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BP Refinery
Ferndale, WA
2nd Quarter 1998
---------------- Run title (3 lines) ----------------------------------------

                    CALMET MODEL CONTROL FILE
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INPUT GROUP: 0 -- Input and Output File Names


Subgroup (a)
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Default Name  Type          File Name
------------  ----          ---------
GEO.DAT       input     ! GEODAT=D:\CALPUFF\GEO.DAT        !
SURF.DAT      input     ! SRFDAT=D:\CALPUFF\SURF98Q2.DAT       !
CLOUD.DAT     input     * CLDDAT=                *
PRECIP.DAT    input     ! PRCDAT=D:\CALPUFF\PRECIP.DAT     !
MM4.DAT       input     ! MM4DAT=D:\MM5\ARCO\98Q2\98Q2.MM5      !
WT.DAT        input     ! WTDAT= D:\CALPUFF\WT.DAT      !

CALMET.LST    output    ! METLST=D:\CALPUFF\98Q2MET.LST      !
CALMET.DAT    output    ! METDAT=D:\CALPUFF\98Q2MET.DAT     !
PACOUT.DAT    output    * PACDAT=                *

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

NUMBER OF UPPER AIR & OVERWATER STATIONS:

    Number of upper air stations (NUSTA)  No default     ! NUSTA =  20  !
    Number of overwater met stations
                                 (NOWSTA) No default     ! NOWSTA =  0  !

                        !END!
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Subgroup (b)
--------------------------------
Upper air files (one per station)
--------------------------------
Default Name  Type        File Name
------------  ----        ---------
UP1.DAT       input     1  ! UPDAT=D:\CALPUFF\UA2547.DAT!     !END!
UP2.DAT       input     2  ! UPDAT=D:\CALPUFF\UA2555.DAT!     !END!
UP3.DAT       input     3  ! UPDAT=D:\CALPUFF\UA2563.DAT!     !END!
UP4.DAT       input     4  ! UPDAT=D:\CALPUFF\UA2571.DAT!     !END!
UP5.DAT       input     5  ! UPDAT=D:\CALPUFF\UA3347.DAT!     !END!
UP6.DAT       input     6  ! UPDAT=D:\CALPUFF\UA3355.DAT!     !END!
UP7.DAT       input     7  ! UPDAT=D:\CALPUFF\UA3363.DAT!     !END!
UP8.DAT       input     8  ! UPDAT=D:\CALPUFF\UA3371.DAT!     !END!
UP9.DAT       input     9  ! UPDAT=D:\CALPUFF\UA4147.DAT!     !END!
UP10.DAT       input     10  ! UPDAT=D:\CALPUFF\UA4155.DAT!     !END!
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UP11.DAT        input     11  ! UPDAT=D:\CALPUFF\UA4163.DAT!     !END!
UP12.DAT        input     12  ! UPDAT=D:\CALPUFF\UA4171.DAT!     !END!
UP13.DAT        input     13  ! UPDAT=D:\CALPUFF\UA4947.DAT!     !END!
UP14.DAT        input     14  ! UPDAT=D:\CALPUFF\UA4955.DAT!     !END!
UP15.DAT        input     15  ! UPDAT=D:\CALPUFF\UA4963.DAT!     !END!
UP16.DAT        input     16  ! UPDAT=D:\CALPUFF\UA4971.DAT!     !END!
UP17.DAT        input     17  ! UPDAT=D:\CALPUFF\UA5747.DAT!     !END!
UP18.DAT        input     18  ! UPDAT=D:\CALPUFF\UA5755.DAT!     !END!
UP19.DAT        input     19  ! UPDAT=D:\CALPUFF\UA5763.DAT!     !END!
UP20.DAT        input     20  ! UPDAT=D:\CALPUFF\UA5771.DAT!     !END!
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Subgroup (c)
----------------------------------------
Overwater station files (one per station)
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Default Name  Type        File Name
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Subgroup (d)
----------------
Other file names
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Default Name  Type        File Name
------------  ----        ---------
DIAG.DAT      input       * DIADAT=                    *
PROG.DAT      input       * PRGDAT=                    *

TEST.PRT      output      ! TSTPRT= D:\CALPUFF\INTER.PRT!
TEST.OUT      output      * TSTOUT=                    *
TEST.KIN      output      * TSTKIN=                    *
TEST.FRD      output      * TSTFRD=                    *
TEST.SLP      output      * TSTSLP=                    *

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NOTES: (1) File/path names can be up to 70 characters in length
       (2) Subgroups (a) and (d) must have ONE 'END' (surround by
           delimiters) at the end of the group
       (3) Subgroups (b) and (c) must have an 'END' (surround by
           delimiters) at the end of EACH LINE

                          !END!


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INPUT GROUP: 1 -- General run control parameters
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     Starting date:   Year (IBYR) -- No default        ! IBYR=  1998  !
                     Month (IBMO) -- No default        ! IBMO=  4  !
                       Day (IBDY) -- No default        ! IBDY=  1  !
                      Hour (IBHR) -- No default        ! IBHR=  0  !

     Base time zone         (IBTZ) -- No default        ! IBTZ=  8  !
        PST = 08, MST = 07
        CST = 06, EST = 05
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    Length of run (hours) (IRLG) -- No default        ! IRLG=  2184  !

    Run type              (IRTYPE) -- Default: 1      ! IRTYPE=  1  !

       0 = Computes wind fields only
       1 = Computes wind fields and micrometeorological variables
           (u*, w*, L, zi, etc.)
       (IRTYPE must be 1 to run CALPUFF or CALGRID)

    Compute special data fields required
    by CALGRID (i.e., 3-D fields of W wind
    components and temperature)
    in additional to regular            Default: T    ! LCALGRD = T !
    fields ? (LCALGRD)
    (LCALGRD must be T to run CALGRID)

     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
                 COMPUTATIONAL phase after SETUP

!END!
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INPUT GROUP: 2 -- Grid control parameters
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     HORIZONTAL GRID DEFINITION:

           No. X grid cells (NX)      No default     ! NX =   42  !
           No. Y grid cells (NY)      No default     ! NY =   34  !

     GRID SPACING (DGRIDKM)           No default     ! DGRIDKM = 12. !
                                      Units: km

     REFERENCE COORDINATES
     of SOUTHWEST corner of grid cell (1,1)

        X coordinate (XORIGKM)        No default     ! XORIGKM = 923.800 !
        Y coordinate (YORIGKM)        No default     ! YORIGKM = -108.000 !
                                      Units: km
        Latitude  (XLAT0)             No default     ! XLAT0 = 47.013 !
        Longitude (XLON0)             No default     ! XLON0 = 126.130 !

