Last year, the U.S. Environmental Protection Agency (EPA) published the first federal regulation imposing permitting requirements for greenhouse gas (GHG) emissions from stationary sources of air emissions, such as landfills. This rule, known as the Tailoring Rule, requires applicable sources to comply with two programs created by the Clean Air Act: the Prevention of Significant Deterioration (PSD) permitting program for construction and expansion projects, and the Title V operating permit program.

Traditionally, the Title V and PSD programs have applied to stationary sources that emit regulated pollutants such as carbon monoxide, nitrogen oxides and sulfur oxides at rates of 100 tons per year (tpy) or 250 tpy, depending on the source. However, stationary sources such as production plants, farms and commercial buildings typically emit GHGs at much higher rates than other air pollutants. As such, if the above-mentioned threshold levels also applied to GHG emissions, tens of thousands of small facilities would get caught under the PSD permitting program and millions of facilities would become subject to Title V, EPA estimates.

EPA recognized that this would cause an overwhelming burden on small facilities, as well as on permitting authorities, and thus "tailored" the applicability criteria that determine which GHG emission sources are subject to permitting requirements (hence the name "Tailoring Rule").

FEATURE What the EPA's Tailoring Rule for greenhouse gases means to your landfill.

Tailoring Talk

The Tailoring Rule became effective on Jan. 2, 2011, and is being implemented in a three-step approach per the following schedule:

- Step 1: Jan. 2 – June 30, 2011
- Step 2: July 1, 2011 – June 30, 2013
- Step 3: Beginning July 1, 2013.

Step 1 (Jan. 2 – June 30, 2011)

Step 1 will not impose permitting requirements on a facility solely on the basis of its GHG emissions. During this phase, PSD requirements for GHG emissions will apply to new facility construction or facility modifications only if the site is a) already subject to PSD permitting for another pollutant and b) the construction or modification would produce at least 75,000 tpy of carbon dioxide-equivalent (CO_2e).

As for Title V, only those facilities otherwise subject to the program because of their emission of other pollutants are subject to the Tailoring Rule. These facilities must address GHGs if they apply for, renew or review a Title V permit during this period.

THREE IS THE MAGIC NUMBER: The EPA is implementing its Tailoring Rule in three phases. The first phase began in January of this year.

Step 2 (July 1, 2011 – June 30, 2013)

In Step 2, GHGs are effectively treated as any other pollutant regulated by the Clean Air Act and are more easily subject to PSD and Title V permitting requirements. In this phase, the construction of a new facility would trigger PSD requirements if the site has potential GHG emissions of 100,000 tpy of CO_2e.

Furthermore, the modification of an existing facility would trigger the requirements in the below scenarios:

- if the existing source has the potential to emit 100,000 tpy of CO_2e, and the modification would result in an increase of 75,000 tpy of CO_2e, or
- if the existing source has potential emissions of less than 100,000 tpy of CO_2e, and the modification would result in an increase of 100,000 tpy of CO_2e.

In this phase, all facilities subject to Title V permitting will be required to address GHGs when they apply for a new permit, a renewal or a permit modification. Furthermore, facilities with a potential to emit 100,000 tpy of CO_2e will now be required to obtain a Title V permit if they do not already have one and are not otherwise subject to the program.

Step 3 Begins July 1, 2013

The Tailoring Rule also commits EPA to conduct additional rulemaking that would apply PSD and Title V to more stationary sources. Under Step 3, EPA is required to complete this rulemaking by July 1, 2012, and the rule will take effect exactly one year later. Step 3 may lower the GHG thresholds for PSD or Title V applicability, but EPA has agreed that no new source or modification with the potential to emit less than 50,000 tpy of CO_2e will be subject to the permitting programs before April 30, 2016. This is to limit the administrative burden associated with the Tailoring Rule.

Best Available Control Technology

Sources subject to PSD permitting requirements under the Tailoring Rule will be required to implement Best Available Control Technology (BACT) to minimize GHG emissions. Under PSD, BACT is defined as "an emissions limitation [that] is based on the maximum degree of control that can be achieved." BACT is determined on a case-by-case basis, and considers energy, environmental and economic impacts. BACT can be emissions control equipment or a modification of a production process or method.

