

Appendix F

ISC Input Parameter Description

Appendix F

ISC Input Parameter Description

DESCRIPTION OF CONTROL PATHWAY KEYWORDS

Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of CONTROL pathway inputs
TITLEONE	M - N	First line of title for output
TITLETWO	O - N	Optional second line of title for output
MODELOPT	M - N	Job control and dispersion options
AVERTIME	M - N	Averaging time(s) to process
POLLUTID	M - N	Identifies type of pollutant being modeled
HALFLIFE	O - N ¹	Optional half life used for exponential decay
DCAYCOEF	O - N ¹	Optional decay coefficient
TERRHGTS	O - N	Specifies whether to assume flat terrain (default) or to allow use of receptors on elevated terrain
ELEVUNIT ²	O - N	Defines input units for receptor elevations (defaults to meters)
FLAGPOLE	O - N	Specifies whether to accept receptor heights above local terrain (m) for use with flagpole receptors, and allows for a default flagpole height to be specified
RUNORNOT	M - N	Identifies whether to run model or process setup information only
EVENTFIL ³	O - N	Specifies whether to generate an input file for EVENT model (Applies to ISCST Only)
SAVEFILE ⁴	O - N	Option to store intermediate results for later restart of the model after user or system interrupt (Applies to ISCST Only)
INITFILE ⁴	O - N	Option to initialize model from file of intermediate results generated by SAVEFILE option (Applies to ISCST Only)
MULTYEAR ⁴	O - N	Option to process multiple years of meteorological data (one year per run) and accumulate high short term values across years (Applies to ISCST Only)
ERRORFIL	O - N	Option to generate detailed error listing file (error file is mandatory for CO RUNORNOT NOT case)
FINISHED	M - N	Identifies the end of CONTROL pathway inputs

Type: M -Mandatory N -Non-Repeatable
 O -Optional R -Repeatable

- 1) Either HALFLIFE or DCAYCOEF may be specified. If both cards appear a warning message will be issued and the first value entered will be used in calculations. Default assumes a half life of 4 hours for SO₂ modeled in urban mode.
- 2) The CO ELEVUNIT card is obsolescent with this version of the ISC models. The new RE ELEVUNIT card should be used instead to specify elevation units for receptors.
- 3) The EVENTFIL keyword controls whether or not to generate an input file for the ISCEV (EVENT) model. The primary difference between ISCST and ISCEV processing is in the treatment of source group contributions. The ISCST model treats the source groups independently, whereas the ISCEV model determines individual source contributions to particular events, such as the design concentrations determined from ISCST, or user-specified events. By specifying the EVENTFIL keyword, an input runstream file will be generated that can be used directly with the ISCEV model. The events included in the generated ISCEV model input file are defined by the RECTABLE and MAXIFILE keywords on the OU pathway, and are placed in the EEvent pathway. If more than one output type (CONC, DEPOS, DDEP, and/or WDEP) is selected for the ISCST model, only events associated with the first output type, in the order stated above, are included in the EVENT model input file.
- 4) The SAVEFILE and INITFILE keywords work together to implement the model's re-start capabilities. Since the MULTYEAR option utilizes the re-start features in a special way to accumulate high short term values from year to year, it cannot be used together with the SAVEFILE or INITFILE keyword in the same model run.

DESCRIPTION OF CONTROL PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters	
TITLEONE	Title1	
where:	Title1	First line of title for output, character string of up to 68 characters
TITLETWO	Title2	
where:	Title2	Optional second line of title for output, character string of up to 68 characters
MODELOPT	<p><u>DEFAULT</u> <u>CONC</u> <u>DRYDPLT</u> <u>WETDPLT</u> <u>RURAL</u> <u>GRDRIS</u> <u>NOSTD</u> <u>NOBID</u> <u>NOCALM</u> <u>MSGPRONOSMPL</u> (ST)</p> <p><u>DEPOS</u> or or <u>DDEP</u> <u>URBAN</u> <u>NOCMPL</u> and/or <u>WDEP</u></p> <p><u>DEFAULT</u> <u>CONC</u> <u>DRYDPLT</u> <u>RURAL</u> <u>GRDRIS</u> <u>NOSTD</u> <u>NOBID</u> (LT)</p> <p><u>DEPOS</u> or or <u>URBAN</u> <u>DDEP</u></p>	
where:	<p><u>DEFAULT</u></p> <p><u>CONC</u></p> <p><u>DEPOS</u></p> <p><u>DDEP</u></p> <p><u>WDEP</u></p> <p><u>DRYDPLT</u></p> <p><u>WETDPLT</u></p> <p><u>RURAL</u></p> <p><u>URBAN</u></p> <p><u>GRDRIS</u></p> <p><u>NOSTD</u></p> <p><u>NOBID</u></p> <p><u>NOCALM</u></p> <p><u>MSGPRO</u></p> <p><u>NOSMPL</u></p> <p><u>NOCMPL</u></p>	<p>Specifies use of regulatory default options (final rise, stack tip downwash, BID, calms processing, "upper bound" wake calcs, default exponents and DTDZ), overrides presence of <u>GRDRIS</u>, <u>NOSTD</u>, <u>NOBID</u>, <u>NOCALM</u>, and <u>MSGPRO</u> keywords</p> <p>Specifies calculation of concentration values</p> <p>Specifies calculation of total deposition flux (both dry and wet) for Short Term, and dry deposition flux for Long Term</p> <p>Specifies calculation of dry deposition flux only</p> <p>Specifies calculation of wet deposition flux only (ST only)</p> <p>Specifies inclusion of plume depletion due to dry removal</p> <p>Specified inclusion of plume depletion due to wet removal (ST only)</p> <p>Specifies use of rural dispersion</p> <p>Specifies use of urban dispersion</p> <p>Option to use gradual plume rise</p> <p>Option to use no stack-tip downwash</p> <p>Option to use no buoyancy-induced dispersion</p> <p>Option to bypass calms processing routine (ST only)</p> <p>Option to use missing data processing routines (ST only)</p> <p>Option to suppress simple terrain calculations, i.e., use COMPLEX1 algorithms only (ST only)</p> <p>Option to suppress complex terrain calculations, i.e., use ISCST algorithms only (ST only)</p>
AVERTIME	<p>Time1 Time2 Time3 Time4 <u>MONTH</u> <u>PERIOD</u> (ISCST and ISCEV only)</p> <p>or</p> <p><u>ANNUAL</u></p>	
where:	<p>TimeN</p> <p><u>MONTH</u></p> <p><u>PERIOD</u></p> <p><u>ANNUAL</u></p>	<p>Nth optional averaging time (1, 2, 3, 4, 6, 8, 12, 24-hr: number of periods limited by NAVE parameter)</p> <p>Option to calculate <u>MONTH</u>ly averages (counts toward NAVE limit)</p> <p>Option to calculate averages for the entire data</p> <p><u>PERIOD</u></p> <p>Option to calculate <u>ANNUAL</u> averages for the entire data</p>