     UTM ZONE (IUTMZN)                Default: 0     ! IUTMZN =  10  !

     LAMBERT CONFORMAL PARAMETERS

     Rotate input winds from true north to
     map north using a Lambert conformal
     projection? (LLCONF)             Default: F     ! LLCONF = T !
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    Latitude of 1st standard parallel   Default: 30.    ! XLAT1 = 30.000 !
    Latitude of 2nd standard parallel   Default: 60.    ! XLAT2 = 60.000 !
    (XLAT1 and XLAT2; + in NH, - in SH)

       Longitude (RLON0)                Default = 90.   ! RLON0 = 138.800 !
       (used only if LLCONF = T)
       (Positive = W. Hemisphere;
        Negative = E. Hemisphere)
       Origin Latitude (RLAT0)          Default = 40.   ! RLAT0 = 48.700 !
       (used only if IPROG > 2)
       (Positive = N. Hemisphere;
        Negative = S. Hemisphere)

    Vertical grid definition:

       No. of vertical layers (NZ)    No default     ! NZ =  10  !

       Cell face heights in arbitrary
       vertical grid (ZFACE(NZ+1))    No defaults
                                      Units: m
       ! ZFACE = 0.,20.,40.,80.,160.,300.,600.,1000.,1500.,2200.,3000. !

!END!

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INPUT GROUP: 3 -- Output Options
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    DISK OUTPUT OPTION

       Save met. fields in an unformatted
       output file ?              (LSAVE)  Default: T      ! LSAVE = T !
       (F = Do not save, T = Save)

       Type of unformatted output file:
       (IFORMO)                            Default: 1     ! IFORMO =  1  !

            1 = CALPUFF/CALGRID type file (CALMET.DAT)
            2 = MESOPUFF-II type file     (PACOUT.DAT)


    LINE PRINTER OUTPUT OPTIONS:

       Print met. fields ?  (LPRINT)       Default: F      ! LPRINT = T !
       (F = Do not print, T = Print)
       (NOTE: parameters below control which
              met. variables are printed)

       Print interval
       (IPRINF) in hours                   Default: 1      ! IPRINF =  1  !
       (Meteorological fields are printed
        every  1  hours)
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Specify which layers of U, V wind component
to print (IUVOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T)          Defaults: NZ*0
! IUVOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !
-----------------------


Specify which levels of the W wind component to print
(NOTE: W defined at TOP cell face --  10  values)
(IWOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                    Defaults: NZ*0
 ! IWOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !


Specify which levels of the 3-D temperature field to print
(ITOUT(NZ)) -- NOTE: NZ values must be entered
(0=Do not print, 1=Print)
(used only if LPRINT=T & LCALGRD=T)
-----------------------------------
                                    Defaults: NZ*0
 ! ITOUT =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0  !

Specify which meteorological fields
to print
(used only if LPRINT=T)             Defaults: 0 (all variables)
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  Variable            Print ?
                   (0 = do not print,
                    1 = print)
  --------         ------------------

!  STABILITY  =          0            ! - PGT stability class
!  USTAR      =          0            ! - Friction velocity
!  MONIN      =          0            ! - Monin-Obukhov length
!  MIXHT      =          0            ! - Mixing height
!  WSTAR      =          0            ! - Convective velocity scale
!  PRECIP     =          0            ! - Precipitation rate
!  SENSHEAT   =          0            ! - Sensible heat flux
!  CONVZI     =          0            ! - Convective mixing ht.


 Testing and debug print options for micrometeorological module

    Print input meteorological data and
    internal variables (LDB)          Default: F       ! LDB = F !
    (F = Do not print, T = print)
    (NOTE: this option produces large amounts of output)

