Oil and Gas 101: Using EPA's Nonpoint Oil and Gas Emission Estimation Tool for the 2014 NEI

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Overview of Presentation

- Introduction/Timeline of the Tool Development

- Feedback from the 2011 NEI Oil and Gas Tool

- Development of the 2014 NEI Oil and Gas Tool (beta)

- Case Studies

- Next Steps/Q&A

2011 NEI Oil and Gas Tool, Motivation

- Prior to the development of the 2011 EPA Oil and Gas Tool, oil and gas emission inventories were sparse within the NEI:

  ➢ Few states had the capacity to develop estimates

  ➢ Calculations were complex

  ➢ Obtaining information was difficult, even within state agencies

  ➢ Source category and pollutant coverage were incomplete nationwide

2011 NEI Oil and Gas Tool, Motivation

- Huge void of criteria and hazardous air pollutants (HAPs) in the NEI for the oil and gas sector.

- As such, EPA developed the 2011 NEI Oil and Gas Estimation Tool ("Tool"), to address this sector.

  ➢ Used existing framework/methodologies from work accomplished by states and RPOs

  ➢ Worked in concert with the National Oil and Gas Committee (training, QA, feedback)

2011 NEI Oil and Gas Tool Development

- State calculations tool existed, primarily TX beginning in 2007.

- In Fall 2012, CenSARA developed a spreadsheet-based tool for its member states.

- Using these tools, EPA began development of the 2011 NEI Oil and Gas Tool

  - ➢ Migrate from Excel-based to Access-based

  - ➢ Revised/updated emission algorithms and factors

2011 NEI Oil and Gas Tool – Source Category Coverage

- Exploration Sources:
  - ➢ Drilling
  - ➢ Mud Degassing
  - ➢ Hydraulic Fracturing
  - ➢ Well Completions

2011 NEI Oil and Gas Tool – Source Category Coverage

- Production Sources:
  - ➢ Artificial Lifts
  - ➢ Associated Gas
  - ➢ Condensate Tanks
  - ➢ Crude Oil Tanks
  - ➢ Dehydrators
  - ➢ Fugitives
  - ➢ Gas-Actuated Pumps
  - ➢ Heaters
  - ➢ Lateral/Gathering Compressors
  - ➢ Liquids Unloading
  - ➢ Loading Operations
  - ➢ Pneumatic Devices
  - ➢ Produced Water
  - ➢ Wellhead Compressors

2011 NEI Oil and Gas Tool – Pollutant Coverage

- Criteria Pollutants:
  - CO, NH3, NOx, PM10, PM2.5, SO2, VOC

- HAPs:
  - BTEX, formaldehyde, and Other HAPs

- Other Pollutants:
  - GHGs
  - Hydrogen sulfide

2011 NEI Oil and Gas Tool – Data Sources

- Methodologies: CenSARA and Texas calculation tools

- Activity Data: HPDI, state OGC databases; EIA; RigData

- Emission Factors: mostly EPA AP-42; API, Climate Registry

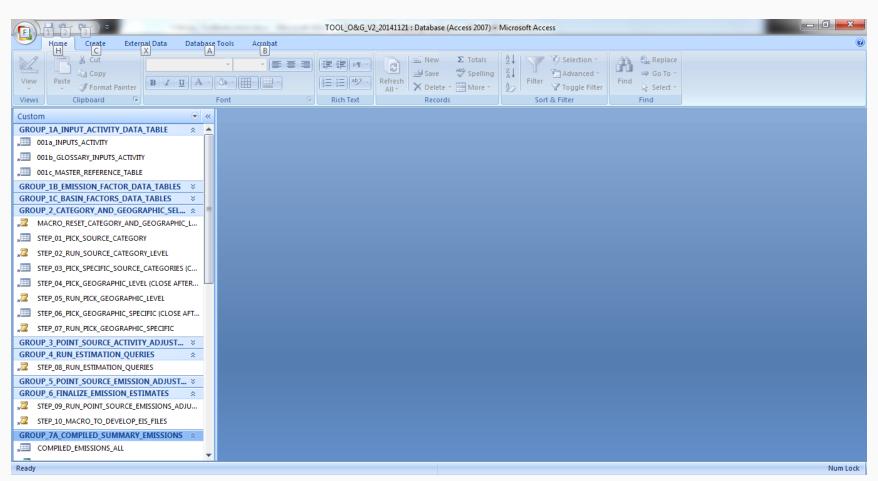- Basin Factors: CenSARA; state feedback

2011 NEI Oil and Gas Tool – Format

- The 2011 Tool was developed in Microsoft Access
  - ➢ Easily-accessible/Familiarity