DESCRIPTION OF CONTROL PATHWAY KEYWORDS AND PARAMETERS

AVERTIME	<u>JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC</u> (ISCLT model) <u>WINTER SPRING SUMMER FALL</u> or <u>QUART1 QUART2 QUART3 QUART4</u> <u>MONTH SEASON QUARTR ANNUAL PERIOD</u>	
where:	<u>JAN</u> <u>FEB</u> <u>DEC</u> <u>WINTER</u> <u>SPRING</u> <u>SUMMER</u> <u>FALL</u> <u>QUART1</u> <u>QUART2</u> <u>QUART3</u> <u>QUART4</u> <u>MONTH</u> <u>SEASON</u> <u>QUARTR</u> <u>ANNUAL</u> <u>PERIOD</u>	Option to calculate <u>JAN</u> uary averages from STAR data Option to calculate <u>FEB</u> ruary averages from STAR data Option to calculate <u>DEC</u> ember averages from STAR data Option to calculate <u>WINTER</u> averages from STAR data Option to calculate <u>SPRING</u> averages from STAR data Option to calculate <u>SUMMER</u> averages from STAR data Option to calculate <u>FALL</u> averages from STAR data Option to calculate <u>QUART1</u> averages from STAR data Option to calculate <u>QUART2</u> averages from STAR data Option to calculate <u>QUART3</u> averages from STAR data Option to calculate <u>QUART4</u> averages from STAR data Option to calculate averages for all twelve <u>MONTH</u> s Option to calculate averages for all four <u>SEASON</u> s Option to calculate averages for all four <u>QUART</u> ers Option to calculate annual values from an <u>ANNUAL</u> STAR summary Option to calculate averages for the entire data <u>PERIOD</u>
POLLUTID	Pollut	
where:	Pollut	Identifies type of pollutant being modeled. Any name of up to eight characters may be used, e.g., <u>SO2</u> , <u>NOX</u> , <u>CO</u> , <u>PM10</u> , <u>TSP</u> or <u>OTHER</u> . Selection of <u>SO2</u> with the <u>URBAN DFAULT</u> options forces use of a half life of 4 hours for exponential decay. Use of <u>PM10</u> , <u>PM-10</u> or <u>OTHER</u> allows for the use of the <u>MULTYEAR</u> option.
HALFLIFE	Haflif	
where:	Haflif	Half life used for exponential decay (s)
DCAYCOEF	Decay	
where:	Decay	Decay coefficient for exponential decay (s ⁻¹) = 0.693/HAFILIF
TERRHGTS	<u>FLAT</u> or <u>ELEV</u>	
where:	<u>FLAT</u> <u>ELEV</u>	Specifies that flat terrain will be assumed for all calculations (default) Specifies that receptors may be located on elevated terrain (chopped off at release height) Note that if <u>ELEV</u> ated receptors are allowed, then receptor heights must be input on the RE pathway, or they will be assumed to be 0.0.
ELEVUNIT	<u>METERS</u> or <u>FEET</u>	
where:	<u>METERS</u> <u>FEET</u>	Specifies input units for terrain (receptor) elevations of meters Specifies input units for terrain (receptor) elevations of feet Note: This keyword applies to receptor elevations only.
FLAGPOLE	(Flagdf)	
where:	Flagdf	Default value for height of (flagpole) receptors above local ground level, a default value of 0.0 m is used if this optional parameter is omitted

Note: The CO ELEVUNIT card is obsolescent with this version of the ISC models. The new RE ELEVUNIT card should be used instead to specify elevation units for receptors. If the CO ELEVUNIT card is present, it will be processed as it was in the previous version of the ISC models, but it cannot be used when an ELEVUNIT card is present on either the SO, RE or TG pathways.

DESCRIPTION OF CONTROL PATHWAY KEYWORDS AND PARAMETERS

RUNORNOT	<u>RUN</u> or <u>NOT</u>	
where:	<u>RUN</u> <u>NOT</u>	Indicates to run full model calculations Indicates to process setup data and report errors, but to <u>not</u> run full model calculations
EVENTFIL	(Evfile) (Evopt)	
where:	Evfile Evopt	Identifies the filename to be used to generate a file for input to EVENT model (Default=EVENTFIL.INP) Optional parameter to specify the level of output detail selected for the EVENT model: either <u>SOCONT</u> or <u>DETAIL</u> (default is <u>DETAIL</u> if this para- meter is omitted)
SAVEFILE	(Savfil) (Dayinc) (Savf12)	
where:	Savfil Dayinc Savf12	Specifies name of disk file to be used for storing intermediate results (default = SAVE.FIL) file is overwritten after each dump) Number of days between dumps (optional: default is 1) Optional second disk filename to be used on alternate dumps - eliminates risk of system crash during the dump. If blank, file is overwritten each time.
INITFILE	(Inifil)	
where:	Inifil	Specifies name of disk file of intermediate results to be used for initializing run (default = SAVE.FIL)
MULTYEAR	Savfil (Inifil)	
where:	Savfil Inifil	Specifies name of disk file to be used for storing results at end of the year Optional name of disk file used for initializing the results arrays from previous year(s). The Inifil parameter is not used for the first year in the multi-year run.
ERRORFIL	(Errfil) (<u>DEBUG</u>)	
where:	Errfil <u>DEBUG</u>	Specifies name of detailed error listing file (default = ERRORS.LST) Option to provide detailed output for debugging purposes, e.g., plume heights, sigmas, etc. <u>Generates Very Large Files -- Use with CAUTION!!!</u>