    First time step for which debug data
    are printed (NN1)                 Default: 1       ! NN1 =  1  !
```

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      Last time step for which debug data
      are printed (NN2)                Default: 1        ! NN2 =  5  !


    Testing and debug print options for wind field module
    (all of the following print options control output to
     wind field module's output files: TEST.PRT, TEST.OUT,
     TEST.KIN, TEST.FRD, and TEST.SLP)

      Control variable for writing the test/debug
      wind fields to disk files (IOUTD)
      (0=Do not write, 1=write)        Default: 0        ! IOUTD =  0  !

      Number of levels, starting at the surface,
      to print (NZPRN2)                Default: 1        ! NZPRN2 =  10  !

      Print the INTERPOLATED wind components ?
      (IPR0) (0=no, 1=yes)             Default: 0        !  IPR0 =  1  !

      Print the TERRAIN ADJUSTED surface wind
      components ?
      (IPR1) (0=no, 1=yes)             Default: 0        !  IPR1 =  1  !

      Print the SMOOTHED wind components and
      the INITIAL DIVERGENCE fields ?
      (IPR2) (0=no, 1=yes)             Default: 0        !  IPR2 =  1  !

      Print the FINAL wind speed and direction
      fields ?
      (IPR3) (0=no, 1=yes)             Default: 0        !  IPR3 =  1  !

      Print the FINAL DIVERGENCE fields ?
      (IPR4) (0=no, 1=yes)             Default: 0        !  IPR4 =  1  !

      Print the winds after KINEMATIC effects
      are added ?
      (IPR5) (0=no, 1=yes)             Default: 0        !  IPR5 =  1  !

      Print the winds after the FROUDE NUMBER
      adjustment is made ?
      (IPR6) (0=no, 1=yes)             Default: 0        !  IPR6 =  1  !

      Print the winds after SLOPE FLOWS
      are added ?
      (IPR7) (0=no, 1=yes)             Default: 0        !  IPR7 =  1  !

      Print the FINAL wind field components ?
      (IPR8) (0=no, 1=yes)             Default: 0        !  IPR8 =  1  !

!END!

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INPUT GROUP: 4 -- Meteorological data options
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   NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

      Number of surface stations    (NSSTA)  No default      ! NSSTA =  17  !
      Number of precipitation stations
                                    (NPSTA)  No default      ! NPSTA =  63  !

   CLOUD DATA OPTIONS
      Griddid cloud fields:
                                   (ICLOUD)  Default: 0      ! ICLOUD =  0  !
      ICLOUD = 0 - Gridded clouds not used
      ICLOUD = 1 - Gridded CLOUD.DAT generated as OUTPUT
      ICLOUD = 2 - Gridded CLOUD.DAT read as INPUT

   FILE FORMATS

      Surface meteorological data file format
                                   (IFORMS)  Default: 2      ! IFORMS =  2  !
      (1 = unformatted (e.g., SMERGE output))
      (2 = formatted   (free-formatted user input))

      Precipitation data file format
                                   (IFORMP)  Default: 2      ! IFORMP =  2  !
      (1 = unformatted (e.g., PMERGE output))
      (2 = formatted   (free-formatted user input))

      Cloud data file format
                                   (IFORMC)  Default: 2      ! IFORMC =  2  !
      (1 = unformatted - CALMET unformatted output)
      (2 = formatted   - free-formatted CALMET output or user input)

!END!

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INPUT GROUP: 5 -- Wind Field Options and Parameters
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    WIND FIELD MODEL OPTIONS
       Model selection variable (IWFCOD)     Default: 1      ! IWFCOD =  1  !
          0 = Objective analysis only
          1 = Diagnostic wind module

       Compute Froude number adjustment
       effects ? (IFRADJ)                    Default: 1      ! IFRADJ =  1  !
       (0 = NO, 1 = YES)

       Compute kinematic effects ? (IKINE)   Default: 0      ! IKINE  =  0  !
       (0 = NO, 1 = YES)

       Use O'Brien procedure for adjustment
       of the vertical velocity ? (IOBR)     Default: 0      ! IOBR =  0  !
       (0 = NO, 1 = YES)

       Compute slope flow effects ? (ISLOPE) Default: 1      ! ISLOPE  =  1  !
```

```
(0 = NO, 1 = YES)

Extrapolate surface wind observations
to upper layers ? (IEXTRP)            Default: -4      ! IEXTRP = -1  !
(1 = no extrapolation is done,
 2 = power law extrapolation used,
 3 = user input multiplicative factors
     for layers 2 - NZ used (see FEXTRP array)
 4 = similarity theory used
 -1, -2, -3, -4 = same as above except layer 1 data
     at upper air stations are ignored

Extrapolate surface winds even
if calm? (ICALM)                      Default: 0       ! ICALM  =  0  !
(0 = NO, 1 = YES)

Layer-dependent biases modifying the weights of
surface and upper air stations (BIAS(NZ))
  -1<=BIAS<=1
Negative BIAS reduces the weight of upper air stations
  (e.g. BIAS=-0.1 reduces the weight of upper air stations
by 10%; BIAS= -1, reduces their weight by 100 %)
Positive BIAS reduces the weight of surface stations
  (e.g. BIAS= 0.2 reduces the weight of surface stations
by 20%; BIAS=1 reduces their weight by 100%)
Zero BIAS leaves weights unchanged (1/R**2 interpolation)
Default: NZ*0
                          ! BIAS =  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,  0 ,
0 ,  0  !

Minimum distance from nearest upper air station
to surface station for which extrapolation
of surface winds at surface station will be allowed
(RMIN2: Set to -1 for IEXTRP = 4 or other situations
 where all surface stations should be extrapolated)
                                       Default: 4.     ! RMIN2 = 4.0 !

Use gridded prognostic wind field model
output fields as input to the diagnostic
wind field model (IPROG)              Default: 0       ! IPROG =  15  !
(0 = No, [IWFCOD = 0 or 1]
 1 = Yes, use CSUMM prog. winds as Step 1 field, [IWFCOD = 0]
 2 = Yes, use CSUMM prog. winds as initial guess field [IWFCOD = 1]
 3 = Yes, use winds from MM4.DAT file as Step 1 field [IWFCOD = 0]
 4 = Yes, use winds from MM4.DAT file as initial guess field [IWFCOD = 1]
 5 = Yes, use winds from MM4.DAT file as observations [IWFCOD = 1]
 13 = Yes, use winds from MM5.DAT file as Step 1 field [IWFCOD = 0]
 14 = Yes, use winds from MM5.DAT file as initial guess field [IWFCOD =
1]
 15 = Yes, use winds from MM5.DAT file as observations [IWFCOD = 1]

RADIUS OF INFLUENCE PARAMETERS

Use varying radius of influence       Default: F       ! LVARY =  T!
(if no stations are found within RMAX1,RMAX2,
 or RMAX3, then the closest station will be used)
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Maximum radius of influence over land in the surface layer (RMAX1)	No default Units: km	! RMAX1 = 0.5 !
Maximum radius of influence over land aloft (RMAX2)	No default Units: km	! RMAX2 = 0.5 !
Maximum radius of influence over water (RMAX3)	No default Units: km	! RMAX3 = 0.5 !

OTHER WIND FIELD INPUT PARAMETERS

Minimum radius of influence used in the wind field interpolation (RMIN)	Default: 0.1 Units: km	! RMIN = 0.1 !
Radius of influence of terrain features (TERRAD)	No default Units: km	! TERRAD = 50. !
Relative weighting of the first guess field and observations in the SURFACE layer (R1) (R1 is the distance from an observational station at which the observation and first guess field are equally weighted)	No default Units: km	! R1 = 1. !
Relative weighting of the first guess field and observations in the layers ALOFT (R2) (R2 is applied in the upper layers in the same manner as R1 is used in the surface layer).	No default Units: km	! R2 = 1. !
Relative weighting parameter of the prognostic wind field data (RPROG) (Used only if IPROG = 1)	No default Units: km	! RPROG = 0. !

Maximum acceptable divergence in the divergence minimization procedure (DIVLIM)	Default: 5.E-6	! DIVLIM= 5.0E-06 !
Maximum number of iterations in the divergence min. procedure (NITER)	Default: 50	! NITER = 50 !
Number of passes in the smoothing procedure (NSMTH(NZ)) NOTE: NZ values must be entered	Default: 2,(mxnz-1)*4	! NSMTH = 2 , 4 , 4 , 4 , 4 , 4 , 4 , 4 , 4 , 4 !
Maximum number of stations used in each layer for the interpolation of data to a grid point (NINTR2(NZ)) NOTE: NZ values must be entered	Default: 99.	! NINTR2 =

```
5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 , 5 !

    Critical Froude number (CRITFN)        Default: 1.0     ! CRITFN = 1. !

    Empirical factor controlling the
    influence of kinematic effects
    (ALPHA)                                Default: 0.1     ! ALPHA = 0.1 !