  - ➢ Flexibility

  - ➢ Portability

  - ➢ Transparency
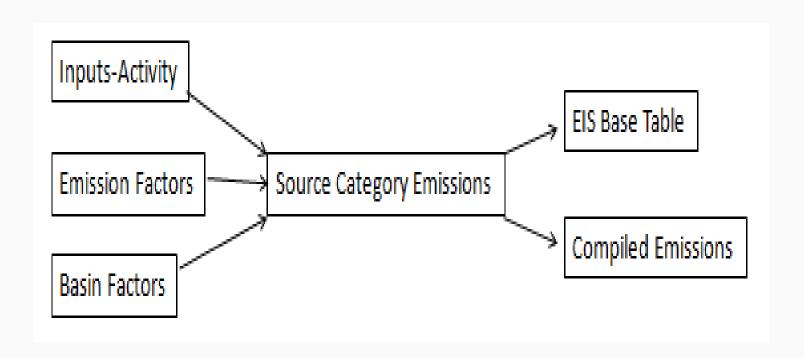
2011 NEI Oil and Gas Tool – Format

2011 NEI Oil and Gas Tool – Format

BASIN	STATE_COUN ▾	STATE_ABBR ▾	COUNTY_NAME ▾	SOURCE_CATEGORY ▾	FUG_VALVES_GAS ▾	REF_FUG_V/
Mid-Gulf Coast Basin	01001	AL	Autauga	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01003	AL	Baldwin	FUGITIVES	13.82857	CENSARA_STUDY_
S.GA Sedimentary Prov	01005	AL	Barbour	FUGITIVES	13.82857	CENSARA_STUDY_
Appalachian Basin (Eastern Overthrust Area)	01007	AL	Bibb	FUGITIVES	13.82857	CENSARA_STUDY_
Appalachian Basin (Eastern Overthrust Area)	01009	AL	Blount	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01011	AL	Bullock	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01013	AL	Butler	FUGITIVES	13.82857	CENSARA_STUDY_
Appalachian Basin (Eastern Overthrust Area)	01015	AL	Calhoun	FUGITIVES	13.82857	CENSARA_STUDY_
Piedmont-Blue Ridge Prov	01017	AL	Chambers	FUGITIVES	13.82857	CENSARA_STUDY_
Appalachian Basin (Eastern Overthrust Area)	01019	AL	Cherokee	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01021	AL	Chilton	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01023	AL	Choctaw	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01025	AL	Clarke	FUGITIVES	13.82857	CENSARA_STUDY_
Piedmont-Blue Ridge Prov	01027	AL	Clay	FUGITIVES	13.82857	CENSARA_STUDY_
Piedmont-Blue Ridge Prov	01029	AL	Cleburne	FUGITIVES	13.82857	CENSARA_STUDY_
S.GA Sedimentary Prov	01031	AL	Coffee	FUGITIVES	13.82857	CENSARA_STUDY_
Black Warrior Basin	01033	AL	Colbert	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01035	AL	Conecuh	FUGITIVES	13.82857	CENSARA_STUDY_
Piedmont-Blue Ridge Prov	01037	AL	Coosa	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01039	AL	Covington	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01041	AL	Crenshaw	FUGITIVES	13.82857	CENSARA_STUDY_
Black Warrior Basin	01043	AL	Cullman	FUGITIVES	13.82857	CENSARA_STUDY_
S.GA Sedimentary Prov	01045	AL	Dale	FUGITIVES	13.82857	CENSARA_STUDY_
Mid-Gulf Coast Basin	01047	AL	Dallas	FUGITIVES	13.82857	CENSARA_STUDY_
Appalachian Basin (Eastern Overthrust Area)	01049	AL	DeKalb	FUGITIVES	13.82857	CENSARA_STUDY_