DESCRIPTION OF SOURCE PATHWAY KEYWORDS

SO Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of SOURCE pathway inputs
ELEVUNIT	O - N	Defines input units for source elevations (defaults to meters), must be first keyword after SO STARTING if used.
LOCATION	M - R	Identifies coordinates for particular source
SRCPARAM	M - R	Identifies source parameters for a particular source
BUILDHGT	O - R	Building height values for each wind sector
BUILDWID	O - R	Building width values for each wind sector
LOWBOUND	O - R	Switch to use non- <u>DEFAULT</u> option for "lower bound" wake calculations, controlled by sector
EMISFACT	O - R	Optional input for variable emission rate factors
EMISUNIT	O - N	Optional conversion factors for emissions, concentrations, and depositions
CONCUNIT	O - N	Optional conversion factors for emissions and concentrations
DEPOUNIT	O - N	Optional conversion factors for emissions and depositions
PARTDIAM	O - R	Input variables for optional input of particle size (microns)
MASSFRAX	O - R	Optional input of mass fraction for each particle size category
PARTDENS	O - R	Optional input of particle density (g/cm ³) for each size category
PARTSLIQ	O - R	Optional input of scavenging coefficient (s-mm/hr) ⁻¹ of particulates for liquid precipitation
PARTSICE	O - R	Optional input of scavenging coefficient (s-mm/hr) ⁻¹ of particulates for frozen precipitation
GAS-SCAV	O - R	Optional input of scavenging coefficient (s-mm/hr) ⁻¹ of gases for liquid or frozen precipitation
HOUREMIS	O - R	Option for specifying hourly emission rates in a separate file
SRCGROUP ¹	M - R	Identification of source groups
FINISHED	M - N	Identifies the end of SOURCE pathway inputs

- 1) Source groups are treated independently for ISCST. The ISCEV (EVENT) model provides the contribution from each source to the group total for each specified event.

DESCRIPTION OF SOURCE PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters	
ELEVUNIT	<u>METERS</u> or <u>FEET</u>	
where:	<u>METERS</u> <u>FEET</u>	Specifies input units for source elevations of meters Specifies input units for source elevations of feet Note: This keyword applies to source elevations only.
LOCATION	Srcid Src typ Xs Ys (Zs)	
where:	Srcid Src typ Xs Ys Zs	Source identification code (alphanumeric string of up to eight characters) Source type: <u>POINT</u> , <u>VOLUME</u> , <u>AREA</u> , <u>OPENPIT</u> x-coord of source location, corner for <u>AREA</u> and <u>OPENPIT</u> (in m) y-coord of source location, corner for <u>AREA</u> and <u>OPENPIT</u> (in m) Optional z-coord of source location (elevation above mean sea level, defaults to 0.0 if omitted)
SRCPARAM	Srcid Ptemis Stkhgt Stktmp Stkvel Stkdia Vlemis Relhgt Syinit Szinit Aremis Relhgt Xinit (Yinit) (Angle) (Szinit) Pitemis Relhgt Xinit Yinit Pitvol (Angle)	
where:	Srcid __Emis __Hgt Stktmp Stkvel Stkdia Syinit Szinit Xinit Yinit Angle Pitvol	Source identification code Source emission rate: in g/s for Ptemis or Vlemis, g/(sm ²) for Aremis or Pitemis for concentration or deposition Source physical release height above ground (center of height for <u>VOLUME</u> , height above base of pit for <u>OPENPIT</u>) Stack gas exit temperature (K) Stack gas exit velocity (m/s) Stack inside diameter (m) Initial lateral dimension of <u>VOLUME</u> source (m) Initial vertical dimension of <u>VOLUME</u> or <u>AREA</u> source (m) (optional parameter for <u>AREA</u> sources, assumed to be 0.0 if omitted) Length of side of <u>AREA</u> or <u>OPENPIT</u> source in X-direction (m) Length of side of <u>AREA</u> or <u>OPENPIT</u> source in Y-direction (m) (optional for <u>AREA</u> sources, assumed to be equal to Xinit if omitted) Orientation angle of <u>AREA</u> or <u>OPENPIT</u> source relative to North (degrees), measured positive clockwise, rotated around the source location, (Xs,Ys) (optional parameter, assumed to be 0.0 if omitted) Volume of open pit (m ³)
BUILDHGT	Srcid (or Srcrng) Dsbh(i), i=1,36 (16 for LT)	

where:	Srcid Srcrng Dsbh	Source identification code Range of sources (inclusive) for which building dimensions apply, entered as two alphanumeric strings separated by a '-' Array of direction-specific building heights (m) beginning with 10 degree flow vector and incrementing by 10 degrees clockwise
BUILDWID	Srcid (or Srcrng) Dsbw(i), i=1,36 (16 for LT)	
where:	Srcid Srcrng Dsbw	Source identification code Range of sources (inclusive) for which building dimensions apply Array of direction-specific building widths (m) beginning with 10 degree flow vector and incrementing by 10 degrees clockwise