    Multiplicative scaling factor for
    extrapolation of surface observations
    to upper layers (FEXTR2(NZ))           Default: NZ*0.0
    ! FEXTR2 = 0., 0., 0., 0., 0., 0., 0., 0., 0., 0. !
    (Used only if IEXTRP = 3 or -3)


BARRIER INFORMATION

    Number of barriers to interpolation
    of the wind fields (NBAR)              Default: 0       ! NBAR =  0  !

    THE FOLLOWING 4 VARIABLES ARE INCLUDED
    ONLY IF NBAR > 0
    NOTE: NBAR values must be entered      No defaults
          for each variable                Units: km

       X coordinate of BEGINNING
       of each barrier (XBBAR(NBAR))       ! XBBAR = 0. !
       Y coordinate of BEGINNING
       of each barrier (YBBAR(NBAR))       ! YBBAR = 0. !

       X coordinate of ENDING
       of each barrier (XEBAR(NBAR))       ! XEBAR = 0. !
       Y coordinate of ENDING
       of each barrier (YEBAR(NBAR))       ! YEBAR = 0. !


DIAGNOSTIC MODULE DATA INPUT OPTIONS

    Surface temperature (IDIOPT1)          Default: 0       ! IDIOPT1 =  0  !
       0 = Compute internally from
           hourly surface observations
       1 = Read preprocessed values from
           a data file (DIAG.DAT)

       Surface met. station to use for
       the surface temperature (ISURFT)    No default       ! ISURFT =  3  !
       (Must be a value from 1 to NSSTA)
       (Used only if IDIOPT1 = 0)
       --------------------------

    Domain-averaged temperature lapse
    rate (IDIOPT2)                         Default: 0       ! IDIOPT2 =  0  !
       0 = Compute internally from
           twice-daily upper air observations
       1 = Read hourly preprocessed values
           from a data file (DIAG.DAT)
```

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  Upper air station to use for
  the domain-scale lapse rate (IUPT) No default     ! IUPT   =  10  !
  (Must be a value from 1 to NUSTA)
  (Used only if IDIOPT2 = 0)
  --------------------------

  Depth through which the domain-scale
  lapse rate is computed (ZUPT)      Default: 200.  ! ZUPT = 200. !
  (Used only if IDIOPT2 = 0)         Units: meters
  --------------------------

Domain-averaged wind components
(IDIOPT3)                            Default: 0     ! IDIOPT3 =  0  !
   0 = Compute internally from
       twice-daily upper air observations
   1 = Read hourly preprocessed values
       a data file (DIAG.DAT)

   Upper air station to use for
   the domain-scale winds (IUPWND)    Default: -1    ! IUPWND =  10  !
   (Must be a value from -1 to NUSTA)
   (Used only if IDIOPT3 = 0)
   --------------------------

   Bottom and top of layer through
   which the domain-scale winds
   are computed
   (ZUPWND(1), ZUPWND(2))        Defaults: 1., 1000. ! ZUPWND= 1., 1000.
!
   (Used only if IDIOPT3 = 0)    Units: meters
   --------------------------

Observed surface wind components
for wind field module (IDIOPT4)  Default: 0     ! IDIOPT4 =  0  !
   0 = Read WS, WD from a surface
       data file (SURF.DAT)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

Observed upper air wind components
for wind field module (IDIOPT5)  Default: 0     ! IDIOPT5 =  0  !
   0 = Read WS, WD from an upper
       air data file (UP1.DAT, UP2.DAT, etc.)
   1 = Read hourly preprocessed U, V from
       a data file (DIAG.DAT)

LAKE BREEZE INFORMATION

   Use Lake Breeze Module  (LLBREZE)
                                     Default: F     ! LLBREZE = F !

    Number of lake breeze regions (NBOX)            ! NBOX =  0  !

  X Grid line 1 defining the region of interest
                                                    ! XG1 = 0. !

  X Grid line 2 defining the region of interest
                                                    ! XG2 = 0. !
```

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Y Grid line 1 defining the region of interest
                                                    ! YG1 = 0. !
Y Grid line 2 defining the region of interest
                                                    ! YG2 = 0. !

 X Point defining the coastline (Straight line)
           (XBCST)  (KM)   Default: none    ! XBCST = 0. !

 Y Point defining the coastline (Straight line)
           (YBCST)  (KM)   Default: none    ! YBCST = 0. !

 X Point defining the coastline (Straight line)
           (XECST)  (KM)   Default: none    ! XECST = 0. !

 Y Point defining the coastline (Straight line)
           (YECST)  (KM)   Default: none    ! YECST = 0. !


Number of stations in the region     Default: none ! NLB = *1 !*
(Surface stations + upper air stations)

Station ID's  in the region   (METBXID(NLB))
(Surface stations first, then upper air stations)
  ! METBXID = *0 !*

!END!

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INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
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    EMPIRICAL MIXING HEIGHT CONSTANTS

       Neutral, mechanical equation
       (CONSTB)                          Default: 1.41    ! CONSTB = 1.41 !
       Convective mixing ht. equation
       (CONSTE)                          Default: 0.15    ! CONSTE = 0.15 !
       Stable mixing ht. equation
       (CONSTN)                          Default: 2400.   ! CONSTN = 2400.!
       Overwater mixing ht. equation
       (CONSTW)                          Default: 0.16    ! CONSTW = 0.16 !
       Absolute value of Coriolis
       parameter (FCORIOL)               Default: 1.E-4   ! FCORIOL = 1.0E-
04!
                                         Units: (1/s)

    SPATIAL AVERAGING OF MIXING HEIGHTS

       Conduct spatial averaging
       (IAVEZI)  (0=no, 1=yes)           Default: 1       ! IAVEZI =  1  !

