

California Environmental Protection Agency

 **Air Resources Board**

Quantification Methods & Future Reporting

**Gas Leak Abatement Rulemaking Workshop
September 23, 2015
San Francisco**



Why Is Emission Quantification Important?

- Understand where the emissions are coming from
- Prioritize emission sources by magnitude
- Examine cost-effectiveness of different strategies



Emissions Quantification

Emissions

$$= \sum_{i=1}^j \textit{Emission Factor}_i * \textit{Activity Data}_i$$

where, for example,

i = material/equipment type;

j = number of material/equipment types;

Emission factors can be scf/hour, tonnes/mile of pipeline type, tonnes/piece of equipment; etc.

Activity Data can be number of hours, miles of pipeline, etc.



EFs Used in May 15 Reports

- TCR = The Climate Registry
- MRR = Mandatory Reporting Regulation
- WSU = Washington State University
- GRI/EPA = Gas Research Inst./Env. Prot. Agcy.
- PHMSA = Pipeline Haz. Mat'l. Sfty. Adm.
- Utility research/testing
- Manufacturer information
- Direct measurement, etc.



Emission Conversions

- Emissions may need to be converted from volume to mass using conversion factors such as molecular weight
- Emissions converted from tonnes of methane to tonnes of CO₂-equivalent using Global Warming Potential (GWP)
 - Fourth Assessment Report (AR4) GWPs



Tier Methodology

- Higher tier
 - More disaggregated, more accurate
 - Require more data
 - Highest tier is direct measurement
- Cost considerations
- Some concerns about EF development
 - Randomness, bias, “super emitters,” equipment precision, human error
- Data Verification
 - 3rd party verification and/or attestations



Discussion Points

- Pros and cons of different methodologies and emission factors
- Are there areas where direct measurements are feasible?
- Accounting for “super emitters”?
- Others?



Future Reporting Discussion

- Establish protocols
- Develop uniform methodologies
- California 'specific' EFs
- Emissions threshold (large vs. small co.)
- Equipment types
- Emission units
- Harmonized reporting (State, Fed)
 - Incorporation into MRR
- Measuring progress



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