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

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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

EPA Oil and Gas Tool, 2014 NEI Version 1 (beta) - Production Activities Module

Welcome to the U.S. Environmental Protection Agency (EPA) Oil and Gas Tool - Production Activities Module. This Module allows the User to generate county-level emission estimates of criteria and hazardous air pollutants (CAPs and HAPs) for oil and gas source categories related to production activities. When finished, data can be exported to Emission Inventory System (EIS) Staging tables.

To begin, first link to the EIS Staging tables in the Nonpoint.mdb database. When finished, please click the "BEGIN" button below to make your geographic and source category selections.

LINK TO EIS STAGING TABLES

BEGIN (go to 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,
    - Hydraulic fracturing engines are limited to NOx emissions of 3.5 g/hp-hr
    - 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