

THE CONFUSING MAZE OF STATE AND FEDERAL MANDATORY GREENHOUSE GAS REPORTING PROGRAMS

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ABSTRACT

With the implementation of Federal Mandatory Greenhouse Gas (GHG) Reporting in 2010, landfill owners in some states have found themselves subject to multiple GHG reporting regulations, both from a state and now federal level, and in some cases, even at the local level. Landfill owners and operators, some of which have also voluntarily reported GHG emissions to a registry body, could have an additional level of reporting, beyond the mandatory reporting.

This paper will review the Federal Mandatory Reporting requirements for landfills subject to mandatory reporting under 40 Code of Federal Regulations (CFR), Part 98, Subpart HH, including the use of applicability tools and thresholds, as well as reporting and monitoring requirements for those landfills subject to reporting.

In addition, the paper will highlight the requirements of select state-level mandatory GHG reporting regulations, focusing on their unique requirements and reporting thresholds. This paper will include points of overlap; areas where requirements, either federal or state, may be more stringent; as well as identification of additional sources that would be covered under either the state- or federal-level programs. These state and federal programs will also be contrasted to the primary voluntary registry in the United States (U.S.), The Climate Registry (TCR).

BACKGROUND/HISTORY

Over the last 10 years, GHG has come to the forefront of the environmental movement. The United Nation's Intergovernmental Panel on Climate Change (IPCC) has indicated that a concerted and coordinated effort must be made to limit the effects of global warming. Approximately 22 percent of the world's GHG emissions originate in the U.S.. The United Nations Framework Convention on Climate Change (UNFCCC) has aimed at combating global warming with the goal of achieving "stabilization of GHG concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC, 2005).

The Kyoto Protocol established the following six substances as recognized GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Of these six gases, anthropogenic CH₄ from landfill gas (LFG) is the driver that brings landfills to the forefront of federal climate change legislation and regulation.

The U.S. Environmental Protection Agency (EPA) promulgated GHG reporting rules under 40 CFR, Part 98 on October 30, 2009. The Mandatory Reporting Rule (MRR) includes reporting requirements for 30 industrial sectors, including solid waste landfills in Subpart HH. Landfills will also be subject to parts of Subpart C, the general stationary combustion section of the regulation. On January 21, 2010, and June 30, 2010, the EPA released Frequently Asked Questions (FAQ) about Subpart HH of the MRR, and on May 27, 2010, the EPA released technical corrections to the MRR. The FAQ are now available in a searchable tool on the EPA website. The FAQ and technical corrections did not substantially change the reporting requirements of the Federal MRR for landfills but they addressed several common practices such as the use of portable CH₄ meters and the estimation and measurement techniques of municipal solid waste (MSW) quantities from passenger vehicles. The Federal MRR includes monitoring requirements that are likely to exceed the existing monitoring at most solid waste landfills, even those already subject to Title V permitting or the New Source Performance Standards (NSPS) under 40 CFR Part 60, Subpart WWW.

Several states have also instituted mandatory GHG reporting rules or are currently developing their own reporting rules, including Massachusetts, California, and Washington. Other states such as New York, Florida, and others have required GHG sources to report using a registry such as the California Climate Action Reserve (CCAR), TCR, or the Regional Greenhouse Gas Initiative (RGGI). The requirements of state programs vary widely. Further, many states and local air districts are requiring landfills subject to Title V permits to report their GHG emissions along with other emissions. Landfills will not be required to report in states where reporting thresholds

are based solely on electrical generation thresholds that exceed small-scale LFG to energy (LFGTE) projects such as the reporting requirements in Florida, but some reporting rules, such as California's, require reporting by all stationary combustion sources over the threshold, including LFG flares and engines.

