

# NOT ANOTHER GREENHOUSE GAS REGULATION---THE IMPACT OF THE TAILORING RULE ON LANDFILLS

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## ABSTRACT

On June 3, 2010 (75 Federal Register [FR] 31514), the U.S. Environmental Protection Agency (EPA) published the first federal regulation to control greenhouse gas (GHG) emissions from stationary sources. This rule, known as the "Tailoring Rule," would require applicable stationary sources to comply with permitting requirements for GHGs under EPA's Prevention of Significant Deterioration (PSD) pre-construction permitting program. The Tailoring Rule would also require some stationary sources to obtain Title V air operating permits due to their GHG emissions.

The Tailoring Rule is the newest installment of federal GHG regulation. As with the Mandatory Reporting Rule (MRR) under 40 Code of Federal Regulations (CFR) Part 98, the Tailoring Rule is expected to have a disproportionate impact on municipal solid waste (MSW) landfills, particularly smaller sites not currently regulated under these permitting programs. Landfills already carry a burden of numerous facilities requiring Title V permits. The Tailoring Rule will increase the number of landfills requiring Title V permits beyond those currently regulated. Landfills will also be faced with impacts under the PSD permitting program, including the implementation of a landfill-specific best available control technology (BACT) standard. Landfill expansions and landfill gas (LFG) to energy (LFGTE) projects can trigger PSD review as a result of GHG emissions regulated by the Tailoring Rule.

This paper will review the Tailoring Rule in depth, including its specific requirements and impacts on the landfill industry. Title V and PSD permitting impacts on landfills are discussed as well as a summary of the ongoing issues the landfill industry, along with the Solid Waste Association of North America (SWANA), are trying to work out with EPA regarding the Tailoring Rule. Finally, the paper looks at the long-term effects the

Tailoring Rule will have on how landfills are regulated under the federal Clean Air Act (CAA), including state-implemented non-attainment New Source Review (NSR) programs and future modifications to the landfill New Source Performance Standards (NSPS), which could cause it to become more stringent and/or affect more landfills.

## REGULATORY BACKGROUND

Traditionally, the Title V and PSD permitting programs have applied to stationary sources that emit regulated pollutants (e.g., carbon monoxide [CO], nitrogen oxides [NOx], sulfur oxides [SOx], etc.) at levels of 100 tons per year (tpy) or 250 tpy. Landfills are regulated at the 250 tpy threshold for the existing regulated pollutants under PSD. Sources typically emit GHGs at much higher rates than other criteria pollutants. As such, if these current threshold levels were applied also to GHG emission rates, the EPA estimates that tens of thousands of small facilities and projects would get caught under the PSD permitting program, and that millions of facilities would become subject to Title V. The EPA recognizes 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 Title V and PSD permitting requirements (hence the name "Tailoring Rule").

### Pollutants Regulated

Under the Tailoring Rule, only those sources that have the potential to emit (PTE) GHGs at levels of 75,000 tpy or 100,000 tpy are subject to PSD and Title V. These thresholds apply to the aggregate sum of carbon dioxide-equivalents (CO<sub>2</sub>e) of six GHGs regulated by the Tailoring Rule. To be consistent with other CAA permitting programs, EPA is using short tons for the Tailoring Rule despite the fact that other GHG programs at the national and international level, including EPA's own MRR, use metric

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tons for GHGs. These GHGs and their global warming potentials (GWPs in CO<sub>2</sub>e)<sup>1</sup> are as follows:

- Carbon dioxide (CO<sub>2</sub>). GWP = 1 CO<sub>2</sub>e
- Methane (CH<sub>4</sub>). GWP = 21 CO<sub>2</sub>e
- Nitrous oxide (N<sub>2</sub>O). GWP = 310 CO<sub>2</sub>e
- Sulfur hexafluoride (SF<sub>6</sub>). GWP = 23,900 CO<sub>2</sub>e
- Hydrofluorocarbons (HFCs). GWP = varies
- Perfluorocarbons (PFCs). GWP = varies

