met!  !END!
CALMET11.DAT  input    ! METDAT=E:\Refined CENRAP\2003\03met11.met!  !END!
CALMET12.DAT  input    ! METDAT=E:\Refined CENRAP\2003\03met12.met!  !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 =  2003  !
(used only if   Month (IBMO) -- No default       ! IBMO =  1  !
 METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  1  !
              Hour (IBHR) -- No default       ! IBHR =  0  !

Note: IBHR is the time at the END of the first hour of the simulation
     (IBHR=1, the first hour of a day, runs from 00:00 to 01:00)

Base time zone        (XBTZ) -- No default       ! XBTZ = 6.0  !
The zone is the number of hours that must be
ADDED to the time to obtain UTC (or GMT)
Examples: PST = 8., MST = 7.
        CST = 6., EST = 5.

Length of run (hours) (IRLG) -- No default       ! IRLG =  8740  !

Number of chemical species (NSPEC)
                         Default: 5       ! NSPEC =  9  !

Number of chemical species
to be emitted  (NSE)           Default: 3       ! NSE =  7   !

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. !


!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 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)

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., 300

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?
(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

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 = 1 !

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
                SVMIN    0.5 (m/s)


!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 =        PMC !        !END!
! CSPEC =        PMF !        !END!
! CSPEC =         EC !        !END!
! CSPEC =        SOA !        !END!

                                        Dry              OUTPUT GROUP
   SPECIES        MODELED        EMITTED      DEPOSITED              NUMBER
    NAME       (0=NO, 1=YES)   (0=NO, 1=YES)   (0=NO,              (0=NONE,
  (Limit: 12                      1=COMPUTED-GAS       1=1st CGRUP,
   Characters                       2=COMPUTED-PARTICLE   2=2nd CGRUP,
   in length)                     3=USER-SPECIFIED)     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   !
!       PMC  =       1,            1,        2,             0   !
!       PMF  =       1,            1,        2,             0   !
!        EC  =       1,            1,        2,             0   !
!       SOA  =       1,            1,        2,             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 = LCC !

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 = -999 !

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 = 40N !
(RLON0) No Default ! RLON0 = 97W !

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 = 33N !
(XLAT2) No Default ! XLAT2 = 45N !

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-G !

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 = 462 !
No. Y grid cells (NY) No default ! NY = 376 !
No. vertical layers (NZ) No default ! NZ = 12 !

Grid spacing (DGRIDKM) No default ! DGRIDKM = 4.0 !
Units: km

Cell face heights
(ZFACE(nz+1)) No defaults
Units: m
! ZFACE = 0.,20.,40.,60.,80.,100.,150.,200.,250.,500.,1000.,2000.,3500. !

Reference Coordinates
of SOUTHWEST corner of
grid cell(1, 1):

X coordinate (XORIGKM) No default ! XORIGKM = -951.547 !
Y coordinate (YORIGKM) No default ! YORIGKM = -1646.637 !
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 = 288 !
(1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP) No default ! JBCOMP = 117 !
(1 <= JBCOMP <= NY)

X index of UR corner (IECOMP) No default ! IECOMP = 451 !
(1 <= IECOMP <= NX)

Y index of UR corner (JECOMP) No default ! JECOMP = 274 !
(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 = 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 =  462   !
       (IBCOMP <= IESAMP <= IECOMP)

      Y index of UR corner (JESAMP)      No default     ! JESAMP =  376    !
       (JBCOMP <= JESAMP <= JECOMP)


     Nesting factor of the sampling
      grid (MESHDN)                    Default: 1     ! MESHDN =  1  !
      (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 =  1   !
  Wet Fluxes (IWET)               1                 !  IWET =  1   !
  2D Temperature (IT2D)            0                 !  IT2D =  0   !
  2D Density (IRHO)               0                 !  IRHO =  0   !
  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


   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 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 = 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 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 -- PRINTED? | SAVED ON DISK? |
|---|---|---|---|---|---|---|---|---|
| ! SO2 = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |
| ! SO4 = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |
| ! NOX = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |
| ! HNO3 = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |
| ! NO3 = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |
| ! PMC = | 0, | 1, | 0, | 1, | 0, | 1, | 1 | ! |

```
!        PMF =    0,        1,        0,        1,        0,        1,        1   !
!         EC =    0,        1,        0,        1,        0,        1,        1   !
!        SOA =    0,        1,        0,        1,        0,        1,        1   !
```

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 CALPUFF coordinate system, in Kilometers (MHILL=1) No Default ! XCTDMKM = 0 !

