

FINAL MANDATORY GREENHOUSE GAS REPORTING RULE AND MANURE MANAGEMENT SYSTEMS

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On September 22, 2009, the U.S. Environmental Protection Agency (EPA) issued its Final Mandatory GHG Reporting Rule, which requires certain owners or operators of facilities that contain manure management systems (MMS) to report anthropogenic greenhouse gas (GHG) emissions (i.e., GHGs that are directly emitted by human activities). This article briefly summarizes the final rule including major terms, the facilities that are required to report emissions, what needs to be reported, and how the emissions will be calculated.

The final rule requires owners or operators of facilities that contain MMS, and all other source categories at the facility, that emit at least 25,000 metric tons of the GHGs methane and nitrous oxide per year, measured as carbon dioxide equivalents, to report emissions from source categories located at the facility.

A facility means any property, plant, building, structure, source, or stationary equipment located on one or more contiguous properties in actual physical contact or separated solely by a roadway or other right-of-way and under common ownership or control, that emits or may emit any GHG. An MMS is a system that stabilizes or stores livestock manure in one or more of the following system components:

- Uncovered anaerobic lagoons;
- Liquid/slurry systems;
- Storage pits;
- Digesters;
- Drylots;
- Solid manure storage;
- Feedlots and other drylots;
- High-rise houses for poultry production (without litter);

- Poultry production with litter;
- Deep bedding systems for cattle and swine; and
- Manure composting.

This definition of MMS encompasses the treatment of wastewaters from manure. However, an MMS does not include components at a livestock operation unrelated to the stabilization or storage of manure such as daily spread or pasture/range/paddock systems, and these emissions would not be reported.

A source category is simply one of the many general industrial categories listed in the final rule. For example, MMS are one source category, petroleum refineries are another source category. The only other source category likely to apply to owners or operators of MMS is the general stationary fuel combustion sources category that would include GHG emissions from combustion of fossil fuels in boilers, water heaters, engines, flares, or other combustion sources. This category is not discussed in this article.

GHGs are gases that influence the climate system by trapping heat in the atmosphere that would otherwise escape into space. GHGs include:

- Carbon dioxide;
- Methane;
- Nitrous oxide;
- Sulfur hexafluoride;
- Hydrofluorocarbons;
- Perfluorochemicals; and
- Other fluorinated gases.

However, the GHGs most relevant to owners or operators of facilities that contain manure management systems are methane and nitrous oxide. Anaerobic decomposition of materials in MMS produces methane, while nitrous oxide is produced as part of the nitrogen cycle through the nitrification of the organic nitrogen in livestock manure and urine. Manure management also produces carbon dioxide; however, this carbon dioxide is not counted in the GHG totals

because it is not considered an anthropogenic emission.

GHGs vary in their capacity to trap heat and how long they remain stable in the atmosphere. Because they have these different properties, they are not directly comparable without translating them into common units. The Global Warming Potential (GWP), a metric that incorporates both the heat-trapping ability and atmospheric lifetime of each GHG, is used to develop comparable numbers by adjusting all GHGs relative to the GWP of carbon dioxide. When quantities of the different GHGs are multiplied by their GWPs, the different GHGs can be compared on a carbon dioxide equivalent basis. The GWP of carbon dioxide is one; the GWP of methane is 21; and the GWP of nitrous oxide is 310.

Methods for calculating GHG emissions are detailed in the final regulation and are briefly described here. Under the final rule, for each system component other than digesters, owners or operators would calculate methane mass emissions using the following inputs and data: type of system component; average annual animal population; percent of manure handled in each component; annual average volatile solids value calculated from monthly manure samples sent to a laboratory for analysis; and maximum methane-producing potential of the managed manure and methane conversion factors provided in reference tables. The calculation for nitrous oxide is similar. Calculations for anaerobic digesters are significantly more complicated and involve continuous monitoring of methane concentrations, volumetric flow rates, temperature, and pressure.

While the final rule only requires *reporting* of GHG emissions, it may be a prelude to more onerous EPA regulation of GHGs. Currently the Obama administration is reviewing an EPA final “endangerment finding” that GHG emissions are a threat to the public health and welfare. Such a finding, if approved, would allow EPA to regulate GHG emissions under the Clean Air Act.

The failure to report could potentially subject the person to CAA enforcement and penalties (under the CAA) of up to \$32,500 per day.

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