EPA Oil and Gas Emissions Estimation Tool Improvements for 2014

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August 18, 2017

2017 Emission Inventory Conference

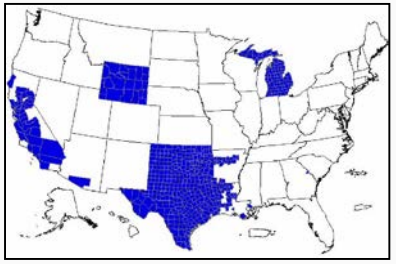
Baltimore, MD

EPA Oil and Gas Emission Estimation Tool

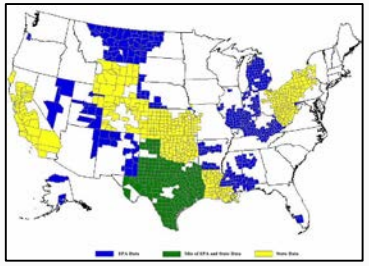
- Access-based emissions estimation calculator
  - County-level activity data
  - County-level process characterization data
  - Emission factors
  - Generates county-level emission estimates by SCC
  - EIS export to National Emission Inventory (NEI)
- State application
  - Portable
  - User-defined inputs
- EPA application
  - Gapfill NEI where no state data available

Tool/NEI Evolution

- 2008 NEI
  - State-provided data for 8 states
  - No EPA gap-filling



- 2011 Tool Development
  - Tool developed based on CenSARA and TCEQ Methodologies
  - County-level activity and emissions compiled for entire US



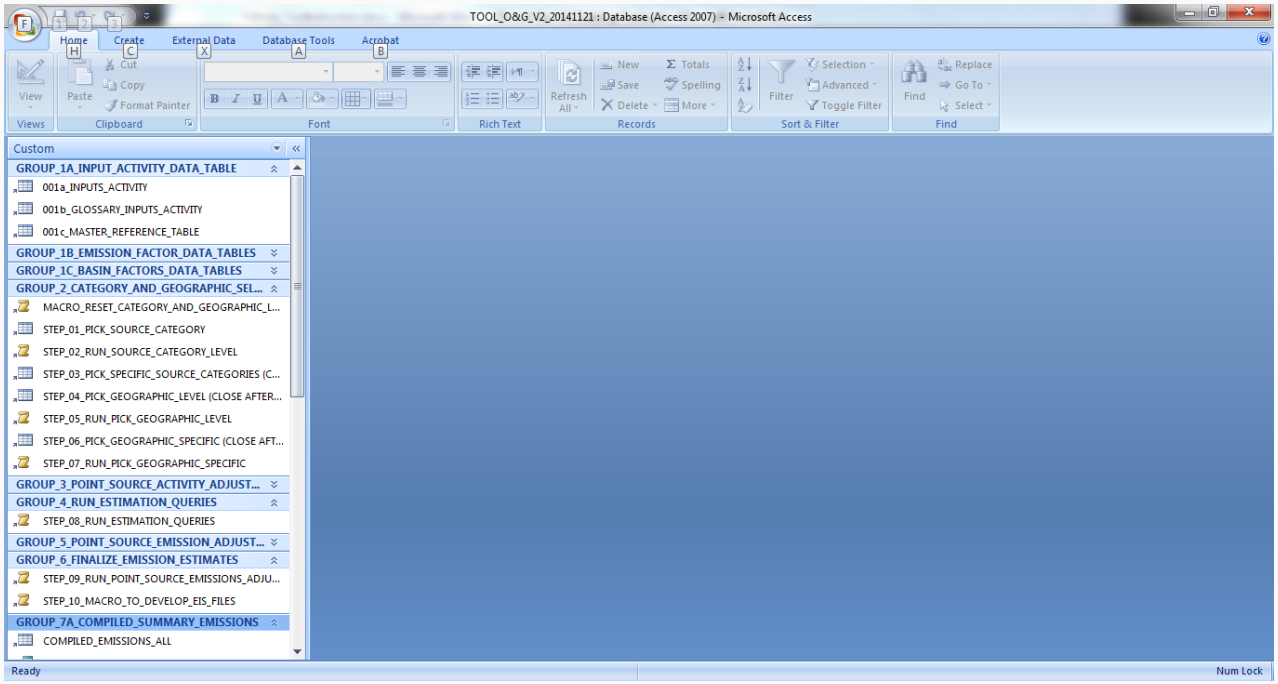
- 2011 Tool Improvements
  - Restructured to allow factors at the county level (previously basin-level)
  - User inputs (activity data, basin factors)
  - U.S. EPA GHGRP and GHG EI Updates
  - U.S. EPA gas composition updates (rulemaking)

