CALPUFF Version: 5.8.4 Level: 130731

****
****

Clock time: 09:52:54
Date: 10-15-2015

Internal Coordinate Transformations by --- COORDLIB Version: 1.98 Level: 060911

Run Title:
CALPUFF Input File
Cleco, Brame Energy Center, Rodemacher II (DSI+FF, 0.5 lb/MMbtu)
2002 Baseline, REV B

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 = 2002 !
(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 = 8753 !

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!

-------------------------------------------------
NOTICE: Starting year in control file sets the
      expected century for the simulation.  All
      YY years are converted to YYYY years in
      the range:  1952 2051
-------------------------------------------------
```

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          for
          Concentration    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

          ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS
FLUX --
  SPECIES
  /GROUP       PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED
ON DISK?   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      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)
```

```
----        ----     ----     ------  -----  ------   ------   ------  -------   -------   -----    -----

---------------
Subgroup (6c)
---------------

   COMPLEX TERRAIN RECEPTOR INFORMATION

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


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

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

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

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


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

     SPECIES    DIFFUSIVITY     ALPHA STAR     REACTIVITY    MESOPHYLL RESISTANCE
HENRY'S LAW COEFFICIENT
      NAME       (cm**2/s)                                  (s/cm)            (dimensionless)
     -------    -----------     ----------     ----------   --------------------    -----------------------

!        SO2 =     .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
        ----------------------------
                                                          b         c
  Source      X        Y      Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
            (km)      (km)      (m)      (m)       (m)  (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   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 No.	Ordered list of X followed by list of Y, grouped by source a
---	---

---
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)
---

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 = 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!
```

**** CONFIRMATION OF CONTROL DATA ****

---------- INPUT GROUP 1 ----------

metrun = 0
ibyr = 2002
ibmo = 1
ibdy = 1
ibhr = 0
irlg = 8753
xbtz = 6.00000000
nspec = 9
nse = 7
itest = 2
metfm = 1
mprffm = 1
mrestart= 0
nrespd = 0
avet = 60.0000000
pgtime = 60.0000000

---------- INPUT GROUP 2 ----------

mgauss = 1
mctadj = 3
mctsg = 0
mslug = 0
mtrans = 1
mchem = 1
maqchem = 0
mwet = 1
mdry = 1
mtilt = 0
mdisp = 3
mdisp2 = 3
mturbvw = 3
mtauly = 0.00000000E+00
mtauadv= 0
mcturb = 1
mrough = 0
mtip = 1
mbdw = 1
mshear = 0
msplit = 0
mpartl = 1
mtinv = 0
mpdf = 0
msgtibl= 0
mbcon = 0
msource= 0
mfog = 0
mreg = 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)

-------------- INPUT GROUP 3 ---------------

SPECIES: SO2      j: 1  isplst(-,j) =  1  1  1  GROUP: SO2
SPECIES: SO4      j: 2  isplst(-,j) =  1  1  2  GROUP: SO4
SPECIES: NOX      j: 3  isplst(-,j) =  1  1  1  GROUP: NOX
SPECIES: HNO3     j: 4  isplst(-,j) =  1  0  1  GROUP: HNO3
SPECIES: NO3      j: 5  isplst(-,j) =  1  0  2  GROUP: NO3
SPECIES: PMC      j: 6  isplst(-,j) =  1  1  2  GROUP: PMC
SPECIES: PMF      j: 7  isplst(-,j) =  1  1  2  GROUP: PMF
SPECIES: EC       j: 8  isplst(-,j) =  1  1  2  GROUP: EC
SPECIES: SOA      j: 9  isplst(-,j) =  1  1  2  GROUP: SOA

-------------- INPUT GROUP 4 ---------------

pmap    = LCC
datum   = WGS-G
daten   = 02-21-2003
feast   = 0.00000000E+00
fnorth  = 0.00000000E+00
rlat0   = 40.0000000
rlon0   = 97.0000000
xlat1   = 33.0000000
xlat2   = 45.0000000
nx      = 462
ny      = 376
nz      = 12
zface  = 0.00000000E+00 20.0000000 40.0000000 60.0000000 80.0000000 100.000000 150.000000
200.000000 250.000000 500.000000 1000.00000 2000.00000 3500.00000
dgridkm = 4.00000000
xorigkm = -951.546997
yorigkm = -1646.63696
iutmzn  = -999
ibcomp  = 288
jbcomp  = 117
iecomp  = 451
jecomp  = 274
lsamp   = F
```