FEDERAL MANDATORY REPORTING RULE BACKGROUND

The final Federal MRR was signed on September 22, 2009, and was published as 40 CFR Parts 86, 87, 89, et al., "Mandatory Reporting of Greenhouse Gas; Final Rule," on October 30, 2009. The Federal MRR affects GHG sources with over 25,000 metric tons CO₂ equivalent (MTCO₂e) emissions. In addition to the 25,000 MTCO₂e reporting requirement, the rule includes reporting for 31 source categories, including landfills. Calendar year 2010 is the first year of reporting under the EPA MRR, and the first official reporting deadline is March 31, 2011. From January 1 through March 31, 2010, facilities were allowed to use best available measures for reporting. If the facility could demonstrate that the equipment required to meet the monitoring requirements of the Federal MRR could not be reasonably obtained by April 1, 2010, the facility could seek an extension to allow the continued use of best available measures up to December 31, 2010. The rule will be treated like any other Clean Air Act (CAA) program with self reporting and fines for non-compliance. Verification by a third party will not be required under the Federal MRR.

Subpart HH triggers new monitoring requirements at applicable landfill facilities. Requirements include continuous monitoring of CH₄, LFG flow, pressure, moisture content, and/or temperature or weekly testing. When calculating fugitive emissions from LFG, the EPA/IPCC method and site-specific information are required. In addition to these new monitoring requirements, a monitoring plan is also required. Small and closed landfills are likely to be subject to the EPA MRR due to the low threshold and the fact that applicability is based on CH₄ generation, not CH₄ emissions. Additional monitoring and reporting can be expensive for facilities that do not otherwise require extensive monitoring or have the required monitoring equipment in place.

It is expected that 2,551 MSW landfills will be affected by the EPA MRR out of the 10,000 facilities that are expected to report (EPA Office of Air and Radiation, 2009).

Federal MRR Applicability

The regulation requires the reporting of GHG emissions from all sectors of the economy in the U.S. The rule

requires that specific industries and source categories report, along with any facility that emits 25,000 MTCO₂e from stationary combustion in 2010 or after. Depending on which category trips the reporting requirement, the required gases to report may vary from the six internationally recognized GHGs from the Kyoto Protocol and other fluorinated gases, including nitrogen trifluoride (NF₃) and hydrofluorinated ethers (HFEs). The rule does not require control or destruction of GHGs; however, it requires only that sources above certain threshold levels monitor and report emissions.

Landfills are categorically addressed under 40 CFR Part 98, Subpart HH. Landfills accepting only hazardous waste, industrial waste, and construction and demolition wastes do not need to report; however, a new standard for industrial waste landfills was signed on June 28, 2010. MSW landfills which accepted waste after 1980 and generate over 25,000 MTCO₂e, must report CH₄ generation and emissions from landfills, CH₄ destruction resulting from LFG collection and combustion systems, and CO₂, CH₄, and N₂O from all regulated general stationary fuel combustion sources. The 25,000 MTCO₂e generation threshold equates to landfills that generate approximately 270 standard cubic feet per minute (scfm) of collected LFG at 50% CH₄, though site specific analysis is necessary to confirm applicability.

In the FAQ, the EPA clarified that landfills are subject to the rule if they exceed 25,000 MTCO₂e of CH₄ generation as calculated based on either LFG recovery or modeled CH₄ generation. The FAQ further clarified that a "facility" required to report under the rule was any contiguous physical property or adjacent properties separated only by a public right of way under common ownership or common control. Thus, a landfill adjacent to a wastewater treatment plant, with both under a common local government, would be considered a single facility for purposes of reporting and that facility could be required to report its emissions based on the GHG emissions of all operations. Similarly, a LFGTE facility on property, surrounded by the landfill but independently owned and operated, would be a separate facility for purposes of reporting GHG under the Federal MRR.

A facility subject to the Federal MRR is required to report all GHG emissions from sources included in 40 CFR Part 98, including stationary combustion of fossil fuels other than LFG, such as natural gas used for comfort heating or supplemental fuel.

