Memorandum: Summary of Revisions to Oil and Gas National Emissions Estimation Tool - Version 2

Memorandum: Summary of Revisions to Oil and Gas National Emissions Estimation Tool - Version 2

U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Air Quality Assessment Division
Research Triangle Park, NC

MEMORANDUM

TO: Roy Huntley, US EPA
               Jennifer Snyder, US EPA
FROM: Mike Pring, Eastern Research Group, Inc. (ERG)
               Regi Oommen, ERG
               Stephen Treimel, ERG
DATE: March 31, 2014
SUBJECT: Summary of Revisions to Oil and Gas National Emissions Estimation Tool –
               Version 2

The purpose of this memo is to summarize the changes that have been made to the oil and gas area source emissions estimation tool since Draft Version 1.4 was submitted on September 12, 2013.

Activity/Basin/Emission Factor Data Updates

1) Updated the tool to include WRAP basin factors for the following basins:
   a. Powder River (Wyoming, Montana);
   b. South San Juan (New Mexico, Utah);
   c. Uinta (Utah);
   d. Southwest Wyoming (Wyoming, Utah);
   e. Wind River (Wyoming);
   f. Denver-Julesburg (CO); and
   g. Piceance (CO).

   (Note: "hybrid" data previously used for the South San Juan and Uinta basins has been replaced using discrete data for coalbed methane wells separate from all other wells.)
2) Applied surrogate data for several counties in New Mexico as follows:
   a. For Chavez, Eddy, Lea, and Roosevelt counties, applied data from Andrews County in Texas as being representative of Permian Basin characteristics in New Mexico; and
   b. For Colfax County (Raton Basin), applied WRAP data from the South San Juan Basin. Engine emissions have been zeroed out for this county as the engines are all electric.
3) Updated the methodology to determine well completion counts to consider "Date of 1st Production" if no well completion date is available.
4) Updated the methodology to identify unconventional wells to consider both the DOE/EIA Crosswalk identifiers and all horizontal wells.
5) Corrected an error in the CO_2 percentage used in the calculation for gas-actuated pumps.
6) Updated the N_2O emission factor for engines to use an emission factor from the API Compendium.
7) Updated the emission factors for Benzene, Toluene, Ethylbenzene, and Xylene for 4-stroke lean burn lateral compressor engines.

Emission Estimation Algorithm Updates

1) Modified the algorithm used to estimate emissions from mud degassing and condensate tank emissions to reflect CBM activity.

2) Updated the methodology used to estimate fugitive (equipment leak) emissions to reflect that all wells have components in light oil service AND in gas service. Previously, only oil wells were assumed to have components in light oil service and only gas wells were assumed to have components in gas service. The default component count profile for oil and gas wells is now the same, as follows:

Component Type	Service Type	Component Count
Valves	Gas	13.83
Valves	Light Oil	19.01
Connectors	Gas	39.07
Connectors	Light Oil	82.71
Flanges	Gas	21.69
Flanges	Light Oil	3.46
Open-ended Lines	Gas	5.23
Open-ended Lines	Light Oil	2.61

3) Modified the algorithm to estimate emissions from wellhead compressor seals to remove the "24" factor in the denominator as the factor V_{vented} is in terms of (SCF/compressor/hour).

Tool Updates

1) Modified the tool to include discrete emissions estimation algorithms for coalbed methane wells. At this time, coalbed methane-specific basin factors are included in the tool for the following basins:
   a. Powder River (Wyoming, Montana);
   b. South San Juan (New Mexico, Utah);
   c. Uinta (Utah)

2) Added a reference field for "OIL_TANK_AVG_LOSSES".

3) Revised field names in the Liquids Unloading Basin Factor table to reflect that controls may include technologies other than flaring. Specifically, revised "LIQ_UNL_FRACTION_WITH_FLARING" to 'LIQ_UNL_FRACTION_WITH_CONT" and "LIQ_UNL_FLARE_CONT_EFF" to "LIQ_UNL_CONT_EFF".

4) Updated the "GLOSSARY_BASIN_FACTORS" table to reflect the new coalbed methane fields.

Report Updates

1) Added pictures to the report illustrative of each source category type (with the exceptions of gas-actuated pumps, loading, and mud degassing).

2) Updated the tool instructions included as Appendix A.
3) Added "default" values (and default value references) to each of the basin factors included in the Data Element Dictionary (Appendix C).
4) Removed the "24" factor in the denominator of equation 25 as the emission factor (V_{vented}) is in terms of (SCF/compressor/hour).
5) Updated the Data Element Dictionary (Appendix C) to reflect the new coalbed methane fields.