```
ibsamp  =  1
jbsamp  =  1
iesamp  =  462
jesamp  =  376
meshdn  =  1

--------------  INPUT GROUP 5  ---------------

icon    =  1
idry    =  1
iwet    =  1
ivis    =  1
lcomprs =  T
icprt   =  0
idprt   =  0
iwprt   =  0
icfrq   =  1
idfrq   =  1
iwfrq   =  1
iprtu   =  3
imesg   =  2
imflx   =  0
imbal   =  0
iqaplot =  1
ldebug  =  F
ipfdeb  =  1
npfdeb  =  1
nn1     =  1
nn2     =  10

GROUP: SO2          j:   1  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: SO4          j:   2  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: NOX          j:   3  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: HNO3         j:   4  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: NO3          j:   5  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: PMC          j:   6  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: PMF          j:   7  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: EC           j:   8  ioutop(-,j) =  0 1 0 1 0 1 1
GROUP: SOA          j:   9  ioutop(-,j) =  0 1 0 1 0 1 1

--------------  INPUT GROUP 6  ---------------

      ------  Subgroup (6a)  ------

nhill  =  0
nctrec =  0
mhill  =  2
xhill2m=  1.00000000
zhill2m=  1.00000000
xctdmkm=  0.00000000E+00
yctdmkm=  0.00000000E+00

      ------  Subgroup (6b)  ------


      ------  Subgroup (6c)  ------
```

```
-------------- INPUT GROUP 7 ---------------

SPECIES: SO2        j:  1  dryg(-,j) =     0.15   1000.00     8.00     0.00     0.04
SPECIES: SO4        j:  2  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00
SPECIES: NOX        j:  3  dryg(-,j) =     0.17     1.00     8.00     5.00     3.50
SPECIES: HNO3       j:  4  dryg(-,j) =     0.16     1.00    18.00     0.00     0.00
SPECIES: NO3        j:  5  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00
SPECIES: PMC        j:  6  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00
SPECIES: PMF        j:  7  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00
SPECIES: EC         j:  8  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00
SPECIES: SOA        j:  9  dryg(-,j) =  -999.00  -999.00  -999.00  -999.00  -999.00

-------------- INPUT GROUP 8 ---------------

SPECIES: SO2        j:  1  dryp(-,j) =  -999.00  -999.00
SPECIES: SO4        j:  2  dryp(-,j) =     0.48     2.00
SPECIES: NOX        j:  3  dryp(-,j) =  -999.00  -999.00
SPECIES: HNO3       j:  4  dryp(-,j) =  -999.00  -999.00
SPECIES: NO3        j:  5  dryp(-,j) =     0.48     2.00
SPECIES: PMC        j:  6  dryp(-,j) =     0.48     2.00
SPECIES: PMF        j:  7  dryp(-,j) =     0.48     2.00
SPECIES: EC         j:  8  dryp(-,j) =     0.48     2.00
SPECIES: SOA        j:  9  dryp(-,j) =     0.48     2.00

-------------- INPUT GROUP 9 ---------------

rcutr   = 30.0000000
rgr     = 10.0000000
reactr  = 8.00000000
pconst  = 2.30000001E-08
bmin    = 1.00000001E-07
bmax    = 2.49999994E-06
qswmax  = 600.000000
dconst1 = 2.00000000
dconst2 = 0.666666687
dconst3 = 4.79999988E-04
dconst4 = 0.666666687
nint    = 9
iveg    = 1

-------------- INPUT GROUP 10 ---------------

SPECIES: SO2        j:  1  wa(-,j) =  3.000E-05   0.000E+00
SPECIES: SO4        j:  2  wa(-,j) =  1.000E-04   3.000E-05
SPECIES: NOX        j:  3  wa(-,j) =  0.000E+00   0.000E+00
SPECIES: HNO3       j:  4  wa(-,j) =  6.000E-05   0.000E+00
SPECIES: NO3        j:  5  wa(-,j) =  1.000E-04   3.000E-05
SPECIES: PMC        j:  6  wa(-,j) =  1.000E-04   3.000E-05
SPECIES: PMF        j:  7  wa(-,j) =  1.000E-04   3.000E-05
SPECIES: EC         j:  8  wa(-,j) =  1.000E-04   3.000E-05
SPECIES: SOA        j:  9  wa(-,j) =  1.000E-04   3.000E-05