       Max. search radius in averaging
       process (MNMDAV)                  Default: 1       ! MNMDAV =  50  !
                                         Units: Grid
                                                cells
```

Half-angle of upwind looking cone for averaging (HAFANG)	Default: 30. Units: deg.	! HAFANG = 30. !
Layer of winds used in upwind averaging (ILEVZI) (must be between 1 and NZ)	Default: 1	! ILEVZI = 1 !

OTHER MIXING HEIGHT VARIABLES

Minimum potential temperature lapse rate in the stable layer above the current convective mixing ht. (DPTMIN)	Default: 0.001 Units: deg. K/m	! DPTMIN = 0.001 !
Depth of layer above current conv. mixing height through which lapse rate is computed (DZZI)	Default: 200. Units: meters	! DZZI = 200. !
Minimum overland mixing height (ZIMIN)	Default: 50. Units: meters	! ZIMIN = 50. !
Maximum overland mixing height (ZIMAX)	Default: 3000. Units: meters	! ZIMAX = 3000. !
Minimum overwater mixing height (ZIMINW) -- (Not used if observed overwater mixing hts. are used)	Default: 50. Units: meters	! ZIMINW = 50. !
Maximum overwater mixing height (ZIMAXW) -- (Not used if observed overwater mixing hts. are used)	Default: 3000. Units: meters	! ZIMAXW = 3000. !

TEMPERATURE PARAMETERS

Interpolation type (1 = 1/R ; 2 = 1/R**2)	Default:1	! IRAD = 1 !
Radius of influence for temperature interpolation (TRADKM)	Default: 500. Units: km	! TRADKM = 100. !
Maximum Number of stations to include in temperature interpolation (NUMTS)	Default: 5	! NUMTS = 5 !
Conduct spatial averaging of temperatures (IAVET) (0=no, 1=yes) (will use mixing ht MNMDAV,HAFANG so make sure they are correct)	Default: 1	! IAVET = 1 !
Default temperature gradient below the mixing height over water (K/m) (TGDEFB)	Default: -.0098	! TGDEFB = -0.0098 !
Default temperature gradient above the mixing height over water (K/m) (TGDEFA)	Default: -.0045	! TGDEFA = -0.0045 !
Beginning (JWAT1) and ending (JWAT2) land use categories for temperature interpolation over water -- Make		! JWAT1 = 999 ! ! JWAT2 = 999 !

```
      bigger than largest land use to disable

   PRECIP INTERPOLATION PARAMETERS

      Method of interpolation (NFLAGP)       Default = 2     ! NFLAGP =  2  !
       (1=1/R,2=1/R**2,3=EXP/R**2)
      Radius of Influence (km) (SIGMAP)      Default = 100.0  ! SIGMAP = 48. !
       (0.0 => use half dist. btwn
        nearest stns w & w/out
        precip when NFLAGP = 3)
      Minimum Precip. Rate Cutoff (mm/hr)    Default = 0.01  ! CUTP = 0.01 !
       (values < CUTP = 0.0 mm/hr)
!END!
```

INPUT GROUP: 7 -- Surface meteorological station parameters

SURFACE STATION VARIABLES
(One record per station -- 17 records in all)

	Name[1]	ID[2]	X coord. (km)	Y coord. (km)	Time zone	Anem. Ht.(m)	
! SS1	='HQM'	1	1080.506	-85.521	8	10	!
! SS2	='OLM'	2	1157.474	-70.567	8	10	!
! SS3	='YKM'	3	1336.913	-75.631	8	10	!
! SS4	='TCM'	4	1183.717	-45.487	8	10	!
! SS5	='PWT'	5	1155.919	-15.002	8	10	!
! SS6	='SEA'	6	1189.995	-11.273	8	10	!
! SS7	='SMP'	7	1262.823	-14.265	8	10	!
! SS8	='BFI'	8	1188.237	-2.862	8	10	!
! SS9	='UIL'	9	1020.069	10.404	8	10	!
! SS10	='EAT'	10	1340.109	16.665	8	10	!
! SS11	='PAE'	11	1181.074	38.443	8	10	!
! SS12	='CLM'	12	1090.878	42.202	8	10	!
! SS13	='AWO'	13	1183.988	66.504	8	10	!
! SS14	='VIC'	14	1084.708	99.031	8	10	!
! SS15	='BLI'	15	1144.363	127.418	8	10	!
! SS16	='VAN'	16	1090.670	160.467	8	10	!
! SS17	='ABB'	17	1150.577	154.328	8	10	!

1
Four character string for station name
(MUST START IN COLUMN 9)

2
Five digit integer for station ID

!END!

INPUT GROUP: 8 -- Upper air meteorological station parameters

UPPER AIR STATION VARIABLES
(One record per station -- 20 records in all)

	Name[1]	ID[2]	X coord. (km)	Y coord. (km)	Time zone	
! US1	='2547'	2547	971.800	-60.000	8	!
! US2	='2555'	2555	971.800	36.000	8	!
! US3	='2563'	2563	971.800	132.000	8	!
! US4	='2571'	2571	971.800	228.000	8	!
! US5	='3347'	3347	1067.800	-60.000	8	!
! US6	='3355'	3355	1067.800	36.000	8	!
! US7	='3363'	3363	1067.800	132.000	8	!
! US8	='3371'	3371	1067.800	228.000	8	!
! US9	='4147'	4147	1163.800	-60.000	8	!
! US10	='4155'	4155	1163.800	36.000	8	!
! US11	='4163'	4163	1163.800	132.000	8	!
! US12	='4171'	4171	1163.800	228.000	8	!
! US13	='4947'	4947	1259.800	-60.000	8	!
! US14	='4955'	4955	1259.800	36.000	8	!
! US15	='4963'	4963	1259.800	132.000	8	!
! US16	='4971'	4971	1259.800	228.000	8	!
! US17	='5747'	5747	1355.800	-60.000	8	!
! US18	='5755'	5755	1355.800	36.000	8	!
! US19	='5763'	5763	1355.800	132.000	8	!
! US20	='5771'	5771	1355.800	228.000	8	!

[1] Four character string for station name
(MUST START IN COLUMN 9)

[2] Five digit integer for station ID

!END!

INPUT GROUP: 9 -- Precipitation station parameters

PRECIPITATION STATION VARIABLES
(One record per station -- 63 records in all)
(NOT INCLUDED IF NPSTA = 0)

	Name[1]	Station Code[2]	X coord. (km)	Y coord. (km)	
! PS1	='2547'	2547	971.800	-60.000	!