2014 Improvements

- Tool structural updates
- Updated activity analysis
- State activity/factor updates
- Gas composition updates
- Emission factor updates
- GHGRP Subpart W updates

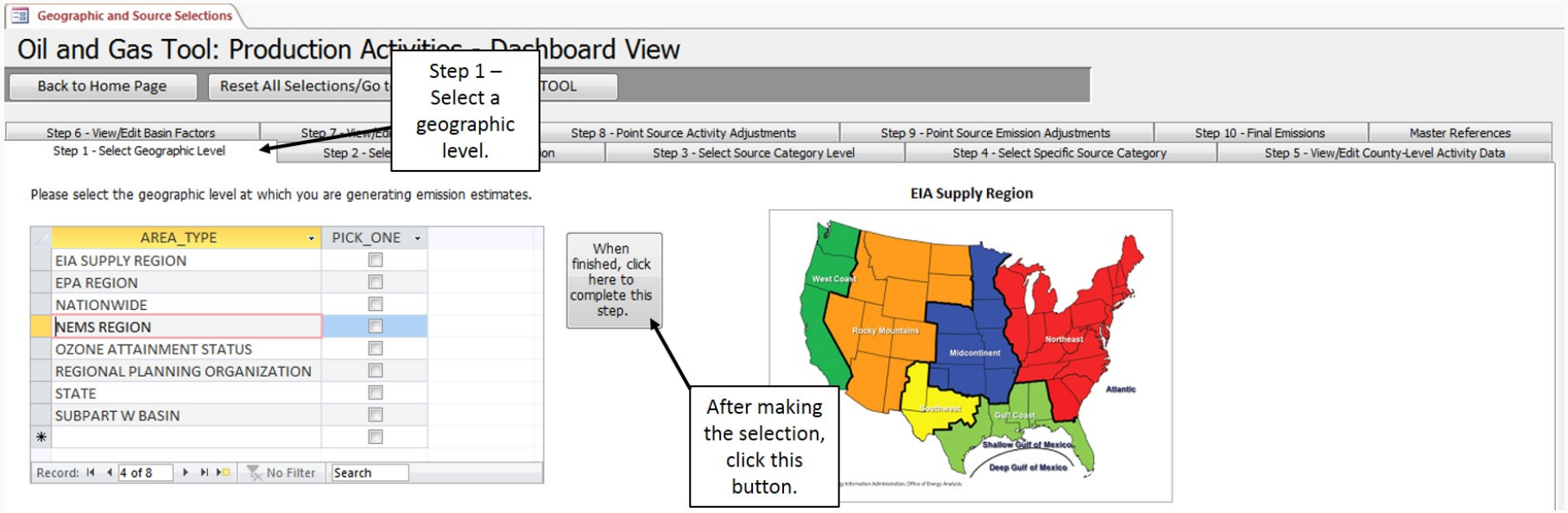
Tool Structural Updates

- 2011 user interface



Tool Structural Updates (cont.)

- 2014 user interface



Tool Structural Updates (cont.)