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

! END !

---
Subgroup (6b)
---

1 **
HILL information

| HILL NO. | XC (km) | YC (km) | THETAH (deg.) | ZGRID (m) | RELIEF (m) | EXPO 1 (m) | EXPO 2 (m) | SCALE 1 (m) | SCALE 2 (m) | AMAX1 (m) | AMAX2 (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     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
      NAME       (cm**2/s)                                (s/cm)            (dimensionless)
     -------     -----------      ----------      ----------    --------------------     -----------------------

!        SO2 =      .1509,       1000.0,          8.0,              .0,                .04 !
!        NOX =      .1656,          1.0,          8.0,             5.0,                3.5 !
!       HNO3 =      .1628,          1.0,         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 =          .48,                    2.0   !
!        NO3 =          .48,                    2.0   !
!        PMC =          .48,                    2.0   !
!        PMF =          .48,                    2.0   !
!         EC =          .48,                    2.0   !
!        SOA =          .48,                    2.0   !

!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 !
!        PMC =          1.0E-04,             3.0E-05 !
!        PMF =         1.0E-04,             3.0E-05 !
!         EC =         1.0E-04,            3.0E-05 !
!        SOA =          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 = 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00, 80.00 !

Monthly ammonia concentrations
(Used only if MCHEM = 1, or 3)
(BCKNH3) in ppb Default: 12*10.
! BCKNH3 = 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00, 3.00 !

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 MQACHEM = 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/m^3 (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
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!

---

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 = 10.0 !
```

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW) Default: 99 ! MXNEW = 60 !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM) Default: 99 ! MXSAM = 60 !

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 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, 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
! 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 !

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 = 20.0 !

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 = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0 !

  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 = 3 !
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
---

| Source No. | X Coordinate (km) | Y Coordinate (km) | Stack Height (m) | Base Elevation (m) | Stack Diameter (m) | b Exit Vel. (m/s) | c Exit Temp. (deg. K) | Bldg. Dwash | Emission Rates |
|---|---|---|---|---|---|---|---|---|---|

```
------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
 1 ! SRCNAM = Unit_2 !
 1 ! X =   408.412,   -942.286,  81.08, 34.16,  5.486,  36.271, 425.93,      0,
       3876.00,0,3298.63,0,0,22.89,22.04,0.85,143.82!
 1 ! ZPLTFM = 0 !
 1 ! FMFAC = 1 !
 1 ! 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)
------ ----------

---

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

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 a
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 = 3 !
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 Default: 6 ! NLRISE = 6 !
transitional rise is computed

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
---

| Source No. | Beg. X Coordinate (km) | Beg. Y Coordinate (km) | End. X Coordinate (km) | End. Y Coordinate (km) | Release Height[a] (m) | Base Elevation (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 ILNTU (e.g. 1 for g/s).

---
Subgroup (15c)
---

BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA[a]
---

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 =  3  !
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
---

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 = 120 !