Landfills can stop reporting under the Federal MRR when the facility generates less than 25,000 MTCO₂e for five consecutive years or less than 15,000 MTCO₂e for three consecutive years.

Determining Applicability

All landfills should evaluate applicability based on modeled CH₄ generation using equations HH-1-3, HH-5, and HH-6, a first order decay model. The model is similar to the EPA's LFG Emission Model (LandGEM) used for NSPS and other reporting. The Federal MRR specifies appropriate values for the decay rate (k) and CH₄ generation potential (L₀). The EPA released a tool to help determine the applicability of the Federal MRR without the use of a more complicated model; however, the EPA states that "The applicability tool and its contents do not constitute rulemaking or a decision by EPA....Use of this tool does not constitute an assessment by EPA of the applicability of the rule to any particular facility. In any particular case, EPA will make its assessment by applying the law and regulations to the specific facts of the case."

Facilities with active LFG collection systems must also calculate CH₄ generation using equations HH-4 and HH-7, which use the measured LFG collection, CH₄ concentration, collection efficiency, and CH₄ oxidation rate in landfill cover to calculate CH₄ generation. Site specific cover parameters can be used when determining the collection efficiency of the facility.

If the CH₄ generation calculated using either of these methods is determined to be greater than the 25,000 MTCO₂e threshold, the facility is required to report under the Federal MRR. It is possible for these two calculated CH₄ generation rates to be significantly different, especially in very dry or very wet climates or when unusual waste handling practices (e.g. bailing) are used.

Schedule

Data collection requirements for facilities subject to the federal MRR began on January 1, 2010. For the first three months, facilities were allowed to use best available methods for collecting the necessary data. During this period, the data collection was not subject to the metering, measurement frequency, calibration, and other requirements. This initial period has expired for all facilities except those that were granted an extension, which must have been requested by January 29, 2010. The extensions expire no later than December 31, 2010. Reporting of GHG emissions for 2010, the first reporting year, will be due on March 31, 2011.

Monitoring and Reporting Requirements

The Federal MRR requires the monitoring and reporting of the parameters used to calculate GHG emissions. The facility is also required to create and maintain a GHG Monitoring Plan, which includes identification of the personnel responsible for collecting the emissions data, the processes used to collect the data, and quality assurance/quality control (QA/QC) procedures used to

insure the data are accurate. The Monitoring Plan was to be in place at all facilities subject to the Federal MRR no later than April 1, 2010. All facilities required to report under the Federal MRR must monitor and report the mass of waste landfilled, the operational status of the landfill, the modeling parameters, the LFG modeling results, and the waste composition if composition data were used.

Sites with an active gas collection and control system (GCCS) have additional reporting requirements under the Federal MRR. While many facilities with a GCCS already monitor some of these parameters, the Federal MRR specifies instrument requirements, monitoring frequency, and calibration requirements, some of which may be new or different. Table 1 summarizes the additional landfill parameters that must be monitored and reported along with their minimum measurement frequency and the minimum calibration frequency.

TABLE 1 – LANDFILL AND LFG PARAMETERS TO BE MONITORED UNDER FEDERAL MRR

| Monitoring Parameter | Measurement Frequency | Calibration Frequency |
|-----------------------------------|------------------------------|------------------------------|
| LFG Flow | Continuous | Biennial ¹ |
| CH ₄ Content | Weekly | Annual ¹ |
| Moisture Content ² | Weekly | Per Manufacturer |
| Cover Type ³ | Annually | N/A |
| LFG Temperature ⁴ | Weekly | Per Manufacturer |
| LFG Pressure ⁴ | Weekly | Per Manufacturer |
| NMOC Correction Factor | Annually | N/A |
| Destruction Device Operating Time | Annually | N/A |
| GCCS Operating Time | Annually | N/A |

¹Or per manufacturer, whichever is more frequent.

²Not required if CH₄ measurements are done on the same wet/dry basis as volumetric flow.