Sources that trigger PSD under the Tailoring Rule would need to evaluate BACT using EPA's long-standing, top-down approach. A top-down BACT analysis traditionally involves the following:

- Step 1: Identify all available control technologies.
- Step 2: Eliminate technically infeasible options.
- Step 3: Rank remaining options by emissions control effectiveness.
- Step 4: Evaluate economic, energy and other environmental impacts.
- Step 5: Select BACT.

As of press time, BACT for control of GHG emissions from municipal solid waste (MSW) landfills has not been established. However EPA reportedly is developing a GHG BACT White Paper for MSW landfills, which would provide guidance on controlling this newly regulated pollutant. EPA also has developed a guidance document on PSD and Title V permitting for GHGs that

includes an example of one possible BACT for MSW landfills. However, the MSW industry has been critical of this specific example and expects to further work with EPA to refine it in the coming months.

EPA may, at some point, establish presumptive BACT for GHG control from MSW landfills to streamline the PSD permitting process. However, this would require additional EPA review of information, and possibly further rulemaking and/or public review and is not likely to occur for several years.

All MSW landfills with a design capacity of 2.5 million megagrams and 2.5 million cubic meters are subject to the Title V permitting program. Additionally, some landfills that are not that large have emissions of a particular pollutant that exceed a Title V major source threshold. By adding GHGs to the mix, even smaller landfills could be subject to Title V.

Fugitive Emissions

MSW landfills typically emit uncollected methane (CH4) and CO2, and emit CO2 from the combustion of captured landfill gas (LFG) in flares, internal combustion engines, turbines, etc. Landfills also may produce CO2 emissions from the combustion of other fuels (diesel, natural gas, etc.) in boilers, generators and other stationary equipment located on site. Equipment such as dozers, compactors and garbage trucks typically are considered to be mobile sources and thus emissions from their engines would not be regulated under the stationary source permitting requirements.

Under the existing PSD program, fugitive emissions from MSW landfills are not counted when evaluating whether a facility is a major stationary source. Fugitive emissions only are counted when permitting a modification at an existing major stationary source (e.g., a landfill expansion at an existing major PSD facility), including cases where the proposed permitting project is a major source for something other than GHGs. The Tailoring Rule does not change this approach.

For MSW landfills, fugitive emissions also are not counted when evaluating whether a facility is subject to Title V permitting requirements. Again, the Tailoring Rule does not change this approach.

One critical issue is the definition of "fugitive" under the permitting programs. Fugitive emissions are defined as "those emissions [that] could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening." For MSW landfills, EPA has determined this to mean that LFG that cannot reasonably be collected is considered fugitive, while LFG that can reasonably be collected is not considered fugitive, even if it is not currently being collected.

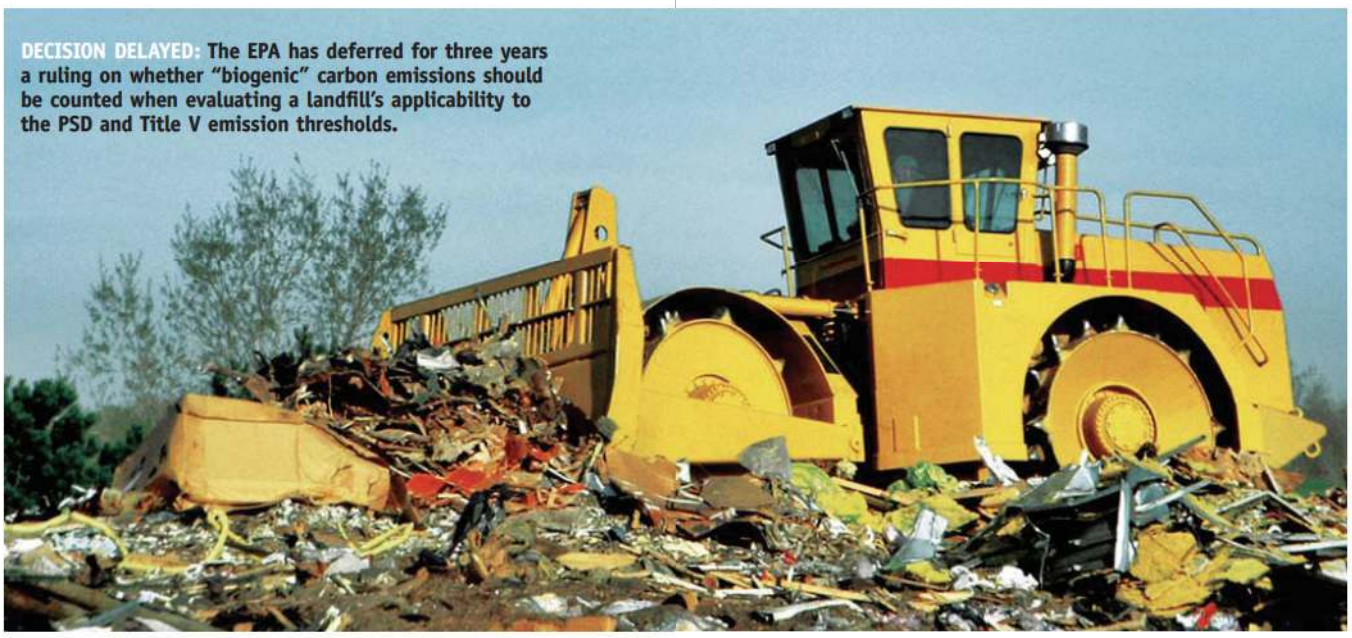
In effect, this essentially means that all uncollected LFG emitted from landfills with comprehensive LFG collection systems should be considered fugitive. However, landfills with poor or no gas collection systems could have a portion of their LFG emissions considered fugitive (and thus should not be counted under PSD/Title V) while the rest of their LFG emissions would be considered non-fugitive (and thus should be counted).