-------------- INPUT GROUP 11 ---------------
```

```
moz      =  1
bcko3m   =  80.0000000 80.0000000 80.0000000 80.0000000
         =  80.0000000 80.0000000 80.0000000 80.0000000
         =  80.0000000 80.0000000 80.0000000 80.0000000
bcknh3m  =  3.00000000 3.00000000 3.00000000 3.00000000
         =  3.00000000 3.00000000 3.00000000 3.00000000
         =  3.00000000 3.00000000 3.00000000 3.00000000
rnite1   =  0.200000003
rnite2   =  2.00000000
rnite3   =  2.00000000
mh2o2    =  1
bckh2o2m =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
bckpmf   =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
         =  1.00000000 1.00000000 1.00000000 1.00000000
ofrac    =  0.150000006 0.150000006 0.200000003 0.200000003
         =  0.200000003 0.200000003 0.200000003 0.200000003
         =  0.200000003 0.200000003 0.200000003 0.150000006
vcnx     =  50.0000000 50.0000000 50.0000000 50.0000000
         =  50.0000000 50.0000000 50.0000000 50.0000000
         =  50.0000000 50.0000000 50.0000000 50.0000000

--------------  INPUT GROUP 12  ---------------

sytdep   =  550.000000
mhftsz   =  0
jsup     =  5
conk1    =  9.99999978E-03
conk2    =  0.100000001
iurb1    =  10
iurb2    =  19

anemht   =  10.0000000
isigmav  =  1
imixctdm =  0
ilanduin =  20
z0in     =  0.250000000
xlaiin   =  3.00000000
elevin   =  0.00000000E+00
xlatin   =  -999.000000
xlonin   =  -999.000000

xmxlen   =  1.00000000
mxnew    =  60
xsamlen  =  10.0000000
mxsam    =  60
ncount   =  2
sl2pf    =  10.0000000
wscalm   =  0.499994993
cdiv     =  0.00000000E+00 0.00000000E+00

wscat    =  1.53999996   top for class 1
wscat    =  3.08999991   top for class 2
wscat    =  5.13999987   top for class 3
```

```
wscat    =  8.22999954   top for class 4
wscat    =  10.8000002   top for class 5

Over LAND
svmin    =  0.500000000  for stability 1
svmin    =  0.500000000  for stability 2
svmin    =  0.500000000  for stability 3
svmin    =  0.500000000  for stability 4
svmin    =  0.500000000  for stability 5
svmin    =  0.500000000  for stability 6
swmin    =  0.200000003  for stability 1
swmin    =  0.119999997  for stability 2
swmin    =  7.99999982E-02  for stability 3
swmin    =  5.99999987E-02  for stability 4
swmin    =  2.99999993E-02  for stability 5
swmin    =  1.60000008E-02  for stability 6

Over WATER
svmin    =  0.500000000  for stability 1
svmin    =  0.500000000  for stability 2
svmin    =  0.500000000  for stability 3
svmin    =  0.500000000  for stability 4
svmin    =  0.500000000  for stability 5
svmin    =  0.500000000  for stability 6
swmin    =  0.200000003  for stability 1
swmin    =  0.119999997  for stability 2
swmin    =  7.99999982E-02  for stability 3
swmin    =  5.99999987E-02  for stability 4
swmin    =  2.99999993E-02  for stability 5
swmin    =  1.60000008E-02  for stability 6

symin    =  1.00000000
szmin    =  1.00000000
szcap_m  =  5000000.00
xminzi   =  20.0000000
xmaxzi   =  3000.00000

plx0     =  7.00000003E-02  for stability 1
plx0     =  7.00000003E-02  for stability 2
plx0     =  0.100000001  for stability 3
plx0     =  0.150000006  for stability 4
plx0     =  0.349999994  for stability 5
plx0     =  0.550000012  for stability 6

ptg0     =  1.99999996E-02  for stability 5
ptg0     =  3.50000001E-02  for stability 6

ppc      =  0.500000000  for stability 1
ppc      =  0.500000000  for stability 2
ppc      =  0.500000000  for stability 3
ppc      =  0.500000000  for stability 4
ppc      =  0.349999994  for stability 5
ppc      =  0.349999994  for stability 6
tbd      =  0.500000000
tibldist =  1.00000000 10.0000000 9.00000000
nsplit   =  3
```