³If site-specific cover parameters are used.

⁴Not required if LFG flow rate is corrected for temperature and pressure by flow meter

In the EPA's FAQ for Subpart HH, the EPA indicated that portable meters, including the Landtec GEM series, can be used to meet the requirements of the CH₄ content monitoring. Similarly, portable devices can be used for temperature, pressure, and moisture content monitoring, if required, if the portable devices meet the accuracy and calibration requirements of the regulation. In the technical corrections, the EPA provided methodologies for estimating the weight of small loads that did not require

small vehicles to use commercial truck scales in order to obtain the annual refuse disposal needed for GHG calculations.

In addition to the landfill and LFG monitoring requirements, the facility must document any other parameters used to report using general stationary combustion emissions required under Subpart C of the Federal MRR. Frequently these fuels can be reported using billing data and Tier 1 emission factors included in the regulation.

Updates from May 2010 Technical Corrections

The EPA revised Subpart HH of the Federal MRR on May 27, 2010, which the EPA characterized as “technical corrections” that it did not expect to significantly change the reporting requirements for landfills.

The regulation now specifically excludes passive LFG collection systems, systems where LFG flows to the surface of the landfill through an opening or pipe naturally, from the definition of a GCCS. The technical corrections also refined the definition of a dedicated construction and demolition landfill and added a definition of the working capacity.

The technical correction also addressed common practices for the estimating the weight of waste from passenger and light trucks. The regulation now explicitly states that passenger vehicles and light trucks are not required to use scales; instead, three alternatives were provided. The methods include determining the mass of the waste on a combined basis rather than by vehicle, determining the representative weight of the vehicles by weighing at least five vehicles after it has unloaded the waste, or determining the working capacity of each type of vehicle. The method used to determine the mass of waste from small vehicles and light trucks must be specified in the Monitoring Plan.

The technical changes also included a change in annual calculations for leap years, to address the extra day, explicitly allowed the use of cumulative volumetric flow of LFG. The changes also removed the moisture content measurement requirement when the CH₄ content and volumetric flow measurements were both made on the same wet or dry basis. The EPA also defined how weekly measurements of CH₄ concentration should be taken “once each calendar week, with at least three days between measurements.” The EPA had previously addressed the CH₄ sampling frequency in its FAQ. The technical correction also required that the annual sample collected for the non-CH₄ organic compound (NMOC) correction factor determination must be collected at the routine sampling location.

The EPA removed the requirement that gas flow meters be calibrated before the first year of reporting, 2010, if the meter was on schedule for calibration per the manufacturer.

The technical correction added a requirement that the facility report whether it had used leachate recirculation within the past 10 years and the typical frequency of the use of leachate recirculation. Sites are also required to report whether scales are present at the facility. Facilities are also required to report whether passive vents or passive flares are present on the site.

Sites are no longer required to report the oxidation fraction of CH₄ in the landfill cover and the cover data used to calculate the oxidation. Because the regulation requires that an oxidation rate of 10 percent be used for all facilities, these data were redundant.

The technical corrections now allow facilities that recirculate leachate to calculate the amount of rainfall plus leachate to determine the k value to use in modeling. Previously, all landfills with leachate recirculation were required to use the highest k value, even if the recirculated leachate was only equal to a few inches of annual rainfall. The technical corrections also require areas of landfills with final cover that is less than three feet of clay to use the intermediate cover collection efficiency.

These technical corrections will not significantly impact the requirements of the Federal MRR, but sites should be sure their Monitoring Plans address the changes.

Recordkeeping

Recordkeeping requirements are found in Section 98.3(g) of the Federal MRR. Records must be retained for at least three years and may be maintained in either as a hard copy or as electronic data. Retained records must include a list of all units and activities for which GHG emissions were calculated, data used for calculations, the annual GHG reports, missing data computations, and the facility’s Monitoring Plan.