- Excel Export/Import Routines

	A	B	C	D	E	F	G	H	I	J
1	STATE_ABBR	STATE_COUNTY_FIPS	COUNTY_NAME	BASIN	YEAR	DATA_CATEGORY	PREVIOUS_VALUE	PREVIOUS_REFERENCE	CURRENT_VALUE	CURRENT_REFERENCE
2	AR	05001	Arkansas	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
3	AR	05001	Arkansas	Louisiana-Mississippi Salt Basins	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
4	AR	05001	Arkansas	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
5	AR	05001	Arkansas	Louisiana-Mississippi Salt Basins	2014	Fraction of natural gas wells in the county needing compression	9.090909E-02	CENSARA_STUDY_2012	9.090909E-02	CENSARA_STUDY_2012
6	AR	05003	Ashley	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
7	AR	05003	Ashley	Louisiana-Mississippi Salt Basins	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
8	AR	05003	Ashley	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
9	AR	05003	Ashley	Louisiana-Mississippi Salt Basins	2014	Fraction of natural gas wells in the county needing compression	9.090909E-02	CENSARA_STUDY_2012	9.090909E-02	CENSARA_STUDY_2012
10	AR	05005	Baxter	Ozark Uplift	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
11	AR	05005	Baxter	Ozark Uplift	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
12	AR	05005	Baxter	Ozark Uplift	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
13	AR	05005	Baxter	Ozark Uplift	2014	Fraction of natural gas wells in the county needing compression	0.2082511	CENSARA_STUDY_2012	0.2082511	CENSARA_STUDY_2012
14	AR	05007	Benton	Ozark Uplift	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
15	AR	05007	Benton	Ozark Uplift	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
16	AR	05007	Benton	Ozark Uplift	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
17	AR	05007	Benton	Ozark Uplift	2014	Fraction of natural gas wells in the county needing compression	0.2082511	CENSARA_STUDY_2012	0.2082511	CENSARA_STUDY_2012
18	AR	05009	Boone	Ozark Uplift	2014	County-Level N	0	HPDI_2013	0	HPDI_2015
19	AR	05009	Boone	Ozark Uplift	2014	County-Level C	0	HPDI_2013	0	HPDI_2015
20	AR	05009	Boone	Ozark Uplift	2014	County-Level N		HPDI_2013	0	HPDI_2015
21	AR	05009	Boone	Ozark Uplift	2014	Fraction of natu	0.2082511	CENSARA_STUDY_2012	0.2082511	CENSARA_STUDY_2012
22	AR	05011	Bradley	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
23	AR	05011	Bradley	Louisiana-Mississippi Salt Basins	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
24	AR	05011	Bradley	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
25	AR	05011	Bradley	Louisiana-Mississippi Salt Basins	2014	Fraction of natural gas wells in the county needing compression	9.090909E-02	CENSARA_STUDY_2012	9.090909E-02	CENSARA_STUDY_2012
26	AR	05013	Calhoun	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
27	AR	05013	Calhoun	Louisiana-Mississippi Salt Basins	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
28	AR	05013	Calhoun	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
29	AR	05013	Calhoun	Louisiana-Mississippi Salt Basins	2014	Fraction of natural gas wells in the county needing compression	9.090909E-02	CENSARA_STUDY_2012	9.090909E-02	CENSARA_STUDY_2012
30	AR	05015	Carroll	Ozark Uplift	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
31	AR	05015	Carroll	Ozark Uplift	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
32	AR	05015	Carroll	Ozark Uplift	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
33	AR	05015	Carroll	Ozark Uplift	2014	Fraction of natural gas wells in the county needing compression	0.2082511	CENSARA_STUDY_2012	0.2082511	CENSARA_STUDY_2012
34	AR	05017	Chicot	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015
35	AR	05017	Chicot	Louisiana-Mississippi Salt Basins	2014	County-Level Condensate Production from natural gas wells (BBL)	0	HPDI_2013	0	HPDI_2015
36	AR	05017	Chicot	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Well Counts	0	HPDI_2013	0	HPDI_2015
37	AR	05017	Chicot	Louisiana-Mississippi Salt Basins	2014	Fraction of natural gas wells in the county needing compression	9.090909E-02	CENSARA_STUDY_2012	9.090909E-02	CENSARA_STUDY_2012
38	AR	05019	Clark	Louisiana-Mississippi Salt Basins	2014	County-Level Natural Gas Production (MSCF)	0	HPDI_2013	0	HPDI_2015

Step 2 – The User can edit the yellow-shaded cells.

Tool Structural Updates (cont.)

- Re-coding of Tool to resolve emission factors at the state/basin/attainment level
- Inclusion of a change log to document changes to the Tool
- Inclusion of 2011 legacy data
- Synchronization of hydraulic fracturing and unconventional well completion activity

Updated Activity Analysis

- Conventional/Unconventional Activity
  - Developed for DrillingInfo-derived data
  - Updated Tool data tables
  - Not currently utilized in calculations
- 100 MCF/BBL used to distinguish gas/oil wells
  - Consistent with EPA GHG EI
  - Consistent with EPA Regulatory initiatives
  - Consistent with State application (TX, PA, WY)
  - Caused shift from gas to oil (condensate to crude oil)

2014 State Activity/Factor Updates

- State activity data updates provided
  - KS, MI, OH, TN, TX, WV
- Basin factor updates
  - WV
  - TX (also applied to NM Permian Basin counties)
  - AK (closed liquids collection system)
  - NM

Gas Composition Updates

- Kansas
- WRAP
  - Uinta Basin
- EPA SPECIATE data
  - CA, CO, MT, NE, NM, SD, TX, UT, WY
- BOEM Study
  - Alaska's North Slope