!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 = 270.32594, | -617.51875, | 365, | 0.000! | !END! |
| 2 | !X = 271.09038, | -617.49392, | 365, | 0.000! | !END! |
| 3 | !X = 271.85481, | -617.46902, | 368, | 0.000! | !END! |
| 4 | !X = 268.76735, | -616.64630, | 411, | 0.000! | !END! |
| 5 | !X = 269.53171, | -616.62161, | 462, | 0.000! | !END! |
| 6 | !X = 270.29606, | -616.59685, | 431, | 0.000! | !END! |
| 7 | !X = 271.06042, | -616.57202, | 518, | 0.000! | !END! |
| 8 | !X = 271.82476, | -616.54712, | 487, | 0.000! | !END! |
| 9 | !X = 272.58911, | -616.52215, | 396, | 0.000! | !END! |
| 10 | !X = 265.68053, | -615.82245, | 518, | 0.000! | !END! |
| 11 | !X = 266.44481, | -615.79804, | 523, | 0.000! | !END! |
| 12 | !X = 267.20909, | -615.77356, | 548, | 0.000! | !END! |
| 13 | !X = 267.97337, | -615.74902, | 579, | 0.000! | !END! |
| 14 | !X = 268.73764, | -615.72440, | 547, | 0.000! | !END! |
| 15 | !X = 269.50191, | -615.69971, | 538, | 0.000! | !END! |
| 16 | !X = 270.26618, | -615.67495, | 640, | 0.000! | !END! |
| 17 | !X = 271.03045, | -615.65013, | 608, | 0.000! | !END! |
| 18 | !X = 260.30172, | -615.06941, | 335, | 0.000! | !END! |
| 19 | !X = 261.06593, | -615.04550, | 431, | 0.000! | !END! |
| 20 | !X = 261.83014, | -615.02151, | 457, | 0.000! | !END! |
| 21 | !X = 262.59435, | -614.99746, | 414, | 0.000! | !END! |
| 22 | !X = 263.35855, | -614.97334, | 426, | 0.000! | !END! |
| 23 | !X = 264.12276, | -614.94914, | 426, | 0.000! | !END! |
| 24 | !X = 264.88696, | -614.92488, | 388, | 0.000! | !END! |
| 25 | !X = 265.65116, | -614.90054, | 388, | 0.000! | !END! |
| 26 | !X = 266.41536, | -614.87614, | 365, | 0.000! | !END! |
| 27 | !X = 267.17955, | -614.85167, | 386, | 0.000! | !END! |
| 28 | !X = 267.94374, | -614.82712, | 396, | 0.000! | !END! |
| 29 | !X = 268.70793, | -614.80251, | 426, | 0.000! | !END! |
| 30 | !X = 269.47212, | -614.77782, | 446, | 0.000! | !END! |
| 31 | !X = 270.23631, | -614.75307, | 441, | 0.000! | !END! |
| 32 | !X = 271.00049, | -614.72824, | 457, | 0.000! | !END! |
| 33 | !X = 271.76467, | -614.70335, | 465, | 0.000! | !END! |
| 34 | !X = 272.52885, | -614.67838, | 442, | 0.000! | !END! |
| 35 | !X = 273.29303, | -614.65335, | 426, | 0.000! | !END! |
| 36 | !X = 260.27294, | -614.14750, | 304, | 0.000! | !END! |
| 37 | !X = 261.03706, | -614.12359, | 304, | 0.000! | !END! |
| 38 | !X = 261.80119, | -614.09960, | 319, | 0.000! | !END! |
| 39 | !X = 262.56531, | -614.07555, | 334, | 0.000! | !END! |
| 40 | !X = 263.32944, | -614.05143, | 370, | 0.000! | !END! |
| 41 | !X = 264.09356, | -614.02724, | 405, | 0.000! | !END! |
| 42 | !X = 264.85767, | -614.00298, | 409, | 0.000! | !END! |
| 43 | !X = 265.62179, | -613.97865, | 450, | 0.000! | !END! |
| 44 | !X = 266.38590, | -613.95425, | 518, | 0.000! | !END! |
| 45 | !X = 267.15001, | -613.92978, | 609, | 0.000! | !END! |

```
46 !X = 267.91412, -613.90524,    534,     0.000!  !END!
47 !X = 268.67823, -613.88062,    517,     0.000!  !END!
48 !X = 269.44233, -613.85594,    575,     0.000!  !END!
49 !X = 270.20643, -613.83119,    600,     0.000!  !END!
50 !X = 270.97053, -613.80637,    609,     0.000!  !END!
51 !X = 271.73463, -613.78148,    609,     0.000!  !END!
52 !X = 272.49872, -613.75651,    561,     0.000!  !END!
53 !X = 261.00820, -613.20168,    335,     0.000!  !END!
54 !X = 261.77224, -613.17771,    432,     0.000!  !END!
55 !X = 262.53628, -613.15366,    487,     0.000!  !END!
56 !X = 263.30032, -613.12954,    499,     0.000!  !END!
57 !X = 264.06435, -613.10535,    514,     0.000!  !END!
58 !X = 264.82839, -613.08109,    442,     0.000!  !END!
