Additional Revisions Under Consideration

Stakeholder Workshop

October 27, 2017

Overview

- EPA is considering revisions for several topics/sources in the 2018 or future GHGIs.
- Refer to memo posted on EPA website for additional details and requests for stakeholder feedback.

1. Production equipment activity data
2. Well completions and testing
3. Well-related activity data
4. LNG segment updates
5. N_2O emissions
6. Liquids unloading – early time series
7. Offshore platforms
8. Transmission & Storage and Distribution segment updates
9. Natural gas leaks at point of use
10. Additional use of GHGRP data
11. Additional data assessments

1. Production Equipment Activity Data

- Current methodology:
  - Wellhead and major equipment counts as reported in the subpart W equipment leaks table are used to develop activity factors (AFs)—for example, separators per gas well.
    - Paired with national well counts from DrillingInfo to obtain national level equipment counts.
  - AFs calculated from RY2015 subpart W data are applied for years 2011 forward.
    - Earlier years use GRI-based factors or interpolation.
- EPA seeks stakeholder feedback on the basis for calculating major equipment activity factors for the 2018 GHGI.
  - Reported well counts from Equipment Leaks versus Summary table
  - Reporting year(s) data to use—for example, recalculated RY2015 activity factors, year-specific subpart W activity factors, or another approach

2. Well Completions and Testing

- Current GHGI methodology combines IPCC exploration activities (drilling, testing, completions) with production activities.
- Update under consideration would separate exploration and production estimates to improve conformance with IPCC guidelines
- Data are available from GHGRP (incl. control subcategories):

Well Type	Completions	Workovers	Testing
HF Gas	✔	✔	●
HF Oil	●	●	
Non-HF Gas	●	●	
Non-HF Oil			

3. Well-related Activity Data

- EPA seeks stakeholder feedback on four general topics to increase consistency and accuracy of activity data
- **Heavy versus light crude equipment service**:
  - The fractions used to split counts of wellheads, headers, and separators between heavy and light crude service were developed in the 1990s and applied for all time series years.
    - 7.05% of oil wells produce heavy crude
    - 9.9% of oil production segment separators are in heavy crude service
  - An updated data source should account for changing trends over time.
    - Based on GHGRP RY2015, 19% of oil wells produce heavy crude

3. Well-related Activity Data (cont.)

- **Well drilling**:
  - EIA no longer maintains the well drilling activity data set (most recent estimates cover through 2010), so the GHGI requires a new data source for the entire time series, or at least 2011 forward.
  - EPA investigating use of DrillingInfo data (spud date) for time series estimates
  - Because some wells are drilled but do not report production (dry wells, or recently drilled), EPA cannot entirely rely on the existing methodology for apportioning wells between natural gas and petroleum production types.
  - EPA seeks stakeholder feedback on how to apportion counts of dry wells between gas and oil production types; and on how to apportion counts of wells drilled but without public production data.

3. Well-related Activity Data (cont.)

- **Gas and oil well completions without HF:**
  - Non-HF gas well completion activity data based on industry characteristics in year 1992 (from the 1996 GRI/EPA study).
  - Non-HF oil well completions are sometimes zero in recent time series years, due to limitations of the current data sources and methodologies for both oil well drilling and HF oil well completion counts.
    - Event count = [Oil wells drilled (EIA)] – [HF oil well completion events (DrillingInfo)]
  - An updated data source should account for changing trends over time.
    - EPA investigating use of DrillingInfo data (completion date) for time series estimates
    - Same stakeholder questions as presented for well drilling

3. Well-related Activity Data (cont.)

- **HF gas well completions activity data**:
  - The GHGRP reported counts are higher than those obtained from the DrillingInfo analysis.
  - Due to the reporting threshold, GHGRP counts should represent a subset of national activity, so DrillingInfo counts should be equal to, or greater than, GHGRP direct counts.
  - EPA is investigating updates to DrillingInfo count methodology