DESCRIPTION OF SOURCE PATHWAY KEYWORDS AND PARAMETERS

PARTDIAM	Srcid (or Srcrng) Pdiam(i), i=1,Npd	
where:	Srcid Srcrng Pdiam	Source identification code Range of sources (inclusive) for which size categories apply Array of particle diameters (microns)
MASSFRACTION	Srcid (or Srcrng) Phi(i), i=1,Npd	
where:	Srcid Srcrng Phi	Source identification code Range of sources (inclusive) for which mass fractions apply Array of mass fractions for each particle size category
PARTDENS	Srcid (or Srcrng) Pdens(i), i=1,Npd	
where:	Srcid Srcrng Pdens	Source identification code Range of sources (inclusive) for which particle densities apply Array of particle densities (g/cm ³) for each size category
PARTSLIQ	Srcid (or Srcrng) Scavcoef(i), i=1,Npd	
where:	Srcid Srcrng Scavcoef	Source identification code Range of sources (inclusive) for which scavenging coefficients apply Scavenging coefficient (s-mm/hr) ⁻¹ for liquid precipitation for each size category
PARTSICE	Srcid (or Srcrng) Scavcoef(i), i=1,Npd	
where:	Srcid Srcrng Scavcoef	Source identification code Range of sources (inclusive) for which scavenging coefficients apply Scavenging coefficient (s-mm/hr) ⁻¹ for frozen precipitation for each size category
GAS-SCAV	Srcid (or Srcrng) <u>LIQ</u> or <u>ICE</u> Scavcoef	
where:	Srcid Srcrng <u>LIQ</u> <u>ICE</u> Scavcoef	Source identification code Range of sources (inclusive) for which scavenging coefficient applies Specifies that inputs are for liquid precipitation Specifies that inputs are for frozen precipitation Scavenging coefficient (s-mm/hr) ⁻¹ for liquid or frozen precipitation for each size category
HOUREMIS	Emifil Srcid's Srcrng's	
where:	Emifil Srcid's Srcrng's	Specifies name of the hourly emission rate file Discrete source IDs that are included in the hourly emission file Source ID ranges that are included in the hourly emission file
SRCGROUP	Grpid Srcid's Srcrng's	
where:	Grpid Srcid's Srcrng's	Group ID (Grpid = <u>ALL</u> specifies group including all sources), number of source groups limited by NGRP parameter in the computer code Discrete source IDs to be included in group Source ID ranges to be included in group Note: Card may be repeated with same Grpid if more space is needed to specify sources

DESCRIPTION OF RECEPTOR PATHWAY KEYWORDS

(APPLIES TO ISCST AND ISCLT)

RE Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of RECEPTOR pathway inputs
ELEVUNIT	O - N	Defines input units for receptor elevations (defaults to meters), must be first keyword after RE STARTING if used.
GRIDCART	O - R ¹	Defines a Cartesian grid receptor network
GRIDPOLR	O - R ¹	Defines a polar receptor network
DISCCART	O - R ¹	Defines the discretely placed receptor locations referenced to a Cartesian system
DISCPOLR	O - R ¹	Defines the discretely placed receptor locations referenced to a polar system
BOUNDARY	O - R ¹	Defines discrete polar receptor locations corresponding to minimum plant boundary distances for each 10 degree sector
BOUNDELV	O - R	Defines terrain elevations for discrete receptors specified with BOUNDARY keyword
FINISHED	M - N	Identifies the end of RECEPTOR pathway inputs

- 1) At least one of the following must be present: GRIDCART, GRIDPOLR, DISCCART, DISCPOLR, or BOUNDARY. Multiple receptor networks can be specified in a single run, including both Cartesian and polar, up to an overall maximum controlled by the NREC parameter.

DESCRIPTION OF RECEPTOR PATHWAY KEYWORDS AND PARAMETERS

(APPLIES TO ISCST AND ISCLT)

Keyword	Parameters	
ELEVUNIT	<u>METERS</u> or <u>FEET</u>	
where:	<u>METERS</u> <u>FEET</u>	Specifies input units for receptor elevations of meters Specifies input units for receptor elevations of feet Note: This keyword applies to receptor elevations only.
GRIDCART	Netid <u>STA</u> <u>XYINC</u> Xinit Xnum Xdelta Yinit Ynum Ydelta or <u>XPNTS</u> Gridx1 Gridx2 Gridx3 GridxN, and <u>YPNTS</u> Gridy1 Gridy2 Gridy3 GridyN <u>ELEV</u> Row Zelev1 Zelev2 Zelev3 ... ZelevN <u>FLAG</u> Row Zflag1 Zflag2 Zflag3 ... ZflagN <u>END</u>	
where:	Netid <u>STA</u> <u>XYINC</u> Xinit Xnum Xdelta Yinit Ynum Ydelta <u>XPNTS</u> Gridx1 GridxN <u>YPNTS</u> Gridy1 GridyN <u>ELEV</u> Row Zelev <u>FLAG</u> Row Zflag <u>END</u>	Receptor network identification code (up to eight alphanumeric characters) Indicates <u>STA</u> rt of GRIDCART subpathway, repeat for each new Netid Keyword identifying grid network generated from x and y increments Starting x -axis grid location in meters Number of x -axis receptors Spacing in meters between x-axis receptors Starting y -axis grid location in meters Number of y -axis receptors Spacing in meters between y-axis receptors Keyword identifying grid network defined by a series of x and y coordinates Value of first x-coordinate for Cartesian grid Value of 'nth' x-coordinate for Cartesian grid Keyword identifying grid network defined by a series of x and y coordinates Value of first y-coordinate for Cartesian grid Value of 'nth' y-coordinate for Cartesian grid Keyword to specify that receptor elevations follow Indicates which row (y-coordinate fixed) is being input An array of receptor terrain elevations for a particular Row Keyword to specify that flagpole receptor heights follow Indicates which row (y-coordinate fixed) is being input An array of receptor heights above local terrain elevation for a particular Row (flagpole receptors) Indicates <u>END</u> of GRIDCART subpathway, repeat for each new Netid

DESCRIPTION OF RECEPTOR PATHWAY KEYWORDS AND PARAMETERS

(APPLIES TO ISCST AND ISCLT)