#### **Landfill Emissions of GHG**

MSW landfills typically have emissions of uncollected CH<sub>4</sub> and CO<sub>2</sub> derived from LFG, and have emissions of CO<sub>2</sub> from the combustion of captured LFG in flares, internal combustion (IC) engines, turbines, etc. Landfills may also have CO<sub>2</sub> emissions from the combustion of other fuels (e.g., diesel, natural gas, etc.) in boilers, generators, and other stationary equipment located on site. Equipment such as dozers and compactors, as well as waste haul trucks, are typically considered to be mobile sources and thus emissions from their engines would not be regulated under these stationary source permitting requirements. Combustion units may also have limited emissions of uncombusted CH<sub>4</sub> or N<sub>2</sub>O.

#### **General PSD Requirements**

PSD is a Federal pre-construction permitting program that applies to new major stationary sources and major modifications, as defined under PSD, which are located in areas designated attainment or unclassifiable for a national ambient air quality standard (NAAQS). Non-attainment NSR is a pre-construction permitting program that applies in areas not in attainment of an NAAQS. Since there are no NAAQS established for CO<sub>2</sub> or any of the GHGs, PSD will apply in all areas of the U.S. Non-attainment NSR at the federal level will not regulate GHG emissions.

Sources subject to PSD permitting requirements under the Tailoring Rule will be required to implement BACT to minimize GHG emissions. Under PSD, BACT is defined as *"an emissions limitation which 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 control equipment or a modification of a production process or method. This could include fuel cleaning or treatment, or innovative combustion techniques. BACT could involve a design, equipment, work practice or operation standard in the event that an emission standard is infeasible.

In addition to requiring BACT, the PSD permitting program requires sources to analyze their impacts on ambient air quality to demonstrate that no violation of the NAAQS or the allowable PSD increments will occur. However, since the EPA has not established PSD increments or NAAQS for GHGs, these requirements, typically met through extensive air dispersion modeling, will not apply to GHG emissions at sources subject to PSD under the Tailoring Rule. For the same reason, ambient air monitoring commonly performed under PSD will not apply to GHGs.

#### **General Title V Requirements**

Title V is a federal air operating permit program that requires major stationary sources, as defined under Title V, or sources that are already specific subject to regulation under the CAA (e.g., NSPS), to obtain air operating permits. Title V permits generally do not add new control requirements, but rather incorporate all applicable requirements for the various emission units located at a source into one "umbrella" permit.

All MSW landfills subject to the NSPS promulgated under 40 CFR Part 60, Subpart WWW (§60.750-759) or federal or state Emission Guideline (EG) rules are subject to Title V permitting program. There may also be some landfills which are not large enough to trigger NSPS applicability (i.e., 2.5 million megagram [Mg] and 2.5 million cubic meter design capacity), but which have emissions of a particular pollutant that exceed a Title V major source threshold.

#### **Fugitive Emissions Issue**

Under the existing PSD permitting program, fugitive emissions from MSW landfills are not counted when evaluating whether a facility is a major stationary source. The Tailoring Rule does not change this approach. This means that fugitive GHG emissions (such as LFG) should not be counted when evaluating whether an existing source is a major stationary source.

This also means that fugitive GHG emissions are not counted when evaluating whether a new source is a major stationary source, or whether a modification of an existing minor source is a major modification. Under PSD, fugitive emissions are only counted when permitting a modification at an existing PSD major stationary source (e.g., a landfill expansion at an existing major PSD facility), including cases where the proposed permitting project is major for something other than GHGs. EPA tried to eliminate all counting of fugitives for PSD applicability, but the courts stayed any implementation of such a provision until October 31, 2011. It is hopeful that after this time period, EPA will follow through with its previous 2008 decision to exclude fugitive emissions from all consideration

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<sup>1</sup> See also 40 CFR Part 98, Subpart A, Table A-1.

For MSW landfills, under the existing Title V permitting program fugitive emissions are also not counted when evaluating whether a facility is a major source and is thus subject to Title V permitting requirements. Again, the Tailoring Rule does not change this approach. Therefore, fugitive landfill GHG emissions should not be counted when evaluating a site's emissions against the Title V applicability threshold.