```
! PS2  ='2947'    2947   1019.800    -60.000      !
! PS3  ='3347'    3347   1067.800    -60.000      !
! PS4  ='3747'    3747   1115.800    -60.000      !
! PS5  ='4147'    4147   1163.800    -60.000      !
! PS6  ='4547'    4547   1211.800    -60.000      !
! PS7  ='4947'    4947   1259.800    -60.000      !
! PS8  ='5347'    5347   1307.800    -60.000      !
! PS9  ='5747'    5747   1355.800    -60.000      !
! PS10 ='2551'    2551    971.800    -12.000      !
! PS11 ='2951'    2951   1019.800    -12.000      !
! PS12 ='3351'    3351   1067.800    -12.000      !
! PS13 ='3751'    3751   1115.800    -12.000      !
! PS14 ='4151'    4151   1163.800    -12.000      !
! PS15 ='4551'    4551   1211.800    -12.000      !
! PS16 ='4951'    4951   1259.800    -12.000      !
! PS17 ='5351'    5351   1307.800    -12.000      !
! PS18 ='5751'    5751   1355.800    -12.000      !
! PS19 ='2555'    2555    971.800     36.000      !
! PS20 ='2955'    2955   1019.800     36.000      !
! PS21 ='3355'    3355   1067.800     36.000      !
! PS22 ='3755'    3755   1115.800     36.000      !
! PS23 ='4155'    4155   1163.800     36.000      !
! PS24 ='4555'    4555   1211.800     36.000      !
! PS25 ='4955'    4955   1259.800     36.000      !
! PS26 ='5355'    5355   1307.800     36.000      !
! PS27 ='5755'    5755   1355.800     36.000      !
! PS28 ='2559'    2559    971.800     84.000      !
! PS29 ='2959'    2959   1019.800     84.000      !
! PS30 ='3359'    3359   1067.800     84.000      !
! PS31 ='3759'    3759   1115.800     84.000      !
! PS32 ='4159'    4159   1163.800     84.000      !
! PS33 ='4559'    4559   1211.800     84.000      !
! PS34 ='4959'    4959   1259.800     84.000      !
! PS35 ='5359'    5359   1307.800     84.000      !
! PS36 ='5759'    5759   1355.800     84.000      !
! PS37 ='2563'    2563    971.800    132.000      !
! PS38 ='2963'    2963   1019.800    132.000      !
! PS39 ='3363'    3363   1067.800    132.000      !
! PS40 ='3763'    3763   1115.800    132.000      !
! PS41 ='4163'    4163   1163.800    132.000      !
! PS42 ='4563'    4563   1211.800    132.000      !
! PS43 ='4963'    4963   1259.800    132.000      !
! PS44 ='5363'    5363   1307.800    132.000      !
! PS45 ='5763'    5763   1355.800    132.000      !
! PS46 ='2567'    2567    971.800    180.000      !
! PS47 ='2967'    2967   1019.800    180.000      !
! PS48 ='3367'    3367   1067.800    180.000      !
! PS49 ='3767'    3767   1115.800    180.000      !
! PS50 ='4167'    4167   1163.800    180.000      !
! PS51 ='4567'    4567   1211.800    180.000      !
! PS52 ='4967'    4967   1259.800    180.000      !
! PS53 ='5367'    5367   1307.800    180.000      !
! PS54 ='5767'    5767   1355.800    180.000      !
! PS55 ='2571'    2571    971.800    228.000      !
! PS56 ='2971'    2971   1019.800    228.000      !
! PS57 ='3371'    3371   1067.800    228.000      !
! PS58 ='3771'    3771   1115.800    228.000      !
```

```
! PS59 ='4171'    4171   1163.800    228.000      !
! PS60 ='4571'    4571   1211.800    228.000      !
! PS61 ='4971'    4971   1259.800    228.000      !
! PS62 ='5371'    5371   1307.800    228.000      !
! PS63 ='5771'    5771   1355.800    228.000      !

-------------------
      1
        Four character string for station name
        (MUST START IN COLUMN 9)

      2
        Six digit station code composed of state
        code (first 2 digits) and station ID (last
        4 digits)

!END!
```

```
BP Cherry Point Cogeneration
Ferndale, WA
Case 6, Class I receptors
---------------- Run title (3 lines) ----------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

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

INPUT GROUP: 0 -- Input and Output File Names

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =              *
    or
ISCMET.DAT    input    * ISCDAT =              *
    or
PLMMET.DAT    input    * PLMDAT =              *
    or
PROFILE.DAT   input    * PRFDAT =              *
SURFACE.DAT   input    * SFCDAT =              *
RESTARTB.DAT  input    * RSTARTB=              *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =D:\CALPUFF\6PUFF.LST   !
CONC.DAT      output   ! CONDAT =D:\CALPUFF\6CONC.DAT     !
DFLX.DAT      output   ! DFDAT  =D:\CALPUFF\6DRYDEP.DAT     !
WFLX.DAT      output   ! WFDAT  =D:\CALPUFF\6WETDEP.DAT     !

VISB.DAT      output   ! VISDAT =D:\CALPUFF\6VISB.DAT     !
RESTARTE.DAT  output   * RSTARTE=              *
------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =              *
VOLEMARB.DAT  input    * VOLDAT =              *
BAEMARB.DAT   input    * ARDAT  =              *
LNEMARB.DAT   input    * LNDAT  =              *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =              *
VD.DAT        input    * VDDAT  =              *
CHEM.DAT      input    * CHEMDAT=              *
HILL.DAT      input    * HILDAT=               *
HILLRCT.DAT   input    * RCTDAT=               *
COASTLN.DAT   input    * CSTDAT=               *
FLUXBDY.DAT   input    * BDYDAT=               *
BCON.DAT      input    * BCNDAT=               *
DEBUG.DAT     output   * DEBUG =               *
MASSFLX.DAT   output   * FLXDAT=               *
MASSBAL.DAT   output   * BALDAT=               *
FOG.DAT       output   * FOGDAT=               *
------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
```

```
        T = lower case       ! LCFILES = 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 =   4   !

     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
------------  ----          ---------
 none         input    ! METDAT=D:\CALPUFF\98Q2MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\98Q3MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\98Q4MET.DAT     !  !END!
 none         input    ! METDAT=D:\CALPUFF\99Q1MET.DAT     !  !END!


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

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

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

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

     Starting date:   Year (IBYR) -- No default       ! IBYR =  1998  !
     (used only if   Month (IBMO) -- No default       ! IBMO =  4  !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  1  !
                      Hour (IBHR) -- No default       ! IBHR =  0  !

     Length of run (hours) (IRLG) -- No default       ! IRLG =  7992  !

     Number of chemical species (NSPEC)
                                        Default: 5       ! NSPEC =  6   !
```

```
    Number of chemical species
    to be emitted  (NSE)            Default: 3       ! NSE =  4   !

    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)

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


!END!