003q_BASIN_FACTORS_FUGITIVES

Record: 1 of 3227   No Filter   Search

2011 NEI Oil and Gas Tool – Data Flow

2011 NEI Oil and Gas Tool – Results

- Source category coverage: 54 SCCs from 18 source categories

- Pollutant coverage: 51 pollutants

- Geographic coverage: 33 states, 1168 counties, 64 basins

- Emission records generated:
  - From Tool = 1.0+ million
  - To EIS = 807,000+

Re-engineering for 2014 NEI

- Why re-design? Based on User feedback…

  ➢ Access can be "intimidating"…

    ✓ *use of Forms can alleviate*

  ➢ Data files are big

    ✓ *Tool is now separated into 2 separate modules (exploration and production)*

  ➢ My source category is not in there

    ✓ *Separate modules allow for additional source categories to be developed.*

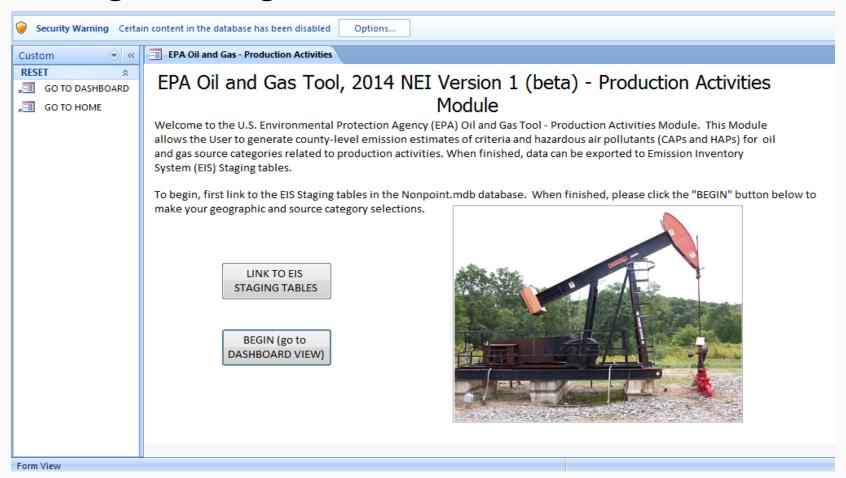 ➢ It's hard to find my data

    ✓ *2014 Tool focus on states.*

Re-engineering for 2014 NEI

- What's new:
  - ➢ Use of data entry forms
  - ➢ Side-by-side EPA defaults along with data used
  - ➢ Use of "Dashboard view with buttons and tabs
  - ➢ Filters and large-scale updates

Re-engineering for 2014 NEI – Dashboard View

Let's go to the Tool.

Case Studies.

Case Study #1

- Sublette County, WY (FIPS = 56035) had 4,550 gas wells producing 1,13+ billion mscf in 2011. Of these 4,550 gas wells, 100 gas wells submitted VOC emissions of 2,500 tpy for inclusion in the point sources NEI for gas-actuated pumps (SCC = 2310121401).

  Use the Tool to calculate the nonpoint VOC emissions for this source category.

Case Study #2

- The Triassic Basins in Lee County, NC (FIPS = 37105) were recently given approval for shale drilling for natural gas production. Based on the following data, calculate NOx emissions from exploration sources.

  - ➢ 200 natural gas wells were drilled horizontally; total feet drilled was 800,000 ft.

  - ➢ 100 wells were completed

  - ➢ Based on survey data,

    - o Hydraulic fracturing engines are limited to NOx emissions of 3.5 g/hp-hr

    - o Mud degassing takes on average 14 days per spud

Case Study #3

- EPA is considering reducing the NOx emission factor for 4-cycle lean-burn wellhead compressor engines at gas wells (SCC = 2310021202) to 0.5 g/hp-hr in nonattainment areas. Using the tool, assess:

  - ➢ Impact of NOx emissions within nonattainment counties.

  - ➢ Impact of NOx emissions nationwide from Wellhead Compressor Engines

  - ➢ Impact of NOx emissions nationwide from all production sources

Plans for 2014 NEI

- Activity Data
  - ➢ HPDI and non-HPDI data obtained Fall 2015
- Basin Factors/Gas Composition Data
  - ➢ Incorporate new/updated data from EPA/states/RPOs
- Emission Factors
  - ➢ Incorporate new/revised factors
- Basin Factors
  - ➢ Incorporate new/updated data from EPA/states/RPOs

Plans for Tool

- Additional Source Categories
  - ➤ e.g., Artificial lifts at gas/CBM wells
- New/revised emission estimation methodologies
- User Enhancements
  - ➤ QA/dialog boxes
  - ➤ Establish point source EIS for subtraction
- Incorporate new rules
  - ➤ e.g., NSPS Subpart OOOO, Nonroad engines

Discussion/Q&A

- What else would you like to see?

- Q&A