GRIDPOLR	<p>Netid <u>STA</u> <u>ORIG</u> Xinit Yinit, or <u>ORIG</u> Srcid <u>DIST</u> Ring1 Ring2 Ring3 ... RingN <u>DDIR</u> Dir1 Dir2 Dir3 ... DirN, or <u>GDIR</u> Dirnum Dirini Dirinc <u>ELEV</u> Dir Zelev1 Zelev2 Zelev3 ... ZelevN <u>FLAG</u> Dir Zflag1 Zflag2 Zflag3 ... ZflagN <u>END</u></p>	
where:	<p>Netid <u>STA</u> <u>ORIG</u> Xinit Yinit Srcid <u>DIST</u> Ring1 RingN <u>DDIR</u> Dir1 DirN <u>GDIR</u> Dirnum Dirini Dirinc <u>ELEV</u> Dir Zelev <u>FLAG</u> Dir Zflag <u>END</u></p>	<p>Receptor network identification code (up to eight alphanumeric characters) Indicates <u>STA</u>rt of GRIDPOLR subpathway, repeat for each new Netid Optional keyword to specify the origin of the polar network (assumed to be at x=0, y=0 if omitted) x-coordinate for origin of polar network y-coordinate for origin of polar network Source ID of source used as origin of polar network Keyword to specify distances for the polar network Distance to the first ring of polar coordinates Distance to the 'nth' ring of polar coordinates Keyword to specify discrete direction radials for the polar network First direction radial in degrees (1 to 360) The 'nth' direction radial in degrees (1 to 360) Keyword to specify generated direction radials for the polar network Number of directions used to define the polar system Starting direction of the polar system Increment (in degrees) for defining directions Keyword to specify that receptor elevations follow Indicates which direction is being input An array of receptor terrain elevations for a particular direction radial Keyword to specify that flagpole receptor heights follow Indicates which direction is being input An array of receptor heights above local terrain elevation for a particular direction (flagpole receptors) Indicates <u>END</u> of GRIDPOLR subpathway, repeat for each new Netid</p>

DESCRIPTION OF RECEPTOR PATHWAY KEYWORDS AND PARAMETERS

(APPLIES TO ISCST AND ISCLT)

DISCCART	Xcoord Ycoord (Zelev) (Zflag)	
where:	Xcoord Ycoord Zelev Zflag	x-coordinate for discrete receptor location y-coordinate for discrete receptor location Elevation above sea level for discrete receptor location (optional), used only for <u>ELEV</u> terrain Receptor height (flagpole) above local terrain (optional), used only with <u>FLAGPOLE</u> keyword
DISCPOLR	Srcid Dist Direct (Zelev) (Zflag)	
where:	Srcid Dist Direct Zelev Zflag	Specifies source identification for which discrete polar receptor locations apply (used to define the origin for the discrete polar receptor) Downwind distance to receptor location Direction to receptor location, in degrees clockwise from North Elevation above sea level for receptor location (optional), used only for <u>ELEV</u> terrain Receptor height (flagpole) above local terrain (optional), used only with <u>FLAGPOLE</u> keyword
BOUNDARY	Srcid Dist(i), i=1,36	
where:	Srcid Dist	Specifies source identification for which boundary distances apply Array of 36 values corresponding to minimum plant boundary distances for every 10-degree sector, beginning with the 10 degree flow vector Note: Discrete receptor coordinates are generated with an origin referenced to the location of the source identified with Srcid
BOUNDELV	Srcid Zelev(i), i=1,36	
where:	Srcid Zelev	Specifies source identification for which boundary distances apply Array of 36 values corresponding to terrain elevation for plant boundary distances for 10-degree sectors, beginning with the 10 degree flow vector

DESCRIPTION OF METEOROLOGY PATHWAY KEYWORDS

ME Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of METEOROLOGY pathway inputs
INPUTFIL	M - N	Describes input meteorological data file
ANEMHGHT	M - N	Input height of anemometer above stack base
SURFDATA	M - N	Describes surface meteorological station
UAIRDATA	M - N	Describes upper air meteorological station
STARTEND	O - N	Specifies start and end dates to be read from input meteorological data file (default is to read entire file). <u>(Applies to ISCST Only)</u>
DAYRANGE	O - R	Specifies days or ranges of days to process (default is to process all data read in). <u>(Applies to ISCST Only)</u>
WDROTATE	O - N	May be used to correct for alignment problems of wind direction measurements, or to convert wind direction <u>from</u> to flow vector
WINDPROF	O - R	Input optional wind profile exponents
DTHETADZ	O - R	Input optional vertical potential temperature gradients
WINDCATS	O - N	Input upper bounds of wind speed categories, five values input - sixth category is assumed to have no upper bound. <u>(Applies to Short Term Only)</u>
AVESPEED	O - N	Average (median) wind speed for each speed category in the STAR summary. <u>(Applies to ISCLT Only)</u>
AVETEMPS	M - R	Average ambient temperatures for each stability category and season. <u>(Applies to ISCLT Only)</u>
AVEMIXHT	M - R	Average mixing heights for each wind speed, stability category and season. <u>(Applies to ISCLT Only)</u>
AVEROUGH	O - R	Roughness length for each season <u>(Applies to ISCLT Only)</u>
FINISHED	M - N	Identifies the end of METEOROLOGY pathway inputs

