

Greenhouse Gas (GHG) Emissions Reporting Requirements

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GHG Emissions Inventory Section

Overview

- GHG Fast Facts
- NMED GHG Reporting Rule
 - The Reporting Process.
 - How to Calculate GHG Emissions.
 - What are the implications?

GHG Fast Facts

- **Carbon Dioxide** (CO₂) is the dominant gas emitted and mostly from combustion.
- **Coal** contains the highest carbon content per unit of energy.
- The **Natural gas** carbon content is 45% lower than coal.
- **Methane** (CH₄) has approximately 21 times the Global Warming Potential of CO₂.

NMED GHG Reporting Rule

- The Rule provides a framework to address climate change.
- Carbon Accounting is an emerging business opportunity and compliance obligation.
- Always measure or estimate emissions using industry specific protocols and methods.
- The science of measuring emissions is evolving.

NMED GHG Reporting Rule

- The Rule was adopted by the New Mexico Environmental Improvement Board in the Fall of 2007.
- GHGs include: CO₂, CH₄, Nitrous Oxide (N₂O), hydrofluorocarbons, sulfur hexafluoride and perfluorocarbons.
- GHG emissions inventory reporting is a phased process.
- The first 2 years apply only to Title V sources.

GHG Reporting Process

- For 2008: CO₂ only; in 2009 add CH₄
- Modified criteria pollutant spreadsheets.
- Always follow Air Quality Bureau (AQB) Reporting Procedures.
- GHG reports shall include: Total CO₂ emissions, fuel consumption, heating value and carbon content.
- Start-up, shutdown and scheduled maintenance emissions are included.

GHG Reporting Process

- **GHG emission sources:**
- Fuel combustion results in CO₂ emissions as a result of carbon oxidation, and;
- CH₄ emissions result from incomplete combustion.
- Vented emissions are GHG releases resulting from normal operations (e.g. dehydrators, gas sweetening units, storage tanks and catalytic cracking units).
- Fugitive source emissions result from equipment leaks (e.g. valves, pump seals or compressor seals).

GHG Reporting Process

- GHG emission sources include permitted and un-permitted equipment.
- **Permitted sources** include: combustion sources, dehydrators, storage tanks, amine units and other process equipment.
- **Un-permitted sources** include: gas driven pneumatic devices and chemical injection pumps.

Calculating GHG Emissions

- Always use industry specific protocols (e.g. electric utilities and refineries).
- Default natural gas data can be used for combustion sources fired with ***pipeline quality*** natural gas (PLQNG).
- If not using PLQNG, then operator needs to obtain fuel carbon content by direct measurement or from supplier.

Calculating GHG Emissions

- *Natural Gas Combustion CO₂ emissions calculation example.*
- For a 1,000 horsepower natural gas fired engine

$$\text{CO}_2 = (\text{Fuel} \times \text{HHVD} \times \text{EF}_{\text{CO}_2} \times 0.001)$$

- **Where:**
 - **CO₂** = CO₂ emissions from a specific fuel type, metric tonnes CO₂ per year
 - **Fuel** = Mass or volume of fuel combusted specified by fuel type, unit of mass or volume per year
 - **HHVD** = Default high heat value specified by fuel type supplied by NMED, MMBtu per unit of mass or volume
 - **EF_{CO₂}** = Default carbon dioxide emission factor provided in Appendix A, kg CO₂ per MMBtu
 - **0.001** = Factor to convert kg to metric tonnes

Calculating GHG Emissions

- 1,000 horsepower Natural gas fired compressor engine CO₂ emissions calculation example:
- 8,000 H/Y operation, 8500 btu-bhp-hr heat input.
- $(68.0 \text{ mmscf/yr} \times 1000 \text{ btu/scf} \times 53.97 \text{ kg CO}_2 / \text{mmbtu} \times 0.001) = 3,670 \text{ metric tonnes CO}_2$

Fuel Consumption (MMSCF/YR)	HHV btu's/scf (Default)	Conversion factor KgCO ₂ / tons	KgCO ₂ / mmbtu emissions factor Table 4 Appendix A
68.0	1000	0.001	53.97

Calculating GHG Emissions (Methane)

- *Glycol Dehydrators*
 - Oil/Gas production.
 - Glycol is used to remove water from gas.
 - Glycol also absorbs CH₄.
 - CH₄ is emitted during glycol regeneration.
 - GRI-GLY Calculation is used to estimate emissions.

Calculating GHG Emissions (Methane)

- *Gas Driven Chemical injection pumps*
 - Oil/Gas production sector.
 - Inject chemicals into process lines using natural gas.
 - Estimate emissions using manufacturers data or site specific measurements.

Calculating GHG Emissions (Methane)

- *Gas Driven Pneumatic Devices*
 - Oil/Gas production sector.
 - Valve actuators and controllers that use natural gas to force valve movement.
 - Commonly found at compressor stations.
 - Estimate emissions using manufacturers data or site specific measurements.

Implications

- The NMED GHG Rule will be revised to align with regional or federal GHG rules.
- There will be an expanded scope of regulated equipment.
- GHG Emissions Reports:
 1. Demonstrate compliance
 2. Justify GHG emission reductions
 3. **Trade emissions credits**

EPA Reporting Rule

- On December 26, 2007, President Bush signed into law the Consolidated Appropriations Act of 2008 (H.R. 2764).
- This Act requires the EPA to develop a mandatory reporting rule.
- A draft rule was due on September 26, 2008 (missed) and a final rule is due on June 26, 2009.
- NMED will likely provide comment on the draft rule.