4. LNG Segment

- Current methodology:
  - Source-level EFs from 1996 GRI/EPA study
    - Developed for underground natural gas storage and transmission compressor station
    - Applied to both LNG storage stations and LNG import terminals.
  - Activity data from EIA (storage stations) and FERC (import stations)
    - Adjustments for satellite vs. complete storage stations
- GHGRP collects data on reciprocating and centrifugal compressor venting, equipment component leaks, and flares
- EPA seeks stakeholder feedback on how to incorporate both emissions and activity data from GHGRP
  - Development of EFs, use over time series (e.g., interpolation to current EFs in early years)
  - Scaling activity data for national total stations and compressor counts

5. N_2O Emissions from Flaring

- N_2O emissions result from combustion processes in natural gas and petroleum systems
  - Some N_2O emissions from fuel combustion are already inventoried.
  - EPA is investigating N_2O sources for inclusion in natural gas and petroleum systems.
- GHGRP collects data on N_2O emissions in subpart W

6. Liquids Unloading

- EPA has made several recent revisions across the time series. Current methodology:
  - EFs for with and without plunger lifts calculated by summing the GHGRP emissions in each category for RY2011-RY2015 and dividing by the total number of wells in each category over those years.
  - These EFs are used for all years in the GHGI time series.
  - Activity over time series is based on:
    - 2012 API-ANGA national average fraction of gas wells requiring liquids unloading (56%), applied throughout the time series.
    - RY2015 GHGRP estimate for the percent of all non-associated gas wells that vent during liquids unloading with and without plunger lifts (16.8%), applied 2011–2015.
    - Assumption that in 1990, all wells requiring liquids unloading use plunger lift.
- EPA is evaluating the liquids unloading data collected for the 1996 GRI/EPA study to determine if it better represents early time series years.
  - The GRI/EPA EF for liquids unloading without plunger lifts is less than one third of the current GHGRP-based EF for this activity.
- EPA also considering additional approaches for liquids unloading (e.g., assessing regional approaches) based on stakeholder feedback

7. Offshore Platforms

- Current methodology uses platform EFs calculated from BOEM's 2011 GOADS data
- 2014 GOADS data are now available.
  - There are competing trends between 2011 and 2014 which result in some EFs increasing and others decreasing.

Platform Category	GOADS 2011 EF (scf/day)	GOADS 2014 EF (scf/day)
Deep Gas	No data	No data
Deep Oil	93,836	67,603
Shallow Gas	10,142	11,656
Shallow Oil	19,567	21,146

- EPA seeks stakeholder feedback on how to use 2014 GOADS data.
  - For example, EPA might use the current EF for years before 2014, and updated EFs for years 2014 forward; or combine emissions data from the 2011 and 2014 data sets (or possibly other data sets) to develop revised EFs to apply to all years.

7. Offshore Platforms (cont.)

- Platform counts in each of the four categories are based on a nationwide DOI platform census that has not been updated since 2010.
  - Additionally, the DOI data source did not differentiate between active and inactive platforms
- EPA is considering using BOEM databases to first calculate the number of in-place complexes each year since 1990, then reduce these numbers by the number scheduled for removal in the following 3 years to obtain estimates of active complexes.
- Counts would be paired with EFs on same basis (e.g., complex-level).

8. Transmission & Storage and Distribution Segment Updates

- Considerations toward revising methodologies to use updated data and calculate net emissions for several emission sources
  - GasSTAR reductions would be removed for sources that use net emissions approach
- Transmission & Storage station fugitives
  - Already calculated using “net” approach – considering removing GasSTAR reductions for consistency
- Transmission & Storage station venting
  - Data available from GHGRP and Zimmerle, et al. 2015
- Compressor exhaust
  - Considering revised activity factor on a station level-basis (i.e., MMhp-hr/station) using subpart W data and maintaining the current GHGI EF
  - This revision was recently implemented in the gas processing segment

