MEMORANDUM

TO: Jennifer Snyder, US EPA
Jeff Vukovich, US EPA
FROM: Mike Pring, Eastern Research Group, Inc. (ERG)
Regi Oommen, ERG
DATE: January 25, 2022
SUBJECT: Review of Western Regional Air Partnership Region Update Recommendations for the 2020 Nonpoint Oil and Gas Emission Estimation Tool

The purpose of this memo is to present findings of the Western Regional Air Partnership (WRAP) recommended updates to the 2020 National Emissions Inventory (NEI) Nonpoint Oil and Gas Emission Estimation Tool (Tool). ERG proposed updates to the Tool in November 2021 based on a series of reports and other data provided by WRAP. [1] WRAP reviewed these suggested updates and presented a series of additional recommended updates in December 2021. [2]

Recommended Updates

ERG reviewed the recommended updates to the Tool and summarizes our findings as follows.

Update recommended (#1): Account for 23% engine electrification as indicated in the WRAP survey.
Response: The Tool does not currently accommodate electrified drilling engines; this capability may be considered for future updates.

Update recommended (#2): It is reasonable to exclude the turbine configuration from the 2020 O&G Tool. If feasible, 5% electrification should be accounted for in the 2020 O&G Tool.
Response: The Tool does not currently accommodate electrified hydraulic fracturing pump engines; this capability may be considered for future updates.

Update recommended (#3): Gas venting rate should be updated based on WRAP survey data in the 2020 O&G Tool.
Response: ERG agrees with this suggestion and will develop updated gas venting rate factors for inclusion in the Tool for crude oil tanks.

[1] Analysis of WRAP Gas Composition and Basin Factor Data for use in the 2020 NEI Nonpoint Oil and Gas Emission Estimation Tool. Prepared by Mike Pring and Stacie Enoch, November 5, 2021.
[2] Review of Western Regional Air Partnership Region Input Factors Implementation in the 2020 Nonpoint Oil and Gas Emission Estimation Tool. Prepared by John Grant, Rajashi Parikh, Anthony Gerigk and Amnon Bar-Ilan, December 30, 2021.

Update recommended (#4): Gas venting rate should be updated based on WRAP survey data in the 2020 O&G Tool.

Response: ERG agrees with this suggestion and will develop updated gas venting rate factors for inclusion in the Tool for condensate tanks.

Update recommended (#5): For basins where horizontal and vertical survey inputs are available, we recommend estimating weighted average input factors based on the oil production by spud type.

Response: ERG agrees with this suggestion. However, production data by spud type is not presented in Table A5, please propose weighted average input factors based on the oil production by spud type if that data is available elsewhere.

Update recommended (#6): Update 2020 O&G Tool based on WRAP survey estimates of lean-burn and rich-burn engine fractions.

Response: The Tool does not currently differentiate between lean-burn and rich-burn artificial lift engines; this capability may be considered for future updates

Update recommended (#7): Revise 2020 O&G Tool emission rates to be consistent with 99% of engines meeting NSPS JJJJ for the Permian (NM) basin.

Response: ERG agrees with this comment. Please suggest proposed emission factors to use for artificial lift engines in the Permian Basin.

Update recommended (#8): Revise venting and flaring volume inputs consistent with WRAP study Section 2.3.21: Combined volume of gas flared and vented: EIA publishes combined gas flared and vented volume estimates for each year, including 2020, for North Dakota and Montana. The Tool input factors should be adjusted so that venting and flaring volumes are consistent with EIA estimates. Vented and flared split. Apply the 2011 Williston Basin emission inventory estimate of 99.7% flared and 0.3% vented.

Response: ERG agrees with this comment and will use the suggested EIA data to develop state-specific flared and vented volume inputs and will update the Williston Basin flared and vented factors as proposed.

Update recommended (#9): Revise the toluene to volatile organic compound (VOC) weight fractions in Column AR.

Response: (Note: WRAP updated this comment to refer to Column AF of Attachment B of ERG's November 2021 analysis memo.) Attachment B of ERG's November 2021 analysis memo erroneously included the data for text field "2020 NEI Tool REF_ACT_OIL_WT_FRACTION_TOLUENE_VOC" under column AF "2020 NEI Tool ACT_OIL_WT_FRACTION_TOLUENE_VOC". ERG will update Attachment B to include the correct value for this field as documented in Attachment A of the November 2021 analysis memo. The data in the Tool for this field is correct and no update to the Tool is required.

Update recommended (#10): Revise the gas composition data for all applicable sources in this basin based on the WRAP OGWG gas composition for this basin.

Response: The gas composition data for the Central Montana Uplift does not include the full speciation data required to prepared updated Tool input data. Specifically, no benzene, toluene, ethylbenzene, or xylene (BTEX) data is provided.

Update recommended (#11): Account for 23% engine electrification as indicated in the WRAP survey.

Response: The Tool does not currently accommodate electrified drilling engines; this capability may be considered for future updates.

Update recommended (#12): It is recommended that electrified activity fractions available from the WRAP OGWG survey be accounted for in 2020 O&G Tool emissions calculations.

Response: The Tool does not currently accommodate electrified hydraulic fracturing pump engines; this capability may be considered for future updates.

Update recommended (#13): Revise emission factor to be consistent with the fraction of engines meeting NSPS JJJJ as indicated in WRAP OGWG survey results.

Response: ERG agrees with this comment. Please suggest proposed emission factors to use for artificial lift engines in the Permian Basin.

Update recommended (#14): Review and confirm 2020 O&G Tool calculations.

Response: ERG has reviewed this issue and identified an error in the Tool algorithm regarding the number of gas wells served per single lateral compressor engines related to the separate factors which should be used for coal-bed methane wells and gas wells. This error impacts estimated emissions for Montana and Wyoming and will be corrected in V1.2 of the Tool. Note that the variable "Fraction of natural gas wells in the county needing compression" is not needed to estimate emissions from lateral compressor engines. Refer to Equations 37 and 38 of Section 3.12 of the Tool report for more information. [3]

[3] 2020 Nonpoint Oil and Gas Emission Estimation Tool Version 1.1. Prepared for U.S. Environmental Protection Agency by Eastern Research Group, Inc. December 17, 2021.