One critical issue here is the definition of fugitive under PSD and Title V. Fugitive emissions are defined as *'those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.'* For MSW landfills, EPA has determined, as set forth in an October 21, 1994, policy memorandum, that this means LFG which cannot reasonably be collected is considered fugitive, while LFG which 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 LFG collection systems could have a portion of their LFG emissions considered fugitive (thus should not be counted under PSD/Title V as described above) while the rest of their LFG emissions would not be considered fugitive (thus should be counted). For landfills that are uncontrolled or under-controlled, the amount of uncollected LFG that is considered non-fugitive could be critical in determining applicability.

#### **Biogenic Carbon Issue**

It is commonly agreed that the methane fraction 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, and in existing GHG programs at the federal and international level, it has been generally accepted that "biogenic" carbon is excluded from GHG inventories, controls, and reporting requirements<sup>2</sup> 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 (e.g., CO<sub>2</sub> 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 a major way because CO<sub>2</sub> emissions from LFG combustion as well as fugitive CO<sub>2</sub>

(where applicable) might now need to be counted. This would represent a significant increase over "anthropogenic-only" MSW landfill emissions, which would only include only methane emissions.

However, in response to significant public comments, on January 12, 2011, the EPA agreed to defer, for a three-year period, the inclusion of biogenic CO<sub>2</sub> emissions in the PSD and Title V permitting programs. During this period, the EPA plans to study the science associated with biogenic CO<sub>2</sub> emissions and reconsider its inclusion under the Tailoring Rule. Therefore, at least for the time being, biogenic CO<sub>2</sub> emissions (including CO<sub>2</sub> in LFG and CO<sub>2</sub> from LFG combustion) are not counted when evaluating an MSW landfill's applicability to the Tailoring Rule. An official rulemaking on this issue is expected prior to July 1, 2011.

#### **TAILORING RULE**

##### **Implementation**

The Tailoring Rule became effective on January 2, 2011, and will be implemented in a 3-step approach per the following schedule:

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

**Step 1:** Step 1 will not impose permitting requirements on a facility solely on the basis of their GHG emissions. During this first phase of implementation, PSD requirements for GHG emissions will apply only for new source permits or permit modifications issued during this time, which trigger PSD for another pollutant (e.g., CO), and which result in a GHG-emission increase of 75,000 tpy CO<sub>2</sub>e. For the Title V permit program, only those facilities otherwise subject to Title V (i.e., not based on GHG emissions) 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.

**Step 2:** In Step 2, GHGs are effectively treated as any other regulated CAA pollutant and can trigger, by themselves, a source to be subject to PSD and Title V permitting requirements. During the second phase of implementation, sources would trigger PSD requirements for GHG emissions according to the scenarios outlined in Table 1.

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<sup>2</sup> For example, "biogenic" carbon is excluded from evaluating applicability under the EPA's MRR promulgated under 40 CFR Part 98.

**TABLE 1: PSD APPLICABILITY CRITERIA, IMPLEMENTATION STEP 2**

<b>New Sources</b>	<b>Modified Sources</b>
<b>PSD Applies if:</b> 1. The source is subject to PSD for another regulated PSD/NSR pollutant (e.g., CO) and the source has potential GHG emissions of 75,000 tpy CO <sub>2</sub> e. <b>OR</b> 2. The source has potential GHG emissions of 100,000 tpy CO <sub>2</sub> e.	<b>PSD Applies if:</b> 1. The modification is subject to PSD for another regulated NS/PSD pollutant (e.g., CO) and has an increase in GHG emissions of 75,000 tpy CO <sub>2</sub> e. <b>OR</b> 2. The existing source emits (PTE) 100,000 tpy CO <sub>2</sub> e and the modification results in an increase of 75,000 tpy CO <sub>2</sub> e. <b>OR</b> 3. The existing source has PTE less than 100,000 tpy CO <sub>2</sub> e and the modification results in an increase of 100,000 tpy CO <sub>2</sub> e.