STATE RULES OVERVIEW

In the absence of a federal action on GHG emissions, several states have instituted their own GHG reporting programs. Even after the recently promulgated Federal MRR, some states continue to develop their own reporting rules. This paper will examine the existing reporting programs in California, Massachusetts, and the program in development by Washington.

California Mandatory Reporting Rule Background

Governor Arnold Schwarzenegger signed the California Global Warming Act of 2006 (Assembly Bill [AB] 32); Stats. 2006, Chapter 488), on September 27, 2006. The California Legislature declared that global warming poses a serious threat to economic well-being, public health, natural resources, and the environment of California. This is the first legislation of its kind, a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reduction of GHGs. AB32 mandates that California reduce its GHG emissions to 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The regulation requires a statewide cap on GHG emissions, starting in 2012. The California Air Resource Board (CARB) is responsible for establishing a mandatory reporting system, early action measures, and cap and trade programs. As part of AB23, CARB requires the reporting of GHG emissions under a state program. Unlike the Federal MRR, the California program requires the verification of reported emissions by third-party verifiers.

CARB has indicated that it will be revising the reporting rule to bring reporting and monitoring requirements more in line with the Federal MRR, but no draft changes have been released. Facilities are required to report under the existing rule, as well as the Federal MMR.

California Mandatory Reporting Rule Applicability:

Landfills are not categorically regulated under the Mandatory GHG Reporting Rule, but may fall under the general stationary combustion facility reporting threshold of 25,000 MTCO₂e per year from combustion or the electric generating facilities threshold of a total facility nameplate generation capacity of 1 Megawatt (MW) and combustion emissions greater than 2,500 MTCO₂e per year. Pass-through CO₂ is not considered when determining whether a facility is required to report. However, combustion emissions from biomass (i.e. biogenic CO₂), such as LFG, is included in the calculation to determine if a facility is mandated to report. Many California LFGTE and waste-to-energy projects are required to report under AB32 due to the low threshold for electrical generators. Once a facility is subject the regulation, all stationary combustion sources at a facility must be reported.

Similar to the Federal MMR, the California program requires that a Monitoring Program, but the requirements of the Monitoring Program are not specified in detail as they are in the Monitoring Plan required under the Federal MMR.

The 25,000 MTCO₂e threshold for general combustion is equivalent to approximately 1,700 scfm at 50 percent CH₄ of LFG combusted, which is significantly higher than the

270 scfm LFG generation rate that triggers the Federal MRR, and it is based on actual CH₄ combustion, not modeled emissions. Facilities with power generation will exceed the 2,500 MTCO₂e threshold which is approximately 170 scfm of LFG, less than the federal threshold except for small microturbine projects.

Facilities reporting under the general stationary combustion category are no longer required to report after three consecutive years of GHG emissions less than 20,000 MTCO₂e, and facilities with electric generation capacity over 1 MW are no longer required to report after three consecutive years with GHG emissions less than 2,000 MTCO₂e. If the facilities later meet the 25,000 MTCO₂e or 2,500 MTCO₂e thresholds that trigger the reporting requirement, they would be required to report again.

Determining Applicability: Unlike the Federal MRR, the California program threshold is based on actual combustion emissions rather than CH₄ generation and/or nameplate capacity. As a result, evaluating the applicability of the Federal MRR and the California program should be treated as independent processes. The combustion threshold in the California program does not require modeling, so no tools are required to determine applicability. Instead, CARB has calculated and published the amount of fuels that would trigger the California program as an appendix to the regulation.

Schedule: Reporting under the California program began with the reporting of 2008 GHG emissions in 2009. This first year of data did not require verification, but all subsequent years will. Submission of 2009 emissions was due on April 1, 2010 for most facilities, including all landfills. Verification of the 2009 submissions is underway.