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

INPUT GROUP: 2 -- Technical options
--------------


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

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

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

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

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

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

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)

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

Dry deposition modeled ? (MDRY)           Default: 1      ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
```

for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP) Default: 3 ! MDISP = 3 !

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

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

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2) Default: 3 ! MDISP2 = 3 !
(used only if MDISP = 1 or 5)
2 = dispersion coefficients from internally calculated sigma v, sigma w using micrometeorological variables (u*, w*, L, etc.)
3 = PG dispersion coefficients for RURAL areas (computed using the ISCST multi-segment approximation) and MP coefficients in urban areas
4 = same as 3 except PG coefficients computed using the MESOPUFF II eqns.

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

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

```
   1 = yes

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

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

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

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes


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 values
                 METFM    1
                 AVET     60. (min)
                 MGAUSS   1
                 MCTADJ   3
                 MTRANS   1
```

```
                    MTIP      1
                    MCHEM     1 (if modeling SOx, NOx)
                    MWET      1
                    MDRY      1
                    MDISP     3
                    MROUGH    0
                    MPARTL    1
                    SYTDEP    550. (m)
                    MHFTSZ    0


!END!

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

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

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !          !END!
! CSPEC =          SO4 !          !END!
! CSPEC =          NOX !          !END!
! CSPEC =         HNO3 !          !END!
! CSPEC =          NO3 !          !END!
! CSPEC =         PM10 !          !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   !
!         PM10  =         1,               1,           2,                 0   !

!END!

-------------
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 -- Grid control parameters

METEOROLOGICAL grid:

```
          No. X grid cells (NX)      No default     ! NX =  42   !
          No. Y grid cells (NY)      No default     ! NY =  34   !
       No. vertical layers (NZ)      No default     ! NZ =  10   !

         Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 12. !
                                     Units: km

              Cell face heights
                  (ZFACE(nz+1))      No defaults
                                     Units: m
  ! ZFACE = 0., 20., 40., 80., 160., 300., 600., 1000., 1500., 2200.,
            3000. !

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

          X coordinate (XORIGKM)     No default     ! XORIGKM = 923.8 !
          Y coordinate (YORIGKM)     No default     ! YORIGKM = -108. !
                                    Units: km

               UTM zone (IUTMZN)     No default     ! IUTMZN =  10   !

  Reference coordinates of CENTER
       of the domain (used in the
    calculation of solar elevation
                         angles)

          Latitude  (deg.) (XLAT)    No default     ! XLAT  = 48.376  !
         Longitude (deg.) (XLONG)    No default     ! XLONG = 122.188  !
           Time zone        (XTZ)    No default     ! XTZ   = 8.0  !
      (PST=8, MST=7, CST=6, EST=5)
```

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) (1 <= IBCOMP <= NX)	No default	! IBCOMP = 1 !
Y index of LL corner (JBCOMP) (1 <= JBCOMP <= NY)	No default	! JBCOMP = 1 !
X index of UR corner (IECOMP) (1 <= IECOMP <= NX)	No default	! IECOMP = 42 !
Y index of UR corner (JECOMP) (1 <= JECOMP <= NY)	No default	! JECOMP = 34 !

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) (T=yes, F=no)	Default: T	! LSAMP = F !
X index of LL corner (IBSAMP) (IBCOMP <= IBSAMP <= IECOMP)	No default	! IBSAMP = 1 !
Y index of LL corner (JBSAMP) (JBCOMP <= JBSAMP <= JECOMP)	No default	! JBSAMP = 1 !
X index of UR corner (IESAMP) (IBCOMP <= IESAMP <= IECOMP)	No default	! IESAMP = 1 !
Y index of UR corner (JESAMP) (JBCOMP <= JESAMP <= JECOMP)	No default	! JESAMP = 1 !
Nesting factor of the sampling grid (MESHDN) (MESHDN is an integer >= 1)	Default: 1	! MESHDN = 1 !

!END!

INPUT GROUP: 5 -- Output Options

```
--------------
                                                  *                                  *
   FILE                          DEFAULT VALUE                VALUE THIS RUN
   ----                          -------------                --------------

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

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


  DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

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

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


  LINE PRINTER OUTPUT OPTIONS:

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

     Concentration print interval
     (ICFRQ) in hours                 Default: 1             ! ICFRQ =  7992   !
     Dry flux print interval
     (IDFRQ) in hours                 Default: 1             ! IDFRQ =  7992   !
     Wet flux print interval
     (IWFRQ) in hours                 Default: 1             ! IWFRQ =  7992   !

     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 =     1,           1,           1,           1,           1,
1,           0   !
!          NOX =     1,           1,           1,           1,           0,
0,           0   !
!         PM10 =     1,           1,           1,           1,           1,
1,           0   !
!          SO4 =     1,           1,           1,           1,           1,
1,           0   !
!         HNO3 =     1,           1,           1,           1,           1,
1,           0   !
!          NO3 =     1,           1,           1,           1,           1,
1,           0   !

     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                Default: 1     ! NPFDEB =  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. !
       to meters (MHILL=1)

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

       X-origin of CTDM system relative to      No Default     ! XCTDMKM =
0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM =
0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

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

                      1 **
     HILL information


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

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

    COMPLEX TERRAIN RECEPTOR INFORMATION
```

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

1

Description of Complex Terrain Variables:

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

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

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

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

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

!END!

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

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

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

	SPECIES NAME	GEOMETRIC MASS MEAN DIAMETER (microns)	GEOMETRIC STANDARD DEVIATION (microns)	
!	SO4 =	0.48,	2.	!
!	NO3 =	0.48,	2.	!
!	PM10 =	0.48,	2.	!

!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 !
!         PM10 =          1.0E-04,             3.0E-05 !

!END!

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


INPUT GROUP: 11 -- Chemistry Parameters
---------------

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

     Background ozone concentration
     (BCKO3) in ppb                     Default: 80.          ! BCKO3 = 28.0 !
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or (MOZ = 1 and all hourly
      O3 data missing)

     Background ammonia concentration
     (BCKNH3) in ppb                    Default: 10.          ! BCKNH3 = 17.0 !

     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 !

  --- 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)

        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 = 100.0
!

        Latitude (degrees) for met location
        (XLATIN)                                 Default: -999.  ! XLATIN = 48.85
!

        Longitude (degrees) for met location
        (XLONIN)                                 Default: -999.  ! XLONIN =
122.75 !

     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 or MTURBVW = 1 or 3)
        (ISIGMAV)                                   Default: 1       ! ISIGMAV =  1
!
            0 = read sigma-theta
            1 = read sigma-v

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

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

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

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

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

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

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

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

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

                                Stability Class :  A     B     C     D     E
F
                                                  ---   ---   ---   ---   ---   -
--
                                        ! SVMIN = 0.500, 0.500, 0.500, 0.500,
0.500, 0.500!
```

```
                                        ! SWMIN = 0.200, 0.120, 0.080, 0.060,
0.030, 0.016!