"Biogenic" Carbon

It is commonly agreed that the methane portion of LFG is "anthropogenic" (i.e., derived from human activities) while the carbon dioxide emitted from landfills is "biogenic" (i.e., natural). In the past, it has been generally accepted that "biogenic" carbon is excluded from GHG inventories, controls and reporting requirements on the basis that it is part of the overall carbon cycle and thus carbon neutral.

The Tailoring Rule, however, reflects a change in this approach in that it originally required that biogenic carbon — such as CO2 emissions from the combustion of LFG — be counted when evaluating a source's applicability to the various PSD and Title V emission thresholds. This could have potentially impacted the MSW landfill industry, in that CO2 emissions from LFG combustion as well as fugitive CO2 (where applicable) would need to be counted. This would represent a significant increase over "anthropogenic-only" MSW landfill emissions, which would include only methane emissions.

However, in response to public comments, on Jan. 12, 2011, EPA agreed to defer, for a three-year period, the inclusion of biogenic CO2 emissions in the PSD and Title V permitting programs. During this period, EPA plans to study the science associated with biogenic CO2 emissions and reconsider their inclusion under the Tailoring Rule. Therefore, at least for the time being, biogenic CO2 emissions (including CO2 in LFG and CO2 from LFG combustion) are not counted when evaluating an MSW landfill's applicability to the Tailoring Rule.



DECISION DELAYED: The EPA has deferred for three years a ruling on whether "biogenic" carbon emissions should be counted when evaluating a landfill's applicability to the PSD and Title V emission thresholds.

Impacts on MSW Landfills

So how will the Tailoring Rule impact MSW landfills and landfill gas-to-energy (LFGTE) projects? Tables 2 and 3 present summaries of typical LFG flow rates in cubic feet per minute (cfm) for combustion devices and uncollected LFG flows that would trigger the applicable thresholds.

TABLE 2: Typical Combustion Unit Flows that Trigger Tailoring Rule Thresholds (Assuming Biogenic CO2 is included)

Emission Threshold (tpy CO2e)	Flow (cfm)	LFGTE Plant Size Size (MW)
100,000	~3,500	~8 to 10
75,000	~2,500	~6 to 7.5

TABLE 3: Typical Uncollected/Non-Fugitive LFG Flows that Trigger Tailoring Rule Thresholds

Emission Threshold (tpy CO2e)	Flow With Biogenic CO2 Included (cfm)	Flow Without Biogenic CO2 Included (cfm)
100,000	~850	~1,000
75,000	~650	~750

The LFG flows in Table 2 are based on the assumption that biogenic CO2 is included in the emissions evaluation, which it very well may be after the three-year deferral period. Table 3 provides typical LFG flows that would trigger the thresholds under both scenarios (biogenic included/excluded).

