MCB 10 AERMOD version 14134 changes by change type.

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

BUG FIXES

Item	Modification	Pollutants	Source Types
1	Modified several subroutines to address issues with EVENT processing. Subroutine EVCALC was modified to call PCALC/VCALC/ACALC/OCALC (as appropriate) if the PVMRM, OLM, ARM, or ARM2 options apply, even if the source is not included in the source group for the event being processed, since the full CHI array of hourly results for each source and receptor is needed for these NO2 options. Subroutine EVLOOP was modified to perform date synchronization checks based on YR/MN/DY (without the HR) due to the fact that hourly events within the same day may not be in chronological order, and to include a logical array to keep track of whether an EVENT has already been processed to avoid reprocessing of events that may occur within the say day but may not be in chronological order. Subroutine EVLOOP was also modified to call PVMRM_CALC and OLM_CALC for hours with missing ozone data.	NO_2	All
2	Modified subroutines ARM_CALC and ARM2_CALC to address several issues associated with the ARM and ARM2 options, including the omission of applying ARM for ANNUAL averages, and also modified subroutine PERAVE to eliminate code specific to the ARM and ARM2 options to correct problems with annual averages for ARM and ARM2.	NO_2	All
3	Modified subroutines PVMRM_CALC and PLUME_VOL to include the receptor index in the call to PLUME_VOL to account for distance-dependent plume penetration factor (PPFACT).	NO_2	All
4	To address issues associated with the NO2 options in general, subroutines SUMVAL and SUMBACK were modified to remove the source group loop, and subroutines PCALC, VCALC, ACALC, and OCALC, as well as ARM_CALC, ARM2_CALC, OLM_CALC, and PVMRM_CALC, were modified to include a source group loop when calling SUMVAL and SUMBACK.	NO_2	All
5	Modified subroutines PCALC, VCALC, ACALC, and OCALC, to fully account for cases when concentration calculations are skipped, e.g., receptor located less than 1m from a POINT source, located “inside” a VOLUME or OPENPIT source, or receptor located upwind of an AREA source, in terms of reinitializing the CHI array associated with the PVMRM, OLM, ARM, or ARM2 options, and other arrays associated with the PVMRM option.	NO_2	POINT, VOLUME, OPENPIT

6	Modified subroutines PCALC, VCALC, ACALC, and OCALC, to store the EPSEFF parameter to an array by source and receptor for use in PVMRM_CALC for the PVMRM option.	NO_2	All
7	Modified subroutine LPARM to include checks on the aspect ratio (length/width) of LINE sources and issue a warning message if the aspect ratio is greater than 100:1, consistent with the checks for AREA sources.	All	LINE
8	Modified subroutine IBLVAL to include LINE source type in the call to subroutine ADISZ to calculate vertical dispersion coefficients based on distance-dependent effective parameters. Previous versions omitted this call for LINE sources, which may have caused incorrect results in some cases.	All	LINE
9	Modified subroutines SOGRP, OLMGRP, and PSDGRP to check for the existence of single SrcIDs input on the SRCGROUP, OLMGROUP, and PSDGROUP keywords. Previous versions only checked for whether the user-specified SrcID was within a range of SrcID's, but would not issue any message if the single SrcID had not been defined.	All	All
10	Modified subroutine EVCALC to assign METHDR = .T. in order to print source-&-receptor-independent meteorological debug information in the METEOR debug output file. Also modified sub EVCALC to call sub EV_SUMBACK for the ARM and ARM2 options.	All	All
11	Modified subroutine MEREAD to use new MEREAD_Date variable to check for end of the year for EVENT processing, and to assign IHOUR = 24 when setting date variables for date synchronization checks since full days of met data are read in the EVENT mode. Also modified subroutine MEREAD to identify and process embedded header records (containing station IDs and AERMET version date) in concatenated surface meteorology files.	All	All
12	Modified subroutine O3READ to use YR/MN/DY date variable to perform date synchronization checks for the EVENT loop, similar to subroutine MEREAD. Modified O3READ to use the IO3HR variable read from the hourly O3 file as the hour index for the EV_O3CONC array, and also modified O3READ to allow 0.0 as a valid hourly O3 value; version 13350 incorrectly treated cases with a zero O3 value as missing O3 data.	NO_2	All
13	Modified subroutine BGREAD to use IBGHR variable read from the hourly background file as the hour index for the EV_BGCONC array. Also modified BGREAD to perform date consistency checks based on YR/MN/DY since hour for events within the same day may not be in order.	All	All
14	Modified subroutine METEXT to improve error handling and reporting for cases where the input met data file does	NO_2, SO_2, $PM_{2.5}$	All

	not begin with hour 1 for applications involving 1-hr NO2, 1-hr SO2 and 24-hr PM2.5, since these applications require full years of data. This included modifying subroutine METEXT to limit assigning a runtime error for cases when the first "hour" of the met data file is not hour 1 and the MAXDCONT option is being used. Non-fatal warning messages are issued if the first hour is not hour 1 if the NO2AVE, SO2AVE or PM25AVE options are being used without the MAXDCONT option.		
15	Modified subroutine SRCSIZ to check for whether the TMPSRCID array has been allocated before checking for AREACIRC source IDs.	All	AREACIRC
16	Modified subroutine MAXDCONT_LOOP to remove unneeded IDYMAX array, and to use DABS of the difference between the original concentration and MAXDCONT value before applying the consistency test.	NO_2, SO_2, $PM_{2.5}$	All
17	Subroutine DEBOPT was modified to increase the number of fields on DEBUGOPT keyword to accommodate all applicable DEBUG options, including the optional user-specified file names. Note that a new AREA/LINE debug option had been added with v14134 (see below under enhancements).	All	All
18	Modified MAIN routine to compare the maximum value in the SHVALS array for the SEASONHR output file used in the test for issuing a warning message to utilize the 'EXP' option to 9999.99999999D0 (instead of 9999999.99999D0) to be consistent with the output format of F13.8 used in subroutine SHOUT.	All	All
19	Modified subroutine HRLOOP to include additional checks for runtime errors (RUNERR = .T.) after processing of hourly emission files, hourly background data, and hourly ozone data to avoid extraneous error or warning messages that may be generated.	All	All
20	Modified the IF-THEN block in subroutine HRLOOP for NO2 options to check for calm or missing met data first rather than including those checks for each of the options.	NO_2	All
21	Modified subroutine HRLOOP to increment the number of hours remaining in the year if the FULLDATE variable equals the ISDATE variable.	All	All