For the Title V permit program, all facilities subject to Title V permitting are required to address GHGs when they apply for a new permit, a renewal, or a permit modification. Furthermore, facilities with a cumulative PTE for GHGs of 100,000 tpy CO<sub>2</sub>e would now be required to obtain a Title V permit if they do not already have one and are not otherwise subject to Title V.

**Step 3:** The Tailoring Rule also commits the EPA to conduct additional rulemaking that would apply PSD and Title V to additional sources under the third phase of implementation. Under Step 3, the EPA is required to complete this rulemaking by July 1, 2012, with the rule taking effect on July 1, 2013. Step 3 may or may not implement lower thresholds for PSD or Title V applicability. However, under the Tailoring Rule, the EPA has agreed that no new source or modification with PTE of GHG less than 50,000 tpy CO<sub>2</sub>e will be subject to PSD or Title V before April 30, 2016. This is to limit the administrative burden associated with the Tailoring Rule. Step 3 is likely where EPA will make their final decision on how biogenic emissions will be treated.

#### **Impacts on MSW Landfills**

So how will the Tailoring Rule impact MSW landfills and landfill gas utilization (LFGTE) projects? Tables 2 and 3 present summaries of typical LFG flow rates for combustion devices and uncollected LFG flows that would trigger the applicable thresholds. These are not

official regulatory thresholds; however, they can be used as a general gauge of applicability.

**TABLE 2: TYPICAL COMBUSTION UNIT FLOWS THAT TRIGGER TAILORING RULE THRESHOLDS (ASSUMING BIOGENIC CO<sub>2</sub> IS INCLUDED)**

<b>Emission Threshold (tpy CO<sub>2</sub>e)</b>	<b>Flow (cfm)</b>	<b>LFGE Plant Size (MW)</b>
100,000	~ 3,500	~ 8 to 10
75,000	~ 2,500	~6 to 7.5

**TABLE 3: TYPICAL UNCOLLECTED/FUGITIVE LFG FLOWS THAT TRIGGER TAILORING RULE THRESHOLDS**

<b>Emission Threshold (tpy CO<sub>2</sub>e)</b>	<b>Flow with Biogenic CO<sub>2</sub> included (cfm)</b>	<b>Flow without Biogenic CO<sub>2</sub> included (cfm)</b>
100,000	~850	~1,000
75,000	~650	~750

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

If the EPA determines that biogenic CO<sub>2</sub> emissions should be excluded (which is currently the case for at least three years during the EPA's evaluation), LFG combustion units would be very unlikely to trigger the emission thresholds on their own because essentially only uncombusted LFG methane and a small amount of N<sub>2</sub>O would be counted. For example, if biogenic CO<sub>2</sub> is excluded, only combustion units approximately 30,000 cubic feet per minute (cfm) or larger (assuming 98 percent methane destruction) would potentially trigger applicability to the Rule.

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

If biogenic CO<sub>2</sub> emissions are not counted, then LFG combustion devices will contribute only very small amounts of GHG emissions (e.g., uncombusted methane) toward determining Title V applicability. However, if after its three-year evaluation the EPA determines that biogenic CO<sub>2</sub> emissions should be included, then LFG combustion devices would contribute significant GHG emissions toward Title V applicability. Although 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 EPA's NSPS Subpart WWW (and thus the Title V program).

Therefore, it seems likely that the Tailoring Rule will generally only expand the Title V permitting program to a limited number of MSW landfills that otherwise are not subject to Title V. The rule appears likely to impact only those smaller landfills (< 2.5 million Mg and < 2.5 million cubic meters design capacity) 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 do not trigger the threshold with uncollected LFG emissions alone could potentially trigger if they also have significant GHG emissions from other stationary 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 the Title V permitting program will be required to address GHGs in new Title V permit applications, permit renewals, and permit modifications.

**Anticipated PSD Permitting Impacts:** As the rule is currently written, fugitive emissions are only included when evaluating PSD applicability for existing major PSD 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 is already an existing major PSD source or triggers PSD for another pollutant.