Monitoring, Reporting, and Recordkeeping

Requirements: The California program requires that general stationary combustion facilities and electrical generation facilities subject to the rule report CO₂, CH₄, and N₂O emissions. Generation facilities are also required to report SF₆, PFC, and HFC associated with power generation, but these gasses are not typically present on LFGTE facilities. Facilities are also required to report fuel consumption by type and that fuel's high heating value (HHV) or carbon content by type, and LFGTE plants must sample for these parameters monthly. General stationary combustion facilities are also required to report their electrical purchases, while electrical generators are required to report their electrical generation.

The monitoring requirements in the California program are less specific than those in the Federal MRR. The accuracy

requirement in the California Code of Regulations (CCR), Title 17, §95103(a)(9), requires that “data measurements (mass or volume flow) used to calculate GHG emissions that quantify fuel use with an accuracy within ±5 percent. All fuel use measurement devices shall be maintained and calibrated in a manner and at a frequency required to maintain this level of accuracy.” While the calibration requirements are less specific than the Federal MRR, the accuracy and calibration of the meters is subject to verification. The California program also requires the capture of 80 percent of the data required for reporting, which allows for some equipment downtime.

California program recordkeeping requirements are found in §95105. Records used for reporting under the California program must be retained for five years, which is longer than the Federal MRR retention requirement of three years. The records must also be made available during the verification process.

Massachusetts Mandatory Reporting Rule Background

Massachusetts joined the RGGI on January 18, 2007, joining six other states in a regional GHG reporting and trading program. Since Massachusetts joined RGGI, three other states have joined RGGI bringing the total the ten states. Some facilities in RGGI member states are required to report GHG emissions, but those reporting requirements are based on nameplate electrical generation capacity. The generation threshold is 25 MW, so landfills are not likely to be subject to RGGI reporting requirements.

The Massachusetts legislature passed the Global Warming Solutions Act, which was approved by Governor Deval Patrick on August 7, 2008. The Global Warming Solution Act required that the Massachusetts Department of Environmental Protection (MDEP) pass regulations requiring that facilities emitting more than 5,000 short tons of CO₂ equivalent (STCO_{2e}) or with a Title V permit to report their GHG emissions to the MDEP. In December, 2008, MDEP promulgated the new reporting regulation as 310 Code of Massachusetts Regulation (CMR) 7.71, which was amended in March, 2009. Even small landfills are likely to be subject to the GHG reporting required by the Global Warming Solutions Act due to the low reporting threshold.

Massachusetts Mandatory Reporting Rule Applicability:

Title V facilities and facilities with GHG emissions greater than 5,000 STCO_{2e} are subject to the Massachusetts program. Landfills are not categorically required to report GHG emissions, but many landfills will be subject to the program because they have emissions over the reporting threshold or have Title V permits due to

NSPS status. It is expected that most landfills with Title V permits will have emissions greater than 5,000 STCO_{2e}.

Determining Applicability: All facilities in the Title V program are required to report GHG emissions. For facilities without a Title V permit, determining applicability is more ambiguous. The Massachusetts program does not prescribe how landfill emissions should be quantified, but fugitive emissions of CH₄ and CO₂ from the landfill are to be included in emission calculations and therefore in determining applicability.

Schedule: All facilities subject to the Massachusetts MRR were to have registered with the MDEP by April 15, 2009. All those facilities are to report their GHG emissions during the previous calendar year to the MDEP by April 15 each year starting in 2010. Reporting facilities are then subject to a triennial verification by a verification body accredited by either TCR or the American National Standards Institute (ANSI). The verification schedule is staggered over three years, with facilities emitting 25,000 short tons of CO₂ requiring verification by December 2011, facilities emitting 10,000 STCO_{2e} but less than 25,000 short tons of CO₂ requiring verification by December 31, 2012, and any facility below those thresholds requiring verification by December 31, 2013. Verification would be required triennially after the initial verification.