DESCRIPTION OF METEOROLOGY PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters	
INPUTFIL	Metfil (Format)	
where:	Metfil Format	Specify filename for meteorological input file Specify format for input file: options are to provide FORTRAN read format for ASCII file, (YR,MN,DY,HR,AFV (or WD),WS,TA,KST,ZIRUR,ZIURB); use default ASCII format (4I2,2F9.4,F6.1,I2,2F7.1) if blank; use free format if <u>FREE</u> ; use default ASCII format with hourly WINDPROF and DTHETADZ if <u>CARD</u> ; or use unformatted PCRAMMET file if <u>UNFORM</u>
ANEMHGHT	Zref (Zrunit)	
where:	Zref Zrunit	Reference (anemometer) height above ground for wind speed measurement; also assumed to be height above stack base Units of Zref: <u>METERS</u> or <u>FEET</u> . (default is <u>METERS</u>)
SURFDATA	Stanum Year (Name) (Xcoord Ycoord)	
where:	Stanum Year Name Xcoord Ycoord	Station number, e.g. 5-digit WBAN number for NWS surface station Year of data being processed (four digits) Station name (optional) x-coordinate of station location (m) (optional) y-coordinate of station location (m) (optional)
UAIRDATA	Stanum Year (Name) (Xcoord Ycoord)	
where:	Stanum Year Name Xcoord Ycoord	Station number, e.g. 5-digit WBAN number for NWS upper air station Year of data being processed (four digits) Station name (optional) x-coordinate of station location (m) (optional) y-coordinate of station location (m) (optional)
STARTEND	Strtyr Strtmn Strtdy (Strthr) Endyr Endmn Enddy (Endhr) (Applies to ISCST Only)	
where:	Strtyr Strtmn Strtdy Strthr Endyr Endmn Enddy Endhr	Year of first record to be read Month of first record to be read Day of first record to be read Hour of first record to be read (optional) Year of last record to be read Month of last record to be read Day of last record to be read Hour of last record to be read (optional) Note: File read begins with hour 1 of the start date and ends with hour 24 of the end date if Stahr and Endhr are omitted.

DESCRIPTION OF METEOROLOGY PATHWAY KEYWORDS AND PARAMETERS

DAYRANGE	Range1 Range2 Range3 ... RangeN (Applies to ISCST Only)	
where:	Range1 RangeN	First range of days to process, either as individual day (XXX) or as range (XXX-YYY); days may be input as Julian dates (XXX) or as month and day (XXYY) The 'nth' range of days to process
STARDATA	<u>JAN</u> <u>FEB</u> <u>MAR</u> <u>APR</u> <u>MAY</u> <u>JUN</u> <u>JUL</u> <u>AUG</u> <u>SEP</u> <u>OCT</u> <u>NOV</u> <u>DEC</u> (ISCLT Model) <u>WINTER</u> <u>SPRING</u> <u>SUMMER</u> <u>FALL</u> or <u>QUART1</u> <u>QUART2</u> <u>QUART3</u> <u>QUART4</u> <u>MONTH</u> <u>SEASON</u> <u>QUARTR</u> <u>ANNUAL</u>	
where:	<u>JAN</u> <u>FEB</u> <u>DEC</u> <u>WINTER</u> <u>SPRING</u> <u>SUMMER</u> <u>FALL</u> <u>QUART1</u> <u>QUART2</u> <u>QUART3</u> <u>QUART4</u> <u>MONTH</u> <u>SEASON</u> <u>QUARTR</u> <u>ANNUAL</u> <u>PERIOD</u>	Option to calculate <u>JAN</u> uary averages from STAR data Option to calculate <u>FEB</u> ruary averages from STAR data Option to calculate <u>DEC</u> ember averages from STAR data Option to calculate <u>WINTER</u> averages from STAR data Option to calculate <u>SPRING</u> averages from STAR data Option to calculate <u>SUMMER</u> averages from STAR data Option to calculate <u>FALL</u> averages from STAR data Option to calculate <u>QUART1</u> averages from STAR data Option to calculate <u>QUART2</u> averages from STAR data Option to calculate <u>QUART3</u> averages from STAR data Option to calculate <u>QUART4</u> averages from STAR data Option to calculate averages for all twelve <u>MONTH</u> s Option to calculate averages for all four <u>SEASON</u> s Option to calculate averages for all four <u>QUART</u> eRs Option to calculate annual values from an <u>ANNUAL</u> STAR summary Option to calculate averages for the entire data <u>PERIOD</u>

WDROTATE	Rotang	
where:	Rotang	Specifies angle (in degrees) to rotate wind direction measurements to correct for alignment problems; value of Rotang is subtracted from WD measurements, i.e., rotation is counterclockwise; may also be used to adjust input of wind direction <u>from</u> values to <u>flow vector</u> values by setting Rotang = 180
WINDPROF	Stab Prof1 Prof2 Prof3 Prof4 Prof5 Prof6	
where:	Stab Prof1 Prof2 Prof3 Prof4 Prof5 Prof6	Specifies stability category (A through F) for the following six values by wind speed class Wind speed profile exponent for first speed class Wind speed profile exponent for second speed class Wind speed profile exponent for third speed class Wind speed profile exponent for fourth speed class Wind speed profile exponent for fifth speed class Wind speed profile exponent for sixth speed class Note: Card is repeated for each stability class
DTHETADZ	Stab Dtdz1 Dtdz2 Dtdz3 Dtdz4 Dtdz5 Dtdz6	
where:	Stab Dtdz1 Dtdz2 Dtdz3 Dtdz4 Dtdz5 Dtdz6	Specifies stability category (A through F) for the following six values by wind speed class Vertical temperature gradient for first speed class Vertical temperature gradient for second speed class Vertical temperature gradient for third speed class Vertical temperature gradient for fourth speed class Vertical temperature gradient for fifth speed class Vertical temperature gradient for sixth speed class Note: Card is repeated for each stability class

