Technical Bulletin

Mandatory Greenhouse Gas Reporting Rule

On October 30, 2009, the U.S. Environmental Protection Agency (EPA) published its mandatory greenhouse gas (GHG) reporting rule in the *Federal Register* [Volume 74, No. 209, pages 56260 – 56519]. The rule will be effective December 29, 2009.

A few highlights are discussed here, but readers should consult the final rule for details.

For those who produce, import, or export certain fuels or industrial gases (coal-based liquid fuels, petroleum products, natural gas and natural gas liquids, CO_2, N_2O, and fluorinated greenhouse gases), the rule requires reporting the amount of fuels or industrial gases supplied.

The rule requires reporting by stationary fuel combustion units that have an aggregate maximum rated heat input capacity of 30 million British thermal units per hour (mmBtu/hr) or greater and that have at least 25,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) emissions per year (excluding emissions from combustion of biomass or biogas).

In addition, the rule applies to the following types of facilities or industrial sectors (each has specific applicability and reporting requirements):

- Electricity generating facilities
- Adipic acid production
- Aluminum production
- Ammonia manufacturing
- Cement production
- HCFC-22 production
- HFC-23 destruction processes
- Lime manufacturing
- Nitric acid production
- Petrochemical production
- Petroleum refineries
- Phosphoric acid production
- Silicon carbide production
- Soda ash production
- Titanium dioxide production
- Municipal solid waste (MSW) landfills
- Manure management systems
- Ferroalloy Production
- Glass Production
- Hydrogen Production
- Iron and Steel Production
- Lead Production
- Pulp and Paper Manufacturing
- Zinc Production

EPA believes there are just over 10,000 facilities that will have to report under the rule, including 3,000 stationary fuel combustion units, 2,551 MSW landfills, 1,502 natural gas suppliers, and 1,108 electric generating facilities.

MSW Landfill Applicability

The rule applies to MSW landfills (not industrial or C&D landfills) that accepted waste after January 1, 1980 if they generate at least 25,000 $MTCO_2e$ (whether or not the landfill gas (LFG) is collected). Landfills on contiguous properties under common control must be included in the estimates (even if they have been closed for years).

MSW landfills must use a mathematical algorithm to estimate gas generation. The rule prescribes a specific model algorithm and coefficient values which are different than the AP-42 and New Source Performance Standards (NSPS) values. As such, facilities cannot rely on existing site gas models to determine applicability. Based on EPA's screening tool:

- Closed landfills with less than 350,000 Mg of waste in place will not be subject to the rule.
- All other MSW landfills that received waste after 1/1/80 should conduct mathematical modeling to evaluate applicability. Landfills that generate approximately 270 scfm of LFG (at 50 percent methane) in 2010 per the rule's gas generation model will be subject to the rule.

MSW landfills with gas collection systems must use a second mathematical algorithm to estimate gas generation, and use whichever estimate is higher to determine if the rule applies. EPA's screening tool says a landfill collecting 900 metric tons of methane (about 185 scfm of LFG at 50 percent methane) will be subject to the rule, but those who collect gas (for any purpose) may wish to perform additional calculations.

For computing emissions, the rule requires use of a conservative 10 percent factor to account for methane oxidation as LFG crosses a landfill cover.

GCCS Monitoring Requirements

In addition to using the EPA model to estimate gas generation, landfills that have gas collection and control systems (GCCS) must perform an alternative estimate of collection efficiency and GHG emissions, and must commence specific gas monitoring requirements by January 1, including:

- Waste Disposal Amounts (Scalehouse)
- Continuous Gas Flow Monitoring
- Gas Flow Correction for Temperature, Pressure, and Moisture
- Methane Monitoring: Continuous or at least Weekly

The rule provides instructions for dealing with missing data points, and includes calibration requirements. Methane content must be measured using one of the following methods:

- EPA Method 18
- ASTM D1945-03 (GC)
- ASTM D1946-90 (GC)
- GPA Standard 2261-00 (GC)
- UOP539-97 (GC)
- EPA Method 25A or 25B (FID/IR)

If EPA Method 25A or 25B (which measure total hydrocarbons, not only methane) are used, landfills must perform an annual sampling event to determine a methane correction factor.

Gas flow rates must be measured using one of the following approved methods:

- ASME MFC-3M-2004 (orifice, nozzle and venturi)
- ASME MFC-4M-1986 (turbine meters)
- ASME MFC-6M-1998 (vortex flow meters)
- ASME MFC-7M-1987 (critical flow venture nozzles)
- ASME MFC-11M-2006 (coriolis mass flowmeters)
- ASME MFC-14M-2003 (small bore precision orifice meters)
- ASME MFC-18M-2001 (variable area meters)
- EPA Method 2A or 2D

The flow measurement must be corrected to standard conditions; thus pressure and temperature must be measured or incorporated by the flow meter. Flow and methane content must be measured on a consistent basis.