PSD could apply, however, to new landfills and landfill expansions which do not involve comprehensive gas collection and which have potential uncollected (non-fugitive) LFG flows of around 1,000 cfm or more. This is certainly possible for a currently uncontrolled landfill that undergoes a large expansion. As long as biogenic emissions are not counted, PSD will likely not be triggered for any LFG combustion projects, either flares or LFGTE facilities, as the non-CO<sub>2</sub> emissions would be minimal.

If the EPA ultimately determines that biogenic CO<sub>2</sub> 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 CO<sub>2</sub> 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. The same flow rates would apply to LFGTE projects. Further, if PSD is triggered for another pollutant (like CO), the same flare or LFGTE projects at about 2,500 cfm would trigger PSD for GHGs.

While landfills and LFGTE plants subject to PSD for GHGs would not need to do air modeling or ambient air monitoring, they *would* be required to implement BACT to minimize GHG emissions. Also, application 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.

#### **Landfill BACT**

Sources that trigger PSD under the Tailoring Rule would need to evaluate BACT using the 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.

At present, BACT for control of GHG emissions from MSW landfills has not been established. However the EPA is reportedly developing a GHG BACT "White Paper" for MSW landfills, which would provide guidance on controlling this newly regulated pollutant. The White Paper is expected to outline various control measures, including experimental ones, that delegated PSD permitting agencies (i.e., state and local air agencies) can use to assess the various technologies that should be considered as BACT. EPA has also developed a guidance document<sup>3</sup> on PSD and Title V permitting for GHGs that includes an example of one possible BACT evaluation 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. The draft BACT example appears to suggest that LFGTE technologies may be required to be considered as

<sup>3</sup> PSD and Title V Permitting Guidance for Greenhouse Gases (EPA-HQ-OAR-2010-0841-0001), available at [www.epa.gov/regulations/guidance/byoffice-oar.html](http://www.epa.gov/regulations/guidance/byoffice-oar.html).

BACT in lieu of flaring of the gas. This is inconsistent with current BACT policies for other criteria pollutants which do not require switching to a different combustion technology. Further, such a BACT determination would actually increase emissions of other regulated pollutants (e.g., CO and NOx) and would significantly increase the cost to control the same amount of methane through combustion. These, and other issues, must be resolved before the MSW industry can support a BACT determination for landfill-derived GHGs.

The 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.

## **SUMMARY**

The Tailoring Rule represents the first federal permitting regulation of GHG emissions from landfills, and comes on the heels of the EPA's new mandatory GHG reporting rule (MRR), which requires MSW landfills that generate 25,000 metric tons of CO<sub>2</sub>e to monitor and report GHG emissions beginning in 2010, with the first reports due March 31, 2011.

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

Also, sites with the greatest chance of triggering PSD (and thus BACT for GHGs) under the Tailoring Rule appear to include: (1) existing PSD major sources going for a landfill expansion and (2) new landfills or expansions which trigger PSD for another pollutant [e.g., CO]. If the EPA ultimately decides to include biogenic CO<sub>2</sub> emissions under the Rule, then PSD could also expand to apply to sites that are permitting a large LFGTE plant or LFG flare.

## **FUTURE DEVELOPMENTS**

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, and the issuance of the BACT White Paper for MSW landfills. In addition, it is important to understand how each state or local air agency will implement these requirements. Some agencies do not have delegation of PSD programs; therefore, the PSD portion of the Tailoring Rule would be implemented by the EPA region. Other agencies have their own versions of PSD that include fugitive emissions and/or have different criteria for implementing the rule, which may or may not apply to GHG PSD program. Various state and local authorities do not have the proper jurisdiction to implement GHG PSD, and EPA issued a series of rulemakings in December 2010 to ensure that such agencies will develop the necessary PSD program elements. Otherwise, they will be subject to a federal version of the rule to be implemented by EPA. Finally, there are several bills being considered in Congress to delay or eliminate the Tailoring Rule; however, the Obama Administration has threatened veto of any such legislation, and it is unclear if there are enough votes in Congress to override a veto. As such, there are still several open issues yet to be decided, and it is critical to keep abreast of these developments as they occur.