Monitoring, Reporting, and Recordkeeping Requirements:

GHG emissions are reported to the MDEP using the TCR’s General Reporting Protocol (GRP), but MDEP requires reporting at the facility level rather than the entity level. TCR does not have methodologies approved for landfills, but landfill emissions are included in the TCR Local Government Operations (LGO) Protocol. Landfills that are part of a LGO may be required to report using the LGO protocol. Emissions from private landfills can be reported using any verifiable methodology. Some potential GHG emission calculation methodologies include the Solid Waste Industry for Climate Solutions (SWICS) methodology, the Federal MRR methodology, the International Council for Local Environmental Initiatives Local Governments for Sustainability (ICLEI) methodology, LGO methodology, or others. The Massachusetts program does not detail what parameters must be monitored and retained, but the documentation must be sufficient to satisfy the verifier.

The Massachusetts program requires the reporting of GHG emissions from mobile sources associated with a facility, which are not required by the Federal MRR or AB32 in California. Landfills are likely to have several mobile sources at the facility, such as compactors, forklifts, tipplers, and other equipment.

Facilities are required to monitor and retain records used to report GHG emissions for five years by 310 CMR 7.71(6), which exceeds the federal retention period of three years.

Washington Mandatory Reporting Rule Background

Washington is currently developing a state GHG reporting program. The regulation began as House Bill 2815, which required the reporting of GHG emissions in 2010. A draft of the program was released October 7, 2009, less than a month after the federal MRR was signed. The initially proposed rule included methodologies for several source categories that were included in the Federal MRR. The Washington Department of Ecology (Ecology) sponsored legislation to align the Washington program requirements with Federal MRR requirements, which was signed into law by Governor Chris Grigore on March 19, 2010. The proposed rule making order was issued May 18, 2010. The most recent revised draft regulation was released June 30, 2010. The revised version of the Washington MRR incorporates much of the Federal MRR by reference. One major difference between the Federal MRR and the Washington MRR is the reporting threshold; the Washington MRR uses a GHG emission threshold of 10,000 MTCO₂e.

Washington Mandatory Reporting Rule Applicability: Because it includes the Federal MRR by reference, the Washington program would categorically require landfills, including industrial landfills, to report GHG emissions if their emissions are over 10,000 MTCO₂e.

Determining Applicability: Like the Federal MRR, the Washington program would require landfills to evaluate GHG emissions based on both modeling and LFG collection. The Washington program would include the biogenic CO₂ from combustion of CH₄ in the threshold for determining the applicability of the rule. The lower reporting threshold of 10,000 MTCO₂e and the inclusion of CO₂ from combustion of CH₄ will result in more landfills being included in the GHG reporting program. The Washington program will require landfills with approximately 115 scfm of captured LFG at 50 percent CH₄ to report under the rule.

Schedule: The Washington program is currently in draft, and Ecology has been holding stakeholder meetings. The revised rule would require reporting of GHG emissions starting in 2012. The reporting schedule for the Washington program would be the same as under the Federal MRR for facilities subject to both rules. For facilities subject to only the Washington MRR, GHG reporting would be due on October 31 each year, starting in 2012.

Monitoring, Reporting, and Recordkeeping Requirements: The monitoring, reporting, and recordkeeping requirements under the Washington MRR are found in Washington Administrative Code (WAC) 173-441-050 and are modeled after the Federal MRR.

VOLUNTARY REPORTING

In addition to the Federal MRR and potential state MRRs, landfills may report to a voluntary GHG emission registry. One of the early major voluntary registries, the CCAR is in its final year and reporters will be transitioning to TCR, a registry intended to succeed the CCAR and serve most of North America.

Reporting to TCR is voluntary, though some states have elected to use the TCR reporting protocol and its Climate Information Registry System (CRIS) as part of a state program. As a voluntary reporting system, there is no threshold of applicability for TCR. Entities of any size can report to TCR.