If EPA ultimately determines that biogenic CO2 emissions should be excluded, LFG combustion units would be very unlikely to trigger the emission thresholds on their own because essentially only uncombusted methane and a small amount of nitrous oxide would be counted. In this scenario, only combustion units approximately 30,000 cfm or larger (assuming 98 percent methane destruction) would potentially trigger applicability to the Tailoring Rule.

Under the Title V permitting program, fugitive GHG emissions (e.g., fugitive LFG emissions) are not counted against the applicability threshold. Landfills with comprehensive gas collection systems likely will have minimal or no fugitive GHG emissions. Given EPA's interpretation of "fugitive" as it applies to MSW landfills, however, landfills with limited or no gas collection could have significant uncollected (non-fugitive) amounts of GHG emissions that would be counted for Title V applicability.

If biogenic CO2 emissions are not counted, then LFG combustion devices will contribute only very small amounts toward Title V eligibility. However, if after its three-year evaluation EPA determines that biogenic CO2 emissions should be included, then LFG combustion devices would contribute significantly toward eligibility. Though the flow rates associated with the thresholds in Table 2 are not particularly high, landfills at which devices this large would be permitted are likely to be large enough to already be subject to regulation under the Title V program.

Therefore, it seems likely that the Tailoring Rule will only expand the Title V permitting program to a limited number of MSW landfills that otherwise are not already subject to the program. The rule appears likely to impact only those smaller landfills (meaning a design capacity of less than 2.5 million megagrams and 2.5 million cubic meters) with limited or no gas collection and with uncollected (non-fugitive) LFG flows of around 1,000 cfm or more. Also, some landfill sites that don't trigger the threshold with uncollected LFG emissions alone could potentially trigger it if they also have significant GHG emissions from other sources on site (e.g., diesel engines, boilers).

One certain impact of the Tailoring Rule will be that landfills and LFGTE plants already subject to Title V will be required to address GHGs in new Title V permit applications, permit renewals and permit modifications.

PSD Impacts

As the rule is currently written, fugitive emissions only are included when evaluating PSD applicability for existing major facilities and are not considered for new sources or existing minor PSD facilities. Therefore, it is unlikely that the Tailoring Rule will result in PSD applying to many new landfills or landfill expansions with comprehensive gas collection unless the site already is an existing major source or triggers PSD for another pollutant.

PSD could apply, however, to new landfills and landfill expansions that do not feature comprehensive gas collection and that have potential uncollected (non-fugitive) LFG flows of around 1,000 cfm or more.

If EPA ultimately determines that biogenic emissions should be included, PSD applicability could expand to medium and larger-sized MSW landfills during the permitting of a new flare or LFGTE facility. For example, when counting biogenic emissions, a new flare rated at about 3,500 cfm at a landfill that is an existing minor PSD facility might trigger PSD requirements, and a new flare rated at about 2,500 cfm at an existing major PSD landfill might trigger PSD.

Furthermore, fees for PSD applications are typically much higher than for non-PSD applications, so the Tailoring Rule could result in increased permitting costs at some landfills. Finally, GHG BACT could also become a major impact to the site, resulting in additional costs for GHG emissions control.

In Closure

The Tailoring Rule represents the first federal permitting regulation of GHG emissions from landfills, and it comes on the heels of EPA's new Mandatory GHG Reporting Rule that took effect last year and that requires MSW landfills that generate 25,000 metric tons of CO2e to monitor and report GHG emissions.

As it stands now, the Tailoring Rule would require landfills with Title V permits to address GHG emissions in their permits, but it appears unlikely to bring many new landfills into the Title V program on the basis of GHG emissions alone since fugitive and biogenic emissions are not currently counted and since many landfills already are in the Title V program due to the Clean Air Act.

Also, sites with the greatest chance of triggering PSD (and thus BACT for GHGs) under the Tailoring Rule appear to include existing PSD major sources going for a landfill expansion and new landfills or expansions which trigger PSD for another pollutant [e.g., CO]. If EPA ultimately decides to include biogenic CO2 emissions under the rule, then PSD also could expand to apply to sites that are permitting a large LFGTE plant or LFG flare.

Stay tuned for further modifications or clarifications under the rule that could impact the MSW industry, such as lower applicability thresholds under Step 3 of the rule, reconsideration of the inclusion of biogenic and/or fugitive emissions under the rule, and the issuance of the BACT White Paper for MSW landfills. ■

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