8. Transmission & Storage and Distribution Segment Updates (cont.)

- "Other" Transmission & Storage GasSTAR reductions
  - In light of new information that might inform future revisions, and the revisions under consideration for station venting and compressor exhaust, the EPA will review the "other" transmission and storage GasSTAR reductions data (i.e., reductions not currently attributed to a specific GHGI emission source).
- Distribution segment mishaps
  - Gas STAR reductions for mishaps in recent years are generally small
  - Lamb et al. 2015 indicates mishap emissions might be higher than estimated in the current GHGI
  - EPA is considering removing GasSTAR reductions for this source

8. Transmission & Storage and Distribution Segment Updates (cont.)

- Distribution segment pipeline blowdowns
  - Due to the lack of a clear trend over time and consideration toward the overall low magnitude of this source's emissions, the EPA is considering GasSTAR reductions for this source, to simplify the methodology.
  - EPA seeks stakeholder feedback on whether an industry trend regarding the pipeline blowdown EF (emissions per mile of pipeline) over time exists, and if so, how to revise the GHGI methodology using available data.
- "Other" distribution segment GasSTAR reductions
  - Less than 2% of the distribution segment emissions are attributable to sources that have not been recently revised.
  - The "other" GasSTAR reductions exceed the total emissions estimated for sources that use the potential emissions approach by approximately 2.5 times on average over the time series.
  - EPA is considering removing "other" GasSTAR reductions from the GHGI, or developing a scaling factor to decrease the magnitude of the reductions.

9. Natural Gas Leaks at Point of Use

- This type of emission source is not currently included in natural gas systems estimates.
- EPA seeks stakeholder feedback regarding whether and how to incorporate sources highlighted in recent publications:
  - Residential and commercial customer natural gas use
    - The current GHGI estimates emissions from customer meters, but not further downstream.
    - At least one country, the United Kingdom, includes this source in its GHGI
    - The EPA seeks stakeholder feedback on data sources in addition to the U.K. estimate which could be assessed.
  - A recent study by Lavoie et al. found that leaks from natural gas-fired power plants (NGPP) and oil refineries may be large sources of methane.
    - The EPA is currently investigating whether and how to incorporate new data for NGPPs into the GHGI, and seeks stakeholder feedback on this issue.

10. Additional Use of GHGRP Data

- EPA plans to consider newly reported (i.e., RY 2016) GHGRP data for the 2019 GHGI and seeks stakeholder feedback on use of the data.
  - Gathering and boosting.
    - Which reported G&B activity data elements should be evaluated for scale-up considerations?
    - Feedback on data sources that provide national-level totals for purposes of considering scaling. approaches
  - HF oil well completions and workovers.
    - Scale up considerations?
  - Transmission pipeline blowdowns
    - Scale up considerations?
  - Well ID numbers
    - Use of this data to inform GHGI methodologies?
- Stakeholders have suggested additional or alternate uses of GHGRP data

10. Additional Data Assessments

- Upcoming data highlighted by stakeholders:
  - API field study on pneumatic controllers
  - Pipeline Research Council International (PRCI) project in which researchers are gathering and analyzing subpart W data on transmission compressor stations and underground storage facilities
- In addition, EPA will continue to review other sources of new data as they become available such as DOE-funded work on vintage and new plastic pipelines (distribution segment), industrial meters (distribution segment), and sources within the gathering and storage segments.

10. Additional Data Assessments (cont.)

- Regional and/or temporal variability expected for certain emission sources:
  - Associated gas venting and flaring regional variation – see separate CO_2 update memo
  - Associated gas venting and flaring temporal variation – see 2017 Production memo
  - Abandoned wells regional variation – see separate abandoned wells memo
  - Anomalous leak events (e.g., Aliso Canyon leak) regional and temporal variation – see separate 2017 storage segment memo
  - Miscellaneous production flares regional variation
  - Liquids unloading regional variation
- Natural gas processing plants – consider using EIA plant counts or throughput scaling approach