API SANGEA™ 4.1 for Oil & Gas GHG Emission Reporting Under USEPA MRR

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- Air quality specialty

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Webinar Agenda

- Updates of US EPA Mandatory Reporting Rule (MRR) and Subpart W
- Overview of SANGEA™ 4.1
- Step-by-Step SANGEA™ Set-up Process
- Demo of SANGEA™ 4.1
UPDATES OF EPA MRR & SUBPART W
EPA MRR Amendments – Deferred Data Elements

- In August 2011, EPA deferred the reporting deadline for a number of Subpart W equation inputs until March 31, 2015. The inputs to equations whose reporting deadline was deferred until 2015 are listed in Table A-7 of subpart A.

- In October 2014 [FR 63750], EPA finalized the approach to collecting these deferred inputs and in that rule made several minor modifications to the reporting requirements for Subpart W.

- As a result, reporters must submit both an expanded set of Subpart W data for Reporting Year (RY) 2014 and deferred data elements for RY 2011, 2012, and 2013 by March 31, 2015. These data must be submitted as part of the facility’s RY2014 submittal.
What Are Deferred Elements?

- Inputs to emission equations
- Production/throughput data that are not inputs to emission equations
- Data elements reported for periods of missing data that are not inputs to emission equations
  - e.g. API well number for wildcat wells
- Revised reporting forms still do not track 100% with the reporting requirements codified in 40 CFR Part 98.236 (but they are getting closer)
Deferred Data by the Numbers…

<table>
<thead>
<tr>
<th>Industry Segment</th>
<th>Additional Data Elements to be Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore petroleum and natural gas production</td>
<td>0</td>
</tr>
<tr>
<td>Onshore petroleum and natural gas production</td>
<td>64</td>
</tr>
<tr>
<td>Onshore natural gas processing</td>
<td>33</td>
</tr>
<tr>
<td>Onshore natural gas transmission compression</td>
<td>22</td>
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<tr>
<td>Underground natural gas storage</td>
<td>21</td>
</tr>
<tr>
<td>Liquefied natural gas (LNG) storage</td>
<td>15</td>
</tr>
<tr>
<td>LNG import and export equipment</td>
<td>16</td>
</tr>
<tr>
<td>Natural gas distribution</td>
<td>14</td>
</tr>
</tbody>
</table>
Updated Subpart W Reporting Forms

1) RY2014 reporting form
   - Include the previously deferred items

2) Deferred data elements collection form

3) Revised XML schema for Subpart W
   - Accommodate these new data and define an additional branch of the schema to accommodate deferred data.

Subpart W reports generated by SANGEA satisfy the MRR reporting requirements.
INTRODUCTION TO SANGEA 4.1™
SANGEA 4.1 Overview

- A desk-top application built in *Microsoft.net Framework* with *Access* database for storing source information and *Microsoft Reporting Services* for reports and export results

- Similar to SANGEA 3, the new software is designed to report emissions for an entity with emissions from multiple “Locations”

- Designed to assist petroleum companies with estimating, managing, and reporting GHG emissions and can normalize GHG emissions based on energy consumption and/or production

- Includes USEPA AP-42 emission factors for calculating criteria pollutant emissions
SANGEA 4.1 Architecture Overview

SANGEA – Entity/Users/Locations

**Sources**
- Module 1
- Module 2
- Module 3
- ...
- Module n

**Activities**
- Fuel Data
- Single Source Data
- Multi Sources Data
- Source Non-Routine Events
- Source Emission Data

**Fuels**
- Fuel Properties
- Emission Factors

**Import/Export**

**Calculation Layer**

**Report**
User Friendly Features

- User selected single standard temperature (60°F or 68°F) for gas property calculations and emission factors.
- Easy updates of Global Warming Potential
- Calculation tool for gas composition properties and API gravity.
- Source import and export tools in Excel spreadsheets allowing users to edit a large number of the same type of sources in spreadsheets, then import into SANGEA 4.1
  - Combustion sources
  - O&G well venting
  - Storage tanks
User Friendly Features (cont.)

- GHG results and source parameters can be exported to spreadsheets – this allows users to process results into formats that are required for regulatory and/or corporate emissions inventory reports.

- For each new reporting year, users can copy from an existing file
  - The function copies all source parameters from the existing file
  - User can choose whether to remove activity data that should be updated for the new reporting year.
STEP-BY-STEP SANGEA SET UP PROCESS
(SOFTWARE DEMO)
Step 1: Select Overall Preferences

- **Standard conditions (60°F vs. 68°F) used for emissions calculations.** To avoid confusion of the standard condition for different source types, all gaseous material volumes are set under one condition.
  - API Compendium is based on 60°F
  - USEPA MRR has mixed standard conditions
  - SANGEA-4.1 has converted emissions factors to cover both conditions.