```
iresplit =  0 0 0 0
         =  0 0 0 0
         =  0 0 0 0
         =  0 0 0 0
         =  0 0 0 1
         =  0 0 0 0
zisplit  =  100.000000
roldmax  =  0.250000000
nsplith  =  5
sysplith =  4000.00000
shsplith =  2.22222233
cnsplith =  1.00000001E-07 1.00000001E-07 1.00000001E-07 1.00000001E-07 1.00000001E-07
1.00000001E-07 1.00000001E-07 1.00000001E-07 1.00000001E-07
epsslug  =  9.99999975E-05
epsarea  =  9.99999997E-07
dsrise   =  1.00000000
trajincl =  20.0000000
mdepbc   =  1
htminbc  =  500.000000
rsampbc  =  10.0000000

--------------  INPUT GROUP 13  ---------------

npt1     =  1
iptu     =  3   units =   lb/hr
     converted to g/s by factor:  0.126000002
nspt1    =  0
npt2     =  0

cnampt1  = UNIT 2
xpt1grd  =  339.989746
ypt1grd  =  176.087738
htstak   =  81.0800018
elstak   =  34.1599998
diam     =  5.48600006
exitw    =  36.2709999
tstak    =  425.929993
idownw   =  0
syipt1   =  0.00000000E+00
szipt1   =  0.00000000E+00
fmfpt1   =  1.00000000
zplatpt1 =  0.00000000E+00

pt. source: UNIT 2          number:  1
qstak    =  488.376007 0.00000000E+00 415.627380 0.00000000E+00 0.00000000E+00 2.88414001
2.77704024 0.107100002 18.1213207