Emission Factor Updates

- NOx emission factor for heaters
  - Based on CARB report
- VOC emission factor for flares
  - AP-42 Section 13.5 update (April, 2015)
- Unconventional oil well completion
  - Developed based on NSPS OOOOa development
- Carbon tetrachloride EF removed (compressor engines, artificial lift)
  - Based on non-detect values

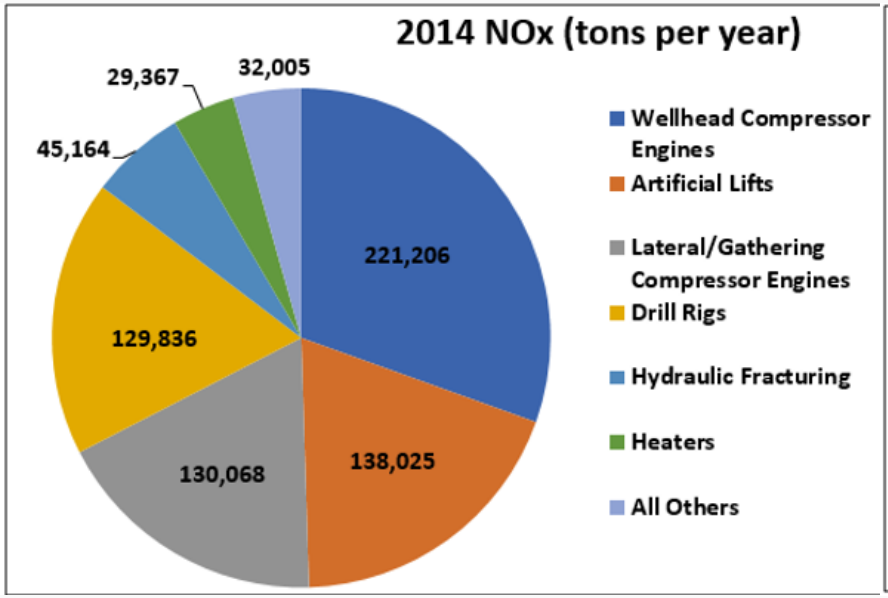
GHGRP Subpart W Updates

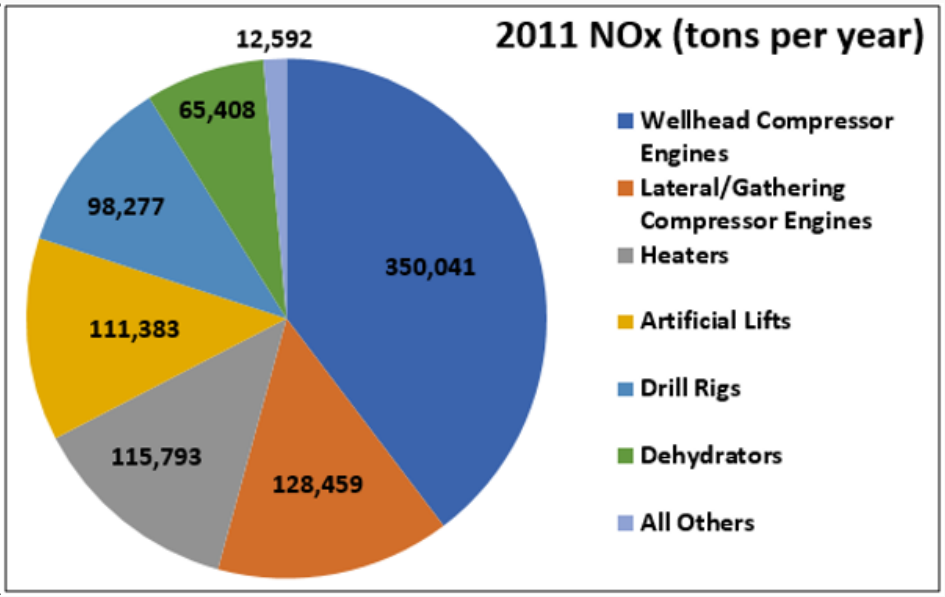
- Expanded reporting requirements
  - Evolving program year-over-year
- November, 2015 Updates (2014 RY)
  - Associated Gas Venting and Flaring (fraction flared)
  - Condensate Tanks (fraction flared)
  - Crude Oil Tanks (fraction flared)
  - Heaters (number of heaters per well)
  - Pneumatic Devices (number of low, intermittent, and high-bleed devices per well)

GHGRP Subpart W Updates (cont.)