Many landfills with GCCS will be unable to comply with these requirements by January 1, due to the lead time required to install continuous flow measuring equipment and/or to arrange for at least weekly monitoring of

methane content. EPA will permit other "best available" monitoring techniques to be used on a temporary basis (until March 31, 2010), and may allow use of such techniques after March 31 if a facility requests and qualifies for an extension. However, requests for extensions are due to the Agency by January 28, 2010.

We anticipate that EPA will be issuing additional guidance in the coming weeks regarding monitoring equipment, and may permit use of other kinds of methane content and flow measurement devices.

Stationary Combustion Units

MSW landfills that are subject to the reporting rule must also report emission of various GHGs from stationary fuel combustion sources located at the facility, such as: boilers, combustion turbines, engines, incinerators, and process heaters. Emissions from flares and portable combustion sources are not included in this portion of the rule.

The rule requires quantification of methane, carbon dioxide, and nitrous oxide emissions from applicable sources. The rule includes separate requirements under the stationary combustion section for monitoring, testing, and reporting based on four "tiers" of sources. Generally, emissions from biomass (e.g., LFG) fueled sources and from other combustion sources at landfills will likely fall under the Tier 1 requirements.

Tier 1 will involve the use of default GHG emission factors and heating values for the fuel type. Fuel consumption rates must be monitored, and procedures must be documented to ensure the accuracy of the fuel volumes.

LFG to Energy (LFGE) Plants

Third-party LFGE facilities not under common control with the landfill may also be subject to the stationary combustion source portion of the rule if the aggregate heat input capacity (not actual flow rates) of their combustion units equals or exceeds 30 million Btu/hr, and they are dual-fueled with a traditional fossil fuel such as natural gas.

MSW Landfills Must Report

MSW landfills subject to the rule must report the following information, with the first reports due for calendar year 2010 by March 31, 2011:

- Landfill Operations (Open/closed/Year)
- Waste Disposal Calculations
- Waste Composition (If Available)
- Modeling Parameters Used
- Methane Data
- Landfill Area, Cover Types by Area, and Oxidation Fractions Used
- LFG Modeling Results
- Emissions from stationary combustion units.

Furthermore, if the MSW landfill facility has a GCCS, the following information must be reported:

- Flow of collected LFG
- Methane content of LFG
- Temperature and pressure data for LFG
- Description of control device(s) both on- and off-site
- Control device operating hours
- Description of GCCS, landfill areas and waste depths
- Computed methane volume captured
- Computed methane generated (corrected for oxidation using EPA model)
- Computed methane generated (corrected for oxidation using LFG recovery flow and collection efficiency)

- Methane Emissions, Method 1 (Modeling)
- Methane Emissions, Method 2 (Gas Captured and Estimated Collection Efficiency)

Key Dates

The rule requires development of a written GHG Monitoring Plan, monitoring beginning January 1, 2010, and reporting for the calendar year 2010 by March 31, 2011.

Affected facilities should determine if they might be subject to the rule and to plan accordingly—for many facilities, it will be too late to comply with the rule if steps are not taken before January 1 to begin appropriate monitoring, testing, and recordkeeping.

Other key dates include:

December 29, 2009: Effective date of the rule.

January 28, 2010: Deadline to request extension of grace period to use best available monitoring methods through calendar year 2010.

January 30, 2011: Deadline to designate authorized representative and alternate authorized representative for facility.

Resources

i) EPA Rule Website

ii) Is the Mandatory Greenhouse Gas Reporting Rule applicable to your facility?

iii) Information Sheets for Each of the Source Categories Covered in the Rule

iv) Mandatory Greenhouse Gas Reporting Rule Training Opportunities Offered by EPA

How SCS Can Help

We help facilities determine if they are subject to the mandatory GHG reporting rule, and if so, how to best prepare to comply with the rule.

For MSW landfills, we can run the EPA model algorithms for active and closed landfills, and help you evaluate whether an existing LFG GCCS should be retrofitted with new monitoring instruments or otherwise modified (or even abandoned) to facilitate compliance with the new rule. We can also develop the required GHG monitoring plans.

For LFGE facilities, we can assess whether your facility will be subject to the stationary combustion portion of the rule.

Our LFG practice is among the largest in the world, and includes study, design, construction, and operation, maintenance and monitoring capabilities. SCS also is an expert in GHG issues for landfills and developed one of the models used by EPA in this rule. We would be pleased to put this experience to work for you.

For more information contact:

Pat Sullivan, Senior Vice President

Mike McLaughlin, PE, Senior Vice President

Or contact your local SCS Engineers office.

http://www.scsengineers.com/