Members are expected to report emissions and have them verified annually. All reporters are required to report stationary combustion emissions, emissions from purchased utilities, combustion emissions from mobile equipment, HFC, PFC, and SF₆ emissions. However, TCR does allow for reporters to omit some of these categories from the scope of their reported emissions during a transitional period limited to the first two years of reporting.

There are no TCR requirements specific to landfills, though the SWICS methodology has been accepted for quantifying emissions from privately-owned landfills, and landfill emissions are included under the TCR LGO Protocol. The LGO protocol is required for government-owned landfills reported as part of local governments reporting to TCR. Any data collected as part of a federal or state reporting programs could potentially be used to report emissions to TCR, but reporting under TCR is likely to require additional data such as mobile sources or fugitive refrigerants from vehicle and office air conditioning units. TCR does not require specific monitoring and calibration requirements like the Federal MRR. Instead, the reported emissions must be verified by a body accredited by ANSI in accordance with TCR's GRP and General Verification Protocol (GVP).

SUMMARY

Landfills are finding themselves subject to both state and federal mandatory GHG reporting requirements. Those reporting programs have addressed landfills in a variety of ways and a single evaluation or tool is unlikely to suffice

for most landfills. Facilities subject to NSPS requirements are likely to have the basic configuration, meters, and procedures in place for reporting under most GHG reporting programs, but each site will have to conduct its own evaluation. At the bare minimum, facilities subject to mandatory GHG reporting will have to create monitoring plans and programs for each program to which they find themselves subject. A summary of major reporting program elements is shown in Table 2.

Some reporting programs, such as California's AB32, have reporting thresholds that are generally higher than the Federal MRR threshold. These states will have few facilities subject to state GHG reporting programs that are not already subject to the Federal MRR, but higher reporting thresholds can result in small landfills being subject to the rule if they have special circumstances such as power generation or neighboring facilities under common control. Facilities must also evaluate the correct parameters. The Federal MRR applicability is triggered by

CH₄ generation, but states may use actual combustion emissions or fugitive CH₄ emissions in their applicability threshold.

Some states, such as Washington, are making efforts to bring their reporting programs into alignment with the Federal MRR. These State programs are unlikely to result in additional monitoring requirements for facilities already subject to the Federal MRR, but will require duplicate reporting and may require smaller facilities to report to the state than required to report under the Federal MRR.

Finally, each delegated CAA agency, which would include most states and various local air pollution control agencies, have the authority to require GHG reporting under their existing permitting programs, such as Title V. Each landfill or LFGTE facility should determine whether this is the case in their jurisdiction, which could result in yet another duplicate set of GHG reporting requirements.

TABLE 2 – COMPARISON OF REPORTING PROGRAM REQUIREMENTS

| Subject | Federal | California | Massachusetts | Washington | Voluntary (TCR) |
|--|---|---|--------------------------|--|---|
| Emission Threshold | 25,000 MTCO _{2e} | 25,000 MTCO _{2c} or 2,500 MTCO _{2c} | 5,000 STCO _{2e} | 10,000 MTCO _{2e} | None (Voluntary) |
| Evaluated Value | CH ₄ Generation and Combustion Emissions | Combustion Emissions | GHG Emissions | CH ₄ Generation + CO ₂ From Combustion | GHG Emissions |
| Reporting Level | Facility | Facility | Facility | Facility | Entity |
| Effective Date | December 2009 | January 2009 | December 2008 | May 2009 | May 2008 |
| First Year Of Reported Emissions | 2010 | 2009 | 2010 | 2011 | First Membership Year (optional historical reporting) |
| Verification | None | Annual | Triennial | None | Annual |
| Calibration Requirements | Extensive Requirements | Verifiable, ±5% | Verifiable | As Federal | Verifiable |
| Mobile Sources Included? | No | No | Yes | No | Yes |
| Landfills Categorically Included? | Yes | No | No | Yes | No (dependent upon reporting entity) |

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