- **Whether to include criteria pollutants.** SANGEA 4.1 includes calculation methods for evaluating criteria pollutants based on emission factors from USEPA AP-42 or user specified emission factors. If the user elects to calculate criteria pollutant emissions in SANGEA 4.1, additional questions for each source will appear for proper calculations.
Step 2: Set Up A Reporting Entity

- For each reporting entity, users will provide basic entity information:
  - Entity name/identification number
  - Reporting year
  - Primary product that will be used for normalizing GHG emissions and production measure
Step 3: Set up Users

- A “User Log” maintains the history of a GHG reporting file and allows company to track who has been involved and is modifying a GHG reporting file.
Step 4: Set Up Reporting Locations

- SANGEA reports emissions for a given location, which can be managed under location groups to cover business segments and/or geographical regions.
- For USEPA MRR reporting requirements, a reporting facility (e.g., onshore production) can be set up as a “location.”
- SANGEA 4.1 includes the USEPA sub-basin categories database.
SANGEA 4.1 Reporting Entity Hierarchy

- **Entity**
  - Reporting Entity
  - Business or Location Segment 1
  - Business or Location Segment 2

- **Location Group**
  - Business or Location Segment 1
  - Business or Location Segment 2

- **Location**
  - EPA MRR Reporting Facility
    - Facility 1
    - Facility 2
    - Sub-Basin 1
    - Sub-Basin 2
    - Sub-Basin 3
    - Facility A
    - Facility B
    - Facility C

- **Sources & Fuels**
  - Fuel 1
  - Fuel 2
  - Source 1
  - Source 2
  - Source 3
Create “Location” for reporting sites

a) Set “Location Group” by region or by business segment
b) Set locations under each location group
c) Set sub-basin for onshore production (USEPA MRR)
Step 5: Set Up Location-Specific Fuel Types

- For each reporting location, users must select fuel types and properties for combustion sources and flares.
  - EPA MRR Fuel Types – Select fuel types based on regulatory requirements
  - API Compendium – Select all possible fuels that can be fired by the location.

This will allow the user to maintain fuel property data and corresponding emission factors for all combustion sources at the reporting location.
Step 6: Select GHG Calculation Protocols

- Users can select a preferred protocol during the initial setup
- Users can also select either API Compendium or USEPA MRR for each specific source
## SANGEA 4.1 Source Modules

<table>
<thead>
<tr>
<th>SANGEA Source Modules</th>
<th>API Compendium 2009</th>
<th>U.S. EPA MRR Subpart</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>Acid Gas Removal (AGR)</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Combustion Control</td>
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<td></td>
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<tr>
<td>Dehydrator</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Equipment Leaks</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Flare</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Hydrogen Plant</td>
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<td></td>
</tr>
<tr>
<td>Indirect Emissions</td>
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<td></td>
</tr>
<tr>
<td>Liquid Loading</td>
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<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Mobile and Transportation</td>
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<td></td>
</tr>
<tr>
<td>Oil and Gas Venting</td>
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<td></td>
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<tr>
<td>Refinery Process Units</td>
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</tr>
<tr>
<td>Stationary Combustion</td>
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<td>✓</td>
</tr>
<tr>
<td>Storage Tank</td>
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</tr>
<tr>
<td>Sulfur Recovery Units (SRU)</td>
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</tr>
<tr>
<td>User Defined Sources</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>
Step 7: Configure Emission Sources under Specific Modules

- Each module includes multiple emission calculation methods, configured as a wizard to help users set up emission sources quickly.
- User-specified source parameters are stored in the software source database for future emission inventory reports.
- SANGEA 4.1 also offers a “User Defined Sources” module under the API Compendium protocol that allows users to include sources that are not already established in the two protocols of the SANGEA reporting system.
Examples of Subpart W Sources

Production & Processing
1. Drilling and Well Completion
2. Producing Wells
3. Gathering Lines
4. Gathering and Boosting Stations
5. Gas Processing Plant

Natural Gas Transmission & Storage
6. Transmission Compressor Stations
7. Transmission Pipeline
8. Underground Storage

Distribution
9. Distribution Mains
10. Regulators and Meters for:
   a. City Gate
   b. Large Volume Customers
   c. Residential Customers
   d. Commercial Customer

Source: Adapted from American Gas Association and EPA Natural Gas STAR Program
Step 8: Enter Source Activity Data

- For each source, users will enter activity data (e.g., fuel usage, annual operating hours, source specific carbon contents and many more, for the reporting period):
  - Fuel properties for fuels data available for the specific location.
  - Single-source data entry.
  - Multi-source data entry for the user to enter source parameters for a group of sources such as tanks for onshore production.
  - Event-based sources data entry for sources that are not operated routinely and emissions occurred on an event-basis.
Step 8: Enter Source Activity Data

- For each source, users will enter activity data (e.g., fuel usage, annual operating hours, source specific carbon contents and many more, for the reporting period):
  - Direct source emissions data entry for emissions calculated based on continuous emissions monitoring system (CEMS) or software programs such as GRI GLYCalc™.
  - Location-specific production data entry to support both USEPA MRR facility reporting requirements and API benchmarking with normalized emissions.
Step 9: Execute Calculations & Select Reports

- SANGEA 4.1 uses Microsoft Reporting Services to generate various types of reports.
- Currently, the system includes more than 20 different reports.
- Users can select one report that can be displayed within the system.
- Results can be exported to files in Excel.
Closing

- **Product Release:**
  - API released SANGEA 4.1 in 2013
  - To order a copy of SANGEA 4.1:
    - visit [http://www.api-sangea.org](http://www.api-sangea.org) or
    - email support@api-sangea.org

- **Support:** [support@api-sangea.org](mailto:support@api-sangea.org)

- **Training courses (hands on training):**
  - *Public and company-specific training courses*
  - *Future training courses – TBD*