Model Change Bulletin (MCB) 13 – AERMOD version 18081 changes by change type.

Listed with each change are the affected pollutants and source types:

Bug Fixes

Item	Modification	Pollutants	Source Types
1	**PRIME Downwash Receptor Bug** In the subroutine SZSFCLPR in prime.f, the calculation of the surface layer dispersion term is different for stable and unstable conditions. For unstable conditions, in 15181 the term was calculated if the receptor height was less than 1/10 of the mixing height. Otherwise, the surface layer dispersion term was set to 0.0 in unstable conditions. In 16216r, the conditional statement was modified to calculate the term if the release was considered a surface release, regardless of the receptor height. Thus, the surface layer dispersion term is applied in 16216r under unstable conditions to all receptors if defined as a surface release which is determined differently under different conditions. Code was reverted back to 15181.	All	POINT
2	**Urban SO2 Half-life for Non-Default Applications** AERMOD includes a decay coefficient for URBAN SO2 sources. This decay will automatically apply if the DFAULT option is specified, but was not applied for Non-DFAULT applications of AERMOD (i.e., when DFAULT option keyword was omitted). The 4-hour half-life is now applied to SO2 urban sources regardless of whether the DFAULT option is specified or not and a user-defined value is not specified. The default decay coefficient is 4-hours if a user-defined value is not specified. Subroutines BL_CALC in calc1.f and DECAY in calc2.f were updated to apply the default (or user-defined) decay coefficient to urban SO2 sources for non-default applications.	SO2	All
3	**Annual POSTFILEs** For multi-year runs, when outputting ANNUAL POSTFILEs, AERMOD would output each year's annual concentration at each receptor with year numbers 1,2, etc. Following all of the individual years' concentrations, AERMOD would output the multi-year average at each receptor and labeled the row with the final year number. Reporting individual year's concentrations was introduced in 15181. Prior to 15181, the POSTFILE would output the multi-year average, not individual years. In this release, the POSTFILE will have the individual years, but not the multi-year average. The multi-year	All	All

	average can still be obtained from a PLOTFILE. In aermod.f, the condition of call to subroutine PSTANN was modified to avoid writing period average to annual POSTFILE.		
4	**Buoyant Line Source Parameters Summary** Summary table of buoyant line source parameters was not included in the AERMOD.OUT file along with the summaries for other source types. Summary table was added.	All	BUOYLINE
5	**AERMOD Seasonal Assignment** AERMOD was using the wrong seasonal assignment for calculation of cuticle resistance for ozone (Rcox) for winter and snow precipitation in subroutine VDP in calc1.f. Conditional statement was corrected to reference seasonal code 4 (winter with snow) rather than 5.	All	All
6	**ARM2 Error/Warning Messages for Range Checks** Corrections were made to the range checks for user-defined ARM2 limits and Error and Warning messages were updated accordingly.	NO2	All
7	**Background Sectors Output** AERMOD was printing the SECT1 values for both SECT1 and SECT2 for: SEASON, MONTH, HROFDY, HRDOW, HRDOW7, SHRDOW, SHRDOW7, MHRDOW, MHRDOW7 (functioning correctly for SEASHR). SECT2 values were correctly used in the model, but were printed incorrectly in the output list file Also, AERMOD was not writing any values for WSPEED. Reporting errors were corrected in this release.	All	All
8	**Apply Minimum Wind Speed** The minimum wind speed was applied to vector winds in calc1.f and iblval.f by taking the max of the calculated effective wind speed and minimum wind set as a lower limit (either a default value or user-defined value that is entered with the ALPHA and LOW_WIND keywords).	All	All
9	**Meteorological Surface File Check** If the surface meteorological file existed, but was empty, AERMOD would enter an infinite error loop. This cause AERMOD to write to the error file until the local disk was full. meset.f was modified to check to see if the file was empty on first read and issue the correct warning if so.	All	All

Enhancements

Item	Modification	Pollutants	Source Types
1	**ARM2 Enabled with Buoyant Line Source** ARM2 was extended for application to buoyant line sources and source groups that include buoyant line sources.	NO2	BUOYLINE

2	**Addition of ALPHA Option Flag** Similar to the BETA option flag, an ALPHA option flag was added to distinguish options that are considered research/experimental options (ALPHA) from those that have been vetted within the scientific community that are under consideration for promulgation as regulatory options (BETA).	All	All
3	**Command-line Arguments** Capability added for user to specify control filename (.inp) and standard output filename (.out) on the command-line when AERMOD is executed. User can include 0, 1, or 2 arguments. If no arguments are included, AERMOD will assume the default names (aermod.inp and aermod.out). When included, the first argument must be the control filename, and the second argument must be the output filename. If only the control filename is provided, AERMOD will use the path and base of the control filename (excluding extension) as the path and base filename for the output file and append ".out" to the end of the filename. Filenames can include the absolute path or relative path from the working directory.	All	All
4	**Removal of LOWWIND1, LOWWIND2, LOWWIND3** Individual BETA options LOWWIND1, LOWWIND2, LOWWIND3 were removed and replaced with LOW_WIND ALPHA option that enables user to specify different values for minimum wind speed, sigma-v, and maximum meander factor (see LOW-WIND Alpha Option in the Enhancements section).	All	All
5	**LOW_WIND ALPHA Option** A new ALPHA option LOW_WIND which enables the user to enter user-defined values for minimum wind speed, sigma-v, and maximum meander factor in lieu of LOWWIND1, LOWWIND2, and LOWWIND3.	All	All
6	**ARM Removed** The original Ambient Ratio Method (ARM), which was replaced with ARM2, was still functional in AERMOD 16216r and could be specified when the DFAULT keyword was also specified. ARM has been removed from AERMOD. Equivalent functionality can be obtained by setting the maximum and minimum ambient ratio to the desired value using the ARM2 options.	NO2	All
7	**Rename Functions ERF and ERFC** Absoft and gfortran compilers issued warnings that the user-defined functions ERF and ERFC in prime.f were named the same as two intrinsic functions. User-defined functions were renamed FNERF and FNERFC to avoid a potential name conflict. Call statements were updated to reference new function names.	All	All
8	**Uninitialized Variables** Initialized variables identified by gfortran compiler as uninitialized. Exceptions are the allocated arrays. All variables that were initialized are set = 0.0D0 (all are double precision). All variables identified were found to be set somewhere in the code either as the	All	All

	value of another variable or by formula, so initialization has no effect. Allocatable arrays were already initialized in code at some point after allocation.		

Formulation updates

None