59 !X = 265.59242, -613.05676,    439,     0.000!  !END!
60 !X = 266.35645, -613.03237,    395,     0.000!  !END!
61 !X = 267.12047, -613.00790,    400,     0.000!  !END!
62 !X = 267.88449, -612.98336,    426,     0.000!  !END!
63 !X = 268.64852, -612.95875,    487,     0.000!  !END!
64 !X = 269.41254, -612.93407,    548,     0.000!  !END!
65 !X = 270.17655, -612.90932,    548,     0.000!  !END!
66 !X = 270.94057, -612.88450,    548,     0.000!  !END!
67 !X = 271.70458, -612.85962,    535,     0.000!  !END!
68 !X = 261.74329, -612.25582,    304,     0.000!  !END!
69 !X = 262.50725, -612.23177,    334,     0.000!  !END!
70 !X = 263.27120, -612.20765,    396,     0.000!  !END!
71 !X = 264.03515, -612.18347,    457,     0.000!  !END!
72 !X = 264.79910, -612.15921,    457,     0.000!  !END!
73 !X = 265.56305, -612.13489,    426,     0.000!  !END!
74 !X = 266.32699, -612.11049,    411,     0.000!  !END!
75 !X = 267.09093, -612.08603,    406,     0.000!  !END!
76 !X = 267.85487, -612.06149,    396,     0.000!  !END!
77 !X = 268.61881, -612.03689,    401,     0.000!  !END!
78 !X = 269.38274, -612.01221,    397,     0.000!  !END!
79 !X = 261.71434, -611.33393,    322,     0.000!  !END!
80 !X = 262.47821, -611.30989,    334,     0.000!  !END!
81 !X = 777.7102,  -1118.0130,    0,       0.000!  !END!
82 !X = 779.9709,  -1115.9389,    0,       0.000!  !END!
83 !X = 780.6968,  -1114.9374,    0,       0.000!  !END!
84 !X = 781.4225,  -1113.9359,    0,       0.000!  !END!
85 !X = 785.6071,  -1106.0668,    0,       0.000!  !END!
86 !X = 789.2269,  -1101.0580,    0,       0.000!  !END!
87 !X = 789.7834,  -1098.1972,    0,       0.000!  !END!
88 !X = 791.2295,  -1096.1934,    1,       0.000!  !END!
89 !X = 791.1458,  -1095.2640,    1,       0.000!  !END!
90 !X = 791.7848,  -1093.3328,    1,       0.000!  !END!
91 !X = 791.7011,  -1092.4035,    1,       0.000!  !END!
92 !X = 792.3396,  -1090.4724,    1,       0.000!  !END!
93 !X = 792.2559,  -1089.5431,    1,       0.000!  !END!
94 !X = 792.1721,  -1088.6139,    1,       0.000!  !END!
95 !X = 792.0883,  -1087.6848,    1,       0.000!  !END!
96 !X = 792.0046,  -1086.7556,    0,       0.000!  !END!
97 !X = 791.9208,  -1085.8265,    0,       0.000!  !END!
98 !X = 791.7533,  -1083.9682,    0,       0.000!  !END!
99 !X = 792.5586,  -1083.8956,    1,       0.000!  !END!
100!X = 792.4747,  -1082.9665,    1,       0.000!  !END!
101!X = 791.5858,  -1082.1101,    0,       0.000!  !END!
```

```
102!X = 792.3909,  -1082.0375,    1,       0.000!  !END!
103!X = 791.5020,  -1081.1811,    0,       0.000!  !END!
104!X = 792.3071,  -1081.1085,    1,       0.000!  !END!
105!X = 791.4182,  -1080.2521,    1,       0.000!  !END!
106!X = 791.3345,  -1079.3231,    1,       0.000!  !END!
107!X = 790.4459,  -1078.4666,    0,       0.000!  !END!
108!X = 791.2507,  -1078.3941,    1,       0.000!  !END!
109!X = 790.3623,  -1077.5376,    0,       0.000!  !END!
110!X = 791.1670,  -1077.4651,    1,       0.000!  !END!
111!X = 790.2786,  -1076.6087,    0,       0.000!  !END!
112!X = 790.1949,  -1075.6798,    0,       0.000!  !END!
113!X = 790.1113,  -1074.7509,    1,       0.000!  !END!
114!X = 789.2232,  -1073.8944,    0,       0.000!  !END!
115!X = 789.1397,  -1072.9655,    0,       0.000!  !END!
116!X = 788.2519,  -1072.1090,    0,       0.000!  !END!
117!X = 788.1684,  -1071.1802,    1,       0.000!  !END!
118!X = 787.2808,  -1070.3236,    0,       0.000!  !END!
119!X = 786.3934,  -1069.4669,    0,       0.000!  !END!
120!X = 785.5062,  -1068.6102,    0,       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.