AERMOD Modeling System: v15181 Regulatory Update

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Introduction

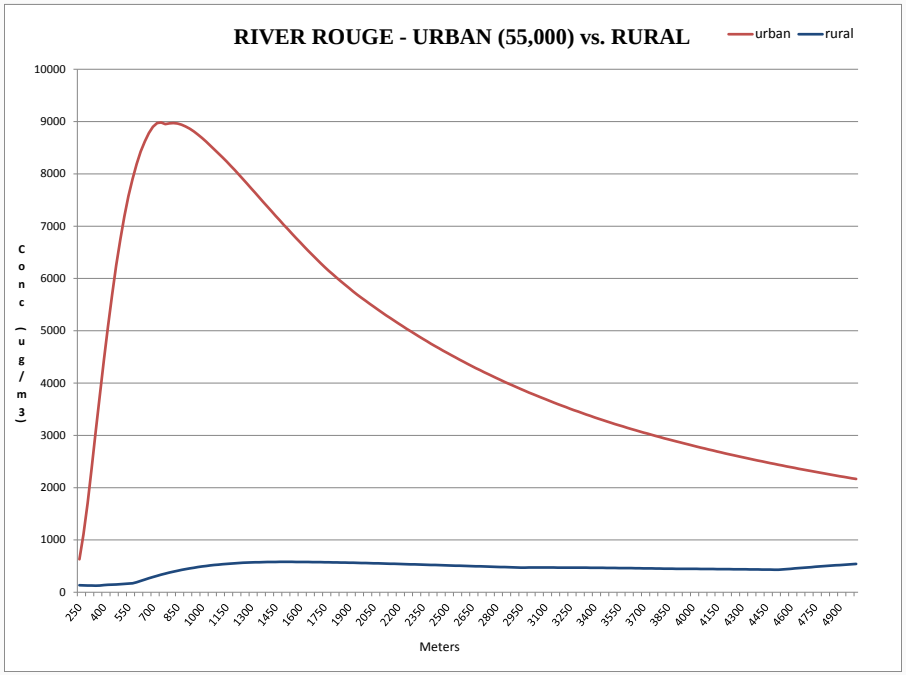
- The regulatory versions of the AERMOD dispersion model and AERMET meteorological processor were recently updated to version 15181 (June 30, 2015);
  - The updates to v15181 of AERMOD and AERMET include several bug fixes, which are discussed below;
  - Version 15181 of AERMOD & AERMET also incorporate proposed enhancements to the non-Default/BETA options which are discussed in the next presentation;
  - The v15181 updates are documented in AERMOD Model Change Bulletin (MCB) 11 and AERMET MCB6.

AERMOD Bug Fixes

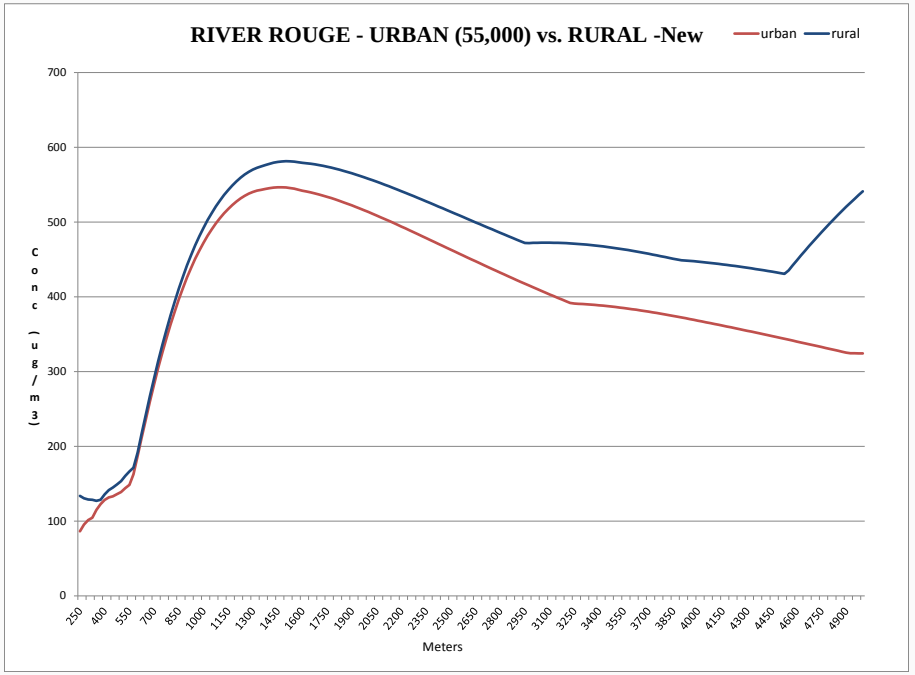
- Incorporated a formulation bug fix to address issues with relatively tall stacks in relatively small urban areas:
  - Previous versions may have applied an unrealistic limit on plume rise, resulting in anomalously high concentrations;
  - Issue has been addressed in the AERMOD Implementation Guide, which recommended treating such sources as rural, with adequate justification;
  - New version emulates approach used for penetrated sources during convective conditions;
  - Example for tall stack with 55,000 population shown in next slide.

Urban vs. Rural Concentrations Before and After Bug Fix

Before



After



AERMOD Bug Fixes (cont.)

- Corrected an issue with use of the NOSTD option with the POINTCAP option for capped stacks;
- Corrected an issue with the emission rate being modified for AREA, LINE and OPENPIT sources if the point source approximation was used under the FASTAREA or FASTALL option;
- Modified the tolerance parameter for AREA and LINE sources to address issues with winds blowing nearly perpendicular to the source.

AERMOD Bug Fixes (cont.)

- Modified several subroutines to address issues associated with the PVMRM option:
  - Included a more explicitly treatment of the vertical and horizontal dimensions of contributing sources for the penetrated plume contribution for unstable conditions;
  - Modified the determination of NOx emissions from major contributing sources to account separately for the horizontal plume component and the terrain-responding plume component.

AERMOD Bug Fixes (cont.)

- Modified subroutines HRLOOP, SET_METDATA and DAYRNG to address issues associated with the DAYRANGE keyword for leap years vs. non-leap years:
  - DAYRANGE keyword allows user to specify days to process or a range of days;
  - Days can be specified as Month/Day or as Julian day
  - Month/Day inputs are unambiguous regarding leap year status;
  - Julian day inputs are interpreted as leap year or non-leap year based on the first year in the data file.

AERMET Bug Fixes

- Modified subroutines UCALST and MPPBL for the ADJ_U* option to improve consistency with Qian and Venkatram (BLM, v138, 2011):
  - Use a constant value of 0.08 for theta-star (THSTAR);
  - Full inclusion of the displacement height;
- Modified subroutine BULKRI to correct the calculation of CDN to use ZREF(IHR)/Z0(IHR) instead of Z2/Z0(IHR), and to use BETAM = 4.7 for the ADJ_U* option instead of 5.0.