DESCRIPTION OF METEOROLOGY PATHWAY KEYWORDS AND PARAMETERS

WINDCATS	Ws1 Ws2 Ws3 Ws4 Ws5	(Applies to Short Term Only)
where:	Ws1 Ws2 Ws3 Ws4 Ws5	Upper bound of first wind speed category (m/s) Upper bound of second wind speed category (m/s) Upper bound of third wind speed category (m/s) Upper bound of fourth wind speed category (m/s) Upper bound of fifth wind speed category (m/s) (sixth category is assumed to have no upper bound)
AVESPEED	Ws1 Ws2 Ws3 Ws4 Ws5 Ws6	(Applies to ISCLT Only)
where:	Ws1 Ws2 Ws3 Ws4 Ws5 Ws6	Median speed of first wind speed category (m/s) Median speed of second wind speed category (m/s) Median speed of third wind speed category (m/s) Median speed of fourth wind speed category (m/s) Median speed of fifth wind speed category (m/s) Median speed of sixth wind speed category (m/s)
AVETEMPS	Aveper Ta1 Ta2 Ta3 Ta4 Ta5 Ta6	(Applies to ISCLT Only)
where:	Aveper Ta1 Ta2 Ta3 Ta4 Ta5 Ta6	Specifies averaging period (see AVERTIME keyword) for the following temperatures (K) Average temperature of stability category A Average temperature of stability category B Average temperature of stability category C Average temperature of stability category D Average temperature of stability category E Average temperature of stability category F Note: Card is repeated for each averaging period
AVEMIXHT	Aveper Stab Mixht1 Mixht2 Mixht3 Mixht4 Mixht5 Mixht6	(Applies to ISCLT Only)
where:	Aveper Stab Mixht1 Mixht2 Mixht3 Mixht4 Mixht5 Mixht6	Specifies averaging period (see AVERTIME keyword) for the following mixing heights (m) Specifies stability category (A through F) for the following six values by wind speed class Average mixing height for first speed class Average mixing height for second speed class Average mixing height for third speed class Average mixing height for fourth speed class Average mixing height for fifth speed class Average mixing height for sixth speed class Note: Card is repeated for each stability class and for each averaging period
AVEROUGH	Aveper Z0	(Applies to ISCLT Only)
where:	Aveper Z0	Specifies averaging period (AVERTIME keyword) for the roughness length (m) Roughness Length Note: Card is repeated for each averaging period

DESCRIPTION OF TERRAIN GRID PATHWAY KEYWORDS

TG Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of TERRAIN GRID pathway inputs
INPUTFIL	M - N	Describes input terrain grid data file
LOCATION	M - N	Specifies the origin of the terrain grid
ELEVUNIT	O - N	Defines input units for terrain grid elevations (defaults to meters)
FINISHED	M - N	Identifies the end of TERRAIN GRID pathway inputs

Note: The Terrain Grid (TG) pathway is optional. The TG pathway is only used for calculating dry depletion in elevated or complex terrain. If it is omitted, then the terrain profile is linearly interpolated along the plume path from source to receptor for dry depletion calculations.

DESCRIPTION OF TERRAIN GRID PATHWAY KEYWORDS AND PARAMETERS

INPUTFIL	Tgfile	
where:	Tgfile	Specifies filename for the terrain grid data file
LOCATION	Xorig Yorig (Units)	
where:	Xorig Yorig Units	UTM X-coordinate of origin for the source and receptor locations UTM Y-coordinate of origin for the source and receptor locations Units for Xorig and Yorig (<u>FEET</u> , <u>KM</u> , or <u>METERS</u> - default is in <u>METERS</u>)
ELEVUNIT	<u>METERS</u> or <u>FEET</u>	
where:	<u>METERS</u> <u>FEET</u>	Specifies input units for terrain grid elevations of meters Specifies input units for terrain grid elevations of feet Note: This keyword applies to terrain grid elevations only.

DESCRIPTION OF EVENT PATHWAY KEYWORDS

(APPLIES TO ISCEV MODEL ONLY)

EV Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of EVENT pathway inputs
EVENTPER	M - R	Describes data and averaging period for an event
EVENTLOC	M - R	Describes receptor location for an event
FINISHED	M - N	Identifies the end of EVENT pathway inputs

DESCRIPTION OF EVENT PATHWAY KEYWORDS AND PARAMETERS

(APPLIES TO ISCEV MODEL ONLY)

Keyword	Parameters	
EVENTPER	Evname Aveper Grpid Date	
where:	Name Grpid Aveper Date	Specify name of event to be processed (e.g. H2H24ALL), (up to eight alphanumeric characters) Specify source group ID for event Specify averaging period for event Specify data period for event (ending YYMMDDHH for averaging period)
EVENTLOC	Evname <u>XR=</u> Xr <u>YR=</u> Yr (Zelev) (Zflag) or <u>RNG=</u> Rng <u>DIR=</u> Dir (Zelev) (Zflag)	
where:	Evname <u>XR=</u> <u>YR=</u> <u>RNG=</u> <u>DIR=</u> Zelev Zflag	Specify name of event to be processed (e.g. H2H24ALL), (up to eight alphanumeric characters) X-coordinate for event (discrete Cartesian receptor) Y-coordinate for event (discrete Cartesian receptor) Distance range for event (discrete polar receptor) Radial direction for event (discrete polar receptor) Terrain elevation for event (optional) Receptor height above ground for event (optional)

Note: EVENT locations can be input as either discrete Cartesian receptors (XR=, YR=) or as discrete polar receptors (RNG=, DIR=). Events that are specified in the file generated by the ISCST model (CO EVENTFIL card) are always given as discrete Cartesian coordinates. Discrete polar receptors are assumed to be relative to an origin of (0,0).

DESCRIPTION OF OUTPUT PATHWAY KEYWORDS

OU Keywords	Type	Keyword Description
STARTING	M - N	Identifies the start of OUTPUT pathway inputs
RECTABLE	O - R	Option to specify value(s) by receptor for output
MAXTABLE	O - R	Option to summarize the overall maximum values
DAYTABLE	O - N	Option to print summaries for each averaging period for each day processed. <i>(Applies to ISCST Only)</i>
MAXIFILE	O - R	Option to list events exceeding a threshold value to file (if CO EVENTFIL option is used, these events are included in the input file generated for the EVENT model). <i>(Applies to ISCST Only)</i>
POSTFILE ¹	O - R	Option to write results to a mass storage file for postprocessing. <i>(Applies to ISCST Only)</i>
PLOTFILE ¹	O - R	Option to write certain results to a storage file suitable for input to plotting routines
TOXXFILE	O - R	Option to write results to a storage file suitable for input to the TOXX model component of TOXST or the RISK model component of TOXLT
EVENTOUT ²	M - N	Specifies the level of output information provided by the EVENT model. <i>(Applies to ISCEV Only)</i>
FINISHED	M - N	Identifies the end of OUTPUT pathway inputs

- 1) POSTFILE is used to output concurrent concentration values for particular source groups and averaging times across the receptor network, suitable for postprocessing, such as might be done for implementing the intermediate terrain policy. PLOTFILE is used to output specific design values, such as second high concentrations, across the receptor network, suitable for plotting concentration contours.