ENHANCEMENTS

Item	Modification	Pollutants	Source Types
1	Modified subroutine POLLID to allow for an additional user-specified field to disable the special processing associated with the 1-hr NO2, 1-hr SO2 and 24-hr PM2.5 NAAQS, which are based on a multi-year average of ranked maximum daily values (1-hr values in the case of NO2 and SO2 and 24-hr values in the case of PM2.5). The optional field allowed after than pollutant ID can be 'H1H', 'H2H', or 'INC' (without the single quotes), indicating that the results will be processed consistent with a deterministic standard, such as the original 3-hr and 24-hr SO2 standards, which could be exceeded once per year, and consistent with PSD increments, which can also be exceeded once per year. These options are intended to provide a mechanism for modeling to demonstrate compliance with the 24-hr PM2.5 increments, and also to provide a mechanism to evaluate the various NO2 chemistry options incorporated in AERMOD without the requirement for modeling complete years of meteorological data.	NO_2, SO_2, $PM_{2.5}$	All
2	Modified subroutine DEBOPT to include a new AREA/LINE debug option, which is output to a separate file, including an optional user-specified file name. This includes additional information regarding AREA/LINE (and OPENPIT) calculations as compared to the AREA-related debug information included under the previous DEBUG option. Also modified subroutines ACALC and PSIDE to output AREA/LINE debug information under the new AREA/LINE debug option. Debug information is no longer included in the main 'aermod.out' file.	All	AREA, LINE, OPENPIT
3	Modified subroutine MEOPEN to check for flags in the header record of the input SURFFILE indicating that MMIF-generated meteorological inputs were used, which is currently treated as non-DFAULT/BETA option, and for use of BULKRN option, which is treated as a DFAULT option. Subroutine MEOPEN also checks for measurement heights in the input PROFFILE file and issues a warning if heights exceed 999m, which could indicate that inputs were based on MMIF or other gridded meteorological data that were processed in a manner that did not include identifying information in the surface file header record (e.g., processing MMIF-generated pseudo- surface and upper air data with user-defined surface characteristics rather than the AERSURF file generate by MMIF. Subroutine MEOPEN was also modified to include checks for blank/missing upper air, surface and/or onsite station IDs in the surface file header record, and issues warning messages if the respective station IDs specified on the ME pathway in the aermod input file are not zero (0).	All	All

4	Modified subroutine PRTSRC to include a table of SrcIDs for sources identified as urban sources under the URBANSRC keyword.	All	All
5	Modified subroutine PRTDET to include the original GrpVal concentration from the Non-EVENT run in the header information for the DETAIL output option under EVENT processing.	All	All

MISCELLANEOUS

Item	Modification	Pollutants	Source Types
1	Modified subroutine PRTOPT to include additional information on the initial input summary page of the 'aermod.out' file related to the use of NO2 options, and to identify which debug options have been selected on the CO DEBUGOPT keyword.	NO_2	All
2	Modified subroutine SRCQA to issue a warning message, instead of a fatal error, if source group ALL is not included for the ARM or ARM2 options. The revised implementation of the ARM and ARM2 options in v14134 of AERMOD no longer requires the user to specify source group ALL.	NO_2	All
3	Modified subroutine PRESET, SETUP, PREINCLUD, and EV_SETUP to check for blank records in the 'aermod.inp' file and cycle the read loop based on LEN_TRIM(RUNST1) = 0, to optimize processing of the aermod input file by avoiding unnecessary calls to LWRUPR, DEFINE and GETFLD. Also modified to include comment records from the CO, SO, and ME pathways from the non-EVENT input file in the EVENT file.	All	All
4	Modified subroutine METEXT to replace the logical variable L_NewMetData used to flag whether input surface met file includes NAD/ADJ flags introduced with version 11059 of AERMOD with variable L_NAD_ADJ_Flags for better clarity.	All	All
5	Modified subroutines HEADER, PRTOPT, and EVSET to generate and use a character string containing only the applicable modeling options to include in the header records of the 'aermod.out' file and other text output files, rather than printing the entire ModelOpts array including blank fields, as done in previous versions. The new model options string is also included in the header records for all of the DEBUG option files, except for the DEPOS debug file.	All	All
6	Modified subroutine BACK_GRND to include additional checks on the optional user-specified Fortran FORMAT statement for reading the background data and issues warning messages to flag potential errors.	All	All

7	The “acceptable” AERMET version date has been modified to version 12345, and AERMOD will not run if meteorological data generated by earlier versions of AERMET are input. AERMOD will run if meteorological data from versions 12345 or 13350 are used, but a warning message will be issued and AERMET version 14134 should be used for regulatory applications of AERMOD.	All	All
8	Several obsolete error/warning messages associated with inputs exceeding array limits were consolidated since array sizes are dynamically allocated at runtime.	All	All