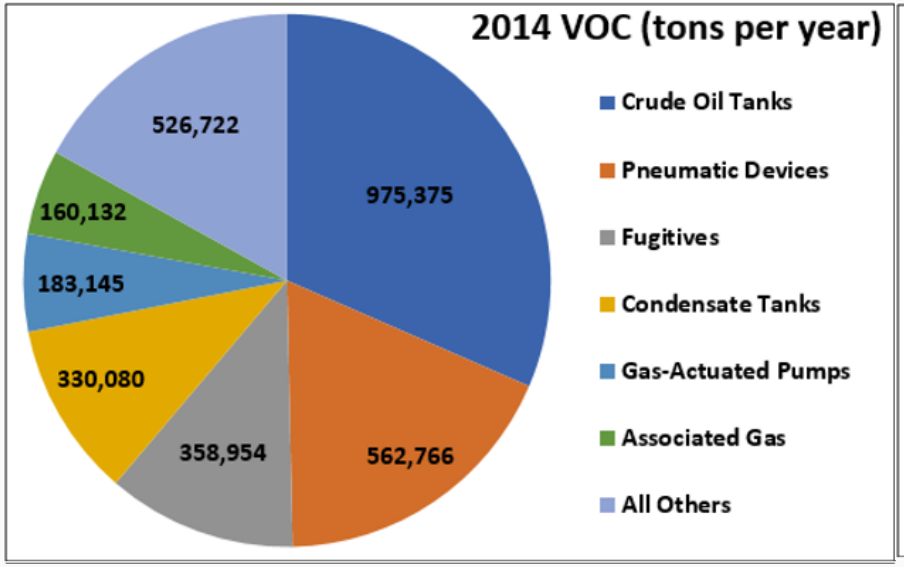
- February, 2017 Updates (2015 RY)
  - Fraction of gas wells requiring compression
- June, 2017 Updates (2015 RY)
  - Wellhead compressor engine sizes
  - Based on TCEQ analysis

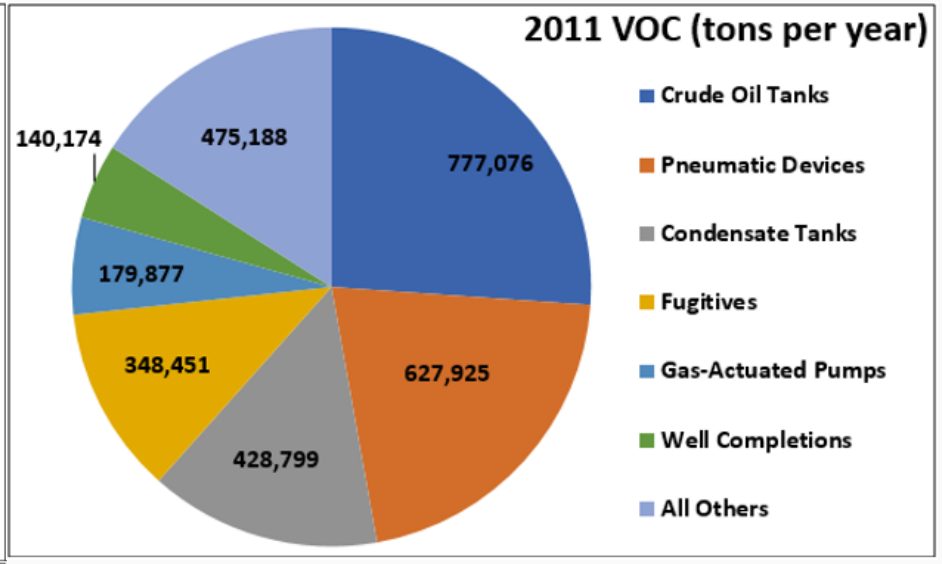
Tool Results - NOx





Tool Results - VOC





Improvements Planned for 2017

- SCC disaggregation (flaring, multi-process equipment)
- Improved activity analysis (crude oil vs. condensate)
- Additional source types
  - Coalbed methane dewatering pumps
  - Others?
- Additional control options/scenarios
  - Electric-powered compressor engines
  - Vapor recovery units

Improvements Planned for 2017 (cont.)

- Update basin factors
  - Subpart W data
  - Gas composition speciation
- Enclosed ground flare updates for 2017?
  - Proposed AP-42 Section 13.5 update (June, 2017)
  - Tool does not currently differentiate flare types

Questions?