- 2) EVENTOUT is the only keyword on the OU pathway for the Short Term EVENT model.

DESCRIPTION OF OUTPUT PATHWAY KEYWORDS AND PARAMETERS

Keyword	Parameters	
RECTABLE	Aveper <u>FIRST</u> <u>SECOND</u> . . . <u>SIXTH</u> (Short Term Model) or Aveper <u>1ST</u> <u>2ND</u> . . . <u>6TH</u> (Short Term Model) <u>INDSRC</u> and/or <u>SRCGRP</u> (Long Term Model)	
where:	Aveper <u>FIRST</u> <u>SECOND</u> <u>SIXTH</u> <u>1ST</u> <u>2ND</u> <u>6TH</u> <u>INDSRC</u> <u>SRCGRP</u>	Averaging period to summarize with high values (keyword <u>ALLAVE</u> specifies all averaging periods) Select summaries of <u>FIRST</u> highest values by receptor Select summaries of <u>SECOND</u> highest values by receptor Select summaries of <u>SIXTH</u> highest values by receptor Select summaries of <u>1ST</u> highest values by receptor Select summaries of <u>2ND</u> highest values by receptor Select summaries of <u>6TH</u> highest values by receptor Note: If two keywords are input separated by a dash (e.g. <u>FIRST-THIRD</u>), then summaries of all high values in that range are provided. The number of high values allowed is con- trolled by the NVAL parameter in the computer code (initially set at 3). Also, if the CO EVENTFIL keyword is exercised, then the events generated by the RECTABLE keyword are included in the input file for EVENT model. Specifies that summaries of individual source values for each receptor point will be provided Specifies that summaries of source group values for each receptor point will be provided Note: Either <u>INDSRC</u> or <u>SRCGRP</u> or both may be specified
MAXTABLE	Aveper Maxnum (Short Term Model) Maxnum <u>INDSRC</u> and/or <u>SRCGRP</u> and/or <u>SOCONT</u> (Long Term Model)	
where:	Aveper Maxnum <u>INDSRC</u> <u>SRCGRP</u> <u>SOCONT</u>	Averaging period to summarize with maximum values (key word <u>ALLAVE</u> specifies all averaging periods) Specifies number of overall maximum values to summarize (number of maximum values permitted is limited by the NMAX parameter in the computer code, initially set at 50 for Short Term and 10 for Long Term) Specifies that summaries of maximum values for individual sources will be provided (independent of source group maxima) Specifies that summaries of maximum values by source group will be provided Specifies that summaries of individual source contri- butions for locations of maximum source group values will be provided Note: Any combination of Long Term parameters is acceptable

DESCRIPTION OF OUTPUT PATHWAY KEYWORDS AND PARAMETERS

DAYTABLE	Aver1 Aver2 Aver3 . . . (Applies to ISCST Only)	
where:	Aver1	Averaging period to summarize with values by receptor for each day of data processed (keyword <u>ALLAVE</u> for first parameter specifies all averaging periods)
MAXIFILE	Aveper Grpid Thresh Filnam (Funit) (Applies to ISCST Only)	
where:	Aveper Grpid Thresh Filnam Funit	Specifies averaging period for list of values equal to or exceeding a threshold value Specifies source group to be output to file Threshold value (e.g. NAAQS) for list of exceedances Name of disk file to store maximum values Optional parameter to specify the file unit Note: If the CO EVENTFIL keyword is exercised, then the events generated by the MAXIFILE keyword are included in the input file for the EVENT model.
POSTFILE	Aveper Grpid Format Filnam (Funit) (Applies to ISCST Only)	
where:	Aveper Grpid Format Filnam Funit	Specifies averaging period to be output to file, e.g., <u>24</u> for 24-hr averages, <u>PERIOD</u> for period averages Specifies source group to be output to file Specifies format of file, either <u>UNIFORM</u> for unformatted files or <u>PLOT</u> for formatted files for plotting Specifies filename for output file Optional parameter to specify the file unit
PLOTFILE	Aveper Grpid Hivalu Filnam (Funit) (ISCST short term values) Aveper Grpid Filnam (Funit) (ISCLT model and ISCST PERIOD averages)	

where:	Aveper Grpid Hivalu Filnam Funit	Specifies averaging period to be output to file, e.g., <u>24</u> for 24-hr averages, <u>PERIOD</u> for period averages, <u>WINTER</u> for winter averages, etc. Specifies source group to be output to file Specifies high value summary (e.g. <u>FIRST</u> , <u>SECOND</u> , <u>1ST</u> , <u>2ND</u> , etc.) to be output to file (must be selected on a RECTABLE card) Specifies filename for output file Optional parameter to specify the file unit
TOXXFILE	Aveper Cutoff Filnam (Funit) (ISCST short term values) Aveper Grpid Filnam (Funit) (ISCLT model)	
where:	Aveper Cutoff Grpid Filnam Funit	Specifies averaging period to be output to file, e.g., <u>1</u> for 1-hr averages, <u>PERIOD</u> for period averages (LT only), <u>WINTER</u> for winter averages, etc. Specifies cutoff (threshold) value in g/m ³ for outputting results for ISCST model Specifies source group to be output to file (LT only) Specifies filename for output file Optional parameter to specify the file unit
EVENTOUT	<u>SOCONT</u> or <u>DETAIL</u>	(Applies to ISCEV Only)
where:	<u>SOCONT</u> <u>DETAIL</u>	Specifies the option to provide source contribution information only in the event output Specifies the option to include hourly concentrations for each source and hourly meteorological data in the event output