--------------  INPUT GROUP 14  ---------------

nar1     =  0
iaru     =  1   units =     g/s/m^2
   converted to g/s/m^2 by factor:  1.00000000
nsar1    =  0
nar2     =  0
```

---------- INPUT GROUP 15 ----------

nln2 = 0
nlines = 0
ilnu = 3 units = lb/hr
converted to g/s by factor: 0.126000002
nsln1 = 0
xl = 0.00000000E+00
hbl = 0.00000000E+00
wbl = 0.00000000E+00
wml = 0.00000000E+00
dxl = 0.00000000E+00
fprimel = 0.00000000E+00
mxnseg = 7
nlrise = 6

---------- INPUT GROUP 16 ----------

nvl1 = 0
ivlu = 3 units = lb/hr
converted to g/s by factor: 0.126000002
nsvl1 = 0
nvl2 = 0

---------- INPUT GROUP 17 ----------

nrec = 120
xng = 305.468231 305.659363 305.850464 305.078583 305.269684 305.460754 305.651855
305.842957 306.034027 304.306885 304.497955 304.689026 304.880096 305.071167 305.262238
305.453308 305.644348 302.962189 303.153229 303.344299 303.535339 303.726379 303.917450
304.108490 304.299530 304.490601 304.681641 304.872681 305.063721 305.254761 305.445831
305.636871 305.827911 306.018951 306.210022 302.954987 303.145996 303.337036 303.528076
303.719116 303.910156 304.101166 304.292206 304.483215 304.674255 304.865295 305.056305
305.247314 305.438354 305.629395 305.820404 306.011414 303.138794 303.329803 303.520813
303.711823 303.902832 304.093842 304.284851 304.475861 304.666870 304.857880 305.048889
305.239868 305.430878 305.621887 305.812897 303.322571 303.513550 303.704559 303.895538
304.086517 304.277527 304.468506 304.659485 304.850464 305.041443 305.232422 303.315338
303.506287 432.314301 432.879456 433.060944 433.242371 434.288513 435.193481 435.332581
435.694122 435.673218 435.832947 435.812012 435.971649 435.950745 435.929779 435.908813
435.887878 435.866943 435.825073 436.026398 436.005432 435.783203 435.984497 435.762268
435.963531 435.741302 435.720367 435.498230 435.699402 435.477325 435.678497 435.456421
435.435486 435.414581 435.192566 435.171692 434.949707 434.928833 434.706970 434.485107
434.263306
yng = 257.279541 257.285767 257.291992 257.497681 257.503845 257.510010 257.516235
257.522461 257.528687 257.703613 257.709717 257.715851 257.721985 257.728149 257.734314
257.740509 257.746704 257.891907 257.897888 257.903870 257.909882 257.915894 257.921936
257.928040 257.934113 257.940186 257.946320 257.952454 257.958618 257.964783 257.970978
257.977173 257.983398 257.989624 257.995911 258.122375 258.128357 258.134338 258.140350
258.146362 258.152435 258.158508 258.164581 258.170685 258.176788 258.182922 258.189087
258.195251 258.201447 258.207642 258.213867 258.220093 258.358826 258.364807 258.370819
258.376862 258.382904 258.388977 258.395050 258.401154 258.407288 258.413391 258.419556
258.425720 258.431915 258.438110 258.444336 258.595276 258.601318 258.607330 258.613373
258.619446 258.625519 258.631622 258.637726 258.643860 258.650024 258.656189 258.825745
258.831787 132.156006 132.674530 132.924896 133.175262 135.142548 136.394745 137.109955

137.610901 137.843231 138.326050 138.558380 139.041138 139.273468 139.505768 139.738037
139.970337 140.202606 140.667206 140.685333 140.917603 141.131714 141.149872 141.363953
141.382111 141.596222 141.828461 142.042603 142.060730 142.274841 142.292969 142.507080
142.739288 142.971527 143.185638 143.417877 143.631989 143.864197 144.078339 144.292511
144.506683
zng = 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
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0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
elevng = 365.000000 365.000000 368.000000 411.000000 462.000000 431.000000 518.000000
487.000000 396.000000 518.000000 523.000000 548.000000 579.000000 547.000000 538.000000
640.000000 608.000000 335.000000 431.000000 457.000000 414.000000 426.000000 426.000000
388.000000 388.000000 365.000000 386.000000 396.000000 426.000000 446.000000 441.000000
457.000000 465.000000 442.000000 426.000000 304.000000 304.000000 319.000000 334.000000
370.000000 405.000000 409.000000 450.000000 518.000000 609.000000 534.000000 517.000000
575.000000 600.000000 609.000000 609.000000 561.000000 335.000000 432.000000 487.000000
499.000000 514.000000 442.000000 439.000000 395.000000 400.000000 426.000000 487.000000
548.000000 548.000000 548.000000 535.000000 304.000000 334.000000 396.000000 457.000000
457.000000 426.000000 411.000000 406.000000 396.000000 401.000000 397.000000 322.000000
334.000000 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00 0.00000000E+00
0.00000000E+00 0.00000000E+00 1.00000000 1.00000000 1.00000000 1.00000000 1.00000000
1.00000000 1.00000000 1.00000000 0.00000000E+00 0.00000000E+00 0.00000000E+00 1.00000000
1.00000000 0.00000000E+00 1.00000000 0.00000000E+00 1.00000000 1.00000000 1.00000000
0.00000000E+00 1.00000000 0.00000000E+00 1.00000000 0.00000000E+00 0.00000000E+00
1.00000000 0.00000000E+00 0.00000000E+00 0.00000000E+00 1.00000000 0.00000000E+00
0.00000000E+00 0.00000000E+00

INPUT FILES

Default Name	Unit No.	File Name and Path
CALPUFF.INP	1	CP_RODE_DSI_02B.INP
CALMET.DAT	7	E:\REFINED CENRAP\2002\02MET01.MET
(----)	7	E:\REFINED CENRAP\2002\02MET02.MET

```
  (----)        7       E:\REFINED CENRAP\2002\02MET03.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET04.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET05.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET06.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET07.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET08.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET09.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET10.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET11.MET
  (----)        7       E:\REFINED CENRAP\2002\02MET12.MET
 OZONE.DAT       22       E:\LA OZONE FILES (TRINITY)\OZONEDATA02_V1.DAT


-------------------------------------------------------------------------------------------------------------------------------
       OUTPUT FILES

Default Name     Unit No.     File Name and Path
------------     --------     ------------------
 CALPUFF.LST        2       CP_RODE_DSI_02B.LST
   CONC.DAT        8       CP_RODE_DSI_02B.DAT
   DFLX.DAT        9       CP_RODE_DSI_02B.DRY
   WFLX.DAT       10       CP_RODE_DSI_02B.WET
   VISB.DAT       11       CP_RODE_DSI_02B.VIS


 LAST DAY/HOUR PROCESSED:
   Year: 2002  Month: 12   Day: 31   Julian day: 365   Hour: 16


 End of run -- Clock time: 22:39:42
                Date: 10-15-2015

     Elapsed Clock Time:    46008.0 (seconds)

            CPU Time:     3095.1 (seconds)
```