     Divergence criterion for dw/dz across puff
     used to initiate adjustment for horizontal
     convergence (1/s)
     Partial adjustment starts at CDIV(1), and
     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 = 1.0 !

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

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

     Default wind speed classes --
     5 upper bounds (m/s) are entered;
     the 6th class has no upper limit
     (WSCAT(5))                       Default   :
                                      ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10,8
(10.8+)

                                Wind Speed Class :  1     2     3     4     5
6
                                                   ---   ---   ---   ---   ---   -
--
                                        ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

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

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

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

     Default plume path coefficients for
```

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

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

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

       VERTICAL SPLIT
       --------------

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

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

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

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

       HORIZONTAL SPLIT
       ----------------

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

       Minimum sigma-y (Grid Cells Units) of puff
       before it may be split
```

```
      (SYSPLITH)                          Default:  1.0       ! SYSPLITH = 1.0
!

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

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

    Integration control variables ------------------------

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

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

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

!END!

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


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

---------------
Subgroup (13a)
---------------

    Number of point sources with
    parameters provided below      (NPT1)  No default  !  NPT1 =  4  !

    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 UTM      Y UTM      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 = T2 !
   1 ! X = 1129.065,  134.135,   45.72, 35.05,      5.79,  20.3,  355.3,
1.0,1.26E01,  1.0E00, 5.61E01,
       0.0E00,  0.0E00, 5.62E01 !
   1 ! FMFAC  =      1.0 !   !END!
   2 ! SRCNAM = GEN !
   2 ! X = 1129.141,  134.218,     3.6,  35.1,        .2, 183.7,  754.8,
1.0,6.3E-02, 5.0E-03,  2.3E00,
       0.0E00,  0.0E00, 5.8E-02 !
   2 ! FMFAC  =      1.0 !   !END!
   3 ! SRCNAM = FPUMP !
   3 ! X = 1129.043,  134.203,    3.56, 35.05,       .15, 36.32,  722.0,
1.0,8.3E-03, 6.6E-04, 2.75E-01,
       0.0E00,  0.0E00, 4.2E-03 !
   3 ! FMFAC  =      1.0 !   !END!
   4 ! SRCNAM = COOL2 !
   4 ! X = 1129.003,  134.143,   22.86, 35.05,      9.15,   8.2, 305.37,  1.0,
0.0E00,  0.0E00,  0.0E00,
       0.0E00,  0.0E00,  1.6E00 !
   4 ! FMFAC  =      1.0 !   !END!

--------
```

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

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

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

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

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

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

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

Subgroup (13c)

BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH

Source No. — Effective building width and height (in meters) every 10 degrees[a]

```
 1    ! SRCNAM  =   T2 !
 1    ! HEIGHT  =  29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   18.3,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                   29.0,   29.0,   29.0,   29.0,   29.0,   29.0!
 1    ! WIDTH   =  34.1,   34.1,   33.1,   31.1,   28.1,   24.3,
                   19.8,   14.6,   101.0,   14.6,   19.7,   24.3,
                   28.1,   31.1,   33.1,   34.1,   34.1,   33.0,
                   34.1,   34.1,   33.1,   31.1,   28.1,   24.3,
                   19.7,   14.6,   9.0,   14.6,   19.7,   24.3,
                   28.1,   31.1,   33.1,   34.1,   34.1,   33.0!
!END!
 2    ! SRCNAM  =   GEN !
 2    ! HEIGHT  =  3.3,   3.3,   29.0,   29.0,   29.0,   29.0,
                   29.0,   15.2,   15.2,   15.2,   15.2,   15.2,
                   15.2,   15.2,   15.2,   9.1,   9.1,   9.1,
                   3.3,   3.3,   3.3,   3.3,   9.1,   9.1,
                   9.1,   15.2,   9.1,   9.1,   9.1,   15.2,
                   15.2,   15.2,   15.2,   9.1,   9.1,   9.1!
 2    ! WIDTH   =  4.0,   4.9,   33.1,   31.1,   28.1,   24.3,
                   19.7,   61.8,   58.0,   61.8,   63.7,   63.7,
                   61.8,   58.0,   52.4,   67.8,   82.3,   61.0,
                   4.0,   4.9,   5.6,   6.2,   26.4,   24.9,
                   22.6,   61.8,   16.0,   19.6,   22.6,   63.7,
```

```
                    61.8,   58.0,   52.4,   67.8,   82.3,   61.0!
!END!
 3    ! SRCNAM  =   FPUMP !
 3    ! HEIGHT  =  12.2,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   15.2,   29.0,
                    29.0,   29.0,   29.0,   29.0,   29.0,   29.0,
                    12.2,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   15.2,   29.0,
                    29.0,   29.0,   29.0,   29.0,   29.0,   29.0!
 3    ! WIDTH   =  12.8,   66.5,   79.9,   91.0,   99.2,   104.4,
                    106.5,   105.4,   101.0,   105.4,   63.7,   24.3,
                    28.1,   31.1,   33.1,   34.1,   34.1,   33.0,
                    12.8,   66.5,   79.9,   91.0,   99.2,   104.5,
                    106.5,   105.4,   101.0,   105.4,   63.7,   24.3,
                    28.1,   31.1,   33.1,   34.1,   34.1,   33.0!
!END!
 4    ! SRCNAM  =   COOL2 !
 4    ! HEIGHT  =  18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    18.3,   18.3,   18.3,   18.3,   18.3,   18.3,
                    29.0,   29.0,   18.3,   29.0,   29.0,   29.0,
                    29.0,   29.0,   18.3,   18.3,   18.3,   18.3!
 4    ! WIDTH   =  51.0,   66.5,   79.9,   91.0,   99.2,   104.5,
                    106.5,   105.4,   101.0,   105.4,   106.5,   104.5,
                    99.2,   91.0,   79.9,   66.5,   51.0,   34.0,
                    51.0,   66.5,   79.9,   91.0,   99.2,   104.5,
                    19.7,   14.6,   101.0,   14.6,   19.7,   24.3,
                    28.1,   31.1,   79.9,   66.5,   51.0,   34.0!
!END!
```

---

[a] Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

Subgroup (13d)

POINT SOURCE: VARIABLE EMISSIONS DATA[a]

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)

AREA SOURCE: CONSTANT DATA[a]

Source No.	Effect. Height (m)	Base Elevation (m)	Initial Sigma z (m)	Emission Rates[b]

---

[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)

Source No.	COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON 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)

AREA SOURCE: VARIABLE EMISSIONS DATA[a]

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