INDUSTRY PERSPECTIVE ON GHG RULES APPLICABLE TO LANDFILLS

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Why Are We Here?

Tailoring Rule is FINAL

- **Landfills ~ 2% US GHGs, but we face largest GHG federal permitting impact**

GHG Reporting Rule is FINAL

How do we implement for our industry?

- **Clarify PSD applicability**
- **Discuss recommendations presented to EPA and comments on latest EPA guidance**
- **Communicate/understand issues**
- **Provide standard approach to permitting and reporting**

Tailoring Rule: PSD Applicability to Landfills

- PSD applicability to landfills significantly expanded
- PSD applicability to landfills rare for criteria pollutants
  - Rare for NMOC to trigger threshold
  - Recently, CO emissions from LFGTE
  - SOx will trigger threshold for landfills with high sulfur
  - GHG will frequently trigger, esp. if biogenic incl.
- Potential landfill projects triggering PSD/BACT analysis
  - Expansion of landfill (with & without GCCS)
  - Control devices (devices added through site life)
  - LFGTE (power generation and treatment to fuel)
  - Ancillary activities (anything with combustion)

Determining Applicability: PTE for Landfills

- Landfill PTE determined by biology & climate:
  - Other Industry: stable, controllable input & output
    - PTE will be stable absent purposeful change
  - Landfills: process input/output varies & increases
    - PTE increases with time up to peak; not controllable
    - PTE is modeled; accuracy of estimate decreases with time

Determining Applicability: PTE for Landfills

- Multiple PTE bases for landfills:
  - Varies by state and local jurisdiction
  - Life of site/peak generation rate (can be up to 50+ yrs)
  - Title V or Solid Waste permit duration (5+ yrs)
  - Current control equipment capacity (may be up to 10 to 15 yrs)

Determining Applicability: GHG PTE for Landfills

- Landfill fugitive and biogenic emissions
  - Distribution of CH_4 & CO_2 emissions:
    - Fugitive LFG = 50% CO_2, 50% CH_4; Controlled = CO2
    - CH_4= fugitives & incomplete combustion (nominal)
    - CO_2 = controlled(combustion/oxidation) & fugitives
    - CH_4 is anthropogenic; **CO_2 is biogenic**
- N_2O emitted from combustion is nominal; should not be included in PTE or total CO2e

Determining Applicability: GHG PTE for Landfills

- Impact of **biogenic** GHG in PTE = early PSD/BACT
  - Inconsistent with EPA GHG & IPCC inventories; NSPS requirement to control LFG
  - "Punishes" landfill for early, voluntary CH_4 control
  - ICR to assess biomass and biogenic emissions
    - Inclusion = dual regulation: CH_4 is regulated as well as the product of CH_4 treatment (CO_2)
    - Cannot control LFG generation, CH_4 or CO_2
    - There is no control technology to apply to CO_2
  - **Update: Proposed deferral of biogenic**

Determining Applicability: GHG PTE for Landfills

- Impact of including **fugitive** GHG = early PSD/BACT
  - Current standard is to count fugitives after in PSD
  - Models overestimate
  - Landfill fugitives “escape” reasonable control…can’t improve
  - Catch 22: Only control technology for fugitives is collection & cover management
  - Controls still can limit only CH_4, not CO_2; more control of CH_4 = more CO_2 emissions

LFG Thresholds for Tailoring Rule

Controlled	Emissions (tpy CO2e)	Flare Flow (cfm)	LFGTE Size (MW)
Combustion	100,000	~3,700	~8-10
Combustion	75,000	~2775	~6-7.5

Uncontrolled	Emissions (tpy CO2e)	w/Biogenic (cfm)	w/o Biogenic (cfm)
Generation	100,000	~1,100	~1,300
Generation	75,000	~825	~975

Counting Fugitives: Every ~250 cfm = 25,000 tpy CO2e

Top Down BACT Analysis

- Five-Step Approach
  - Step 1: Identify all available control technologies
  - Step 2: Eliminate technically infeasible options
  - Step 3: Rand remaining options by emissions control effectiveness
  - Step 4: Evaluate economic, energy, and other environmental impacts
  - Step 5: Select best option as BACT for the source

Top Down BACT Analysis

- To assess BACT without prior examples:
  - Best Demonstrated Technology (BDT) is “floor”
  - Apply available emission reduction technologies
    - Combustion: Flares, engines, turbines, boilers, LFGTE
    - Fuel Conversion (emerging technology)
  - Allow for these tests to technologies:
    - Financial and technical viability
    - Availability on commercial market
    - Confirmed achieved in practice for same source
    - Energy efficiency
    - Other environmental impacts

Industry Recommendations

- Apply top-down BACT analysis for Landfills for Collection and Control
  - Follow current regulatory process for Top-down BACT
  - BDT for landfills is cover oxidation for Collection & open flare for Control
    - Guidance should establish tests, two-step floor and general types of combustion to consider

Industry Recommendations

- BACT Floor Guidance, two step approach:
  - Floor for LFG control = cover oxidation:
    - LFG collection at old, closed areas = subsurface fires and/or low BTU gas requiring fossil fuel supplement
    - LFG collection at very new sites = liner damage, obstruction of heavy equipment & instability
  - If LFG control feasible, floor for combustion = open flare
    - Top down BACT analysis must apply tests to LFG combustion technologies from open flare to LFGTE
    - Two categories of LFGTE: untreated direct use as fuel or treatment to fuel quality specs.

Industry Recommendations

- Recommend what BACT will be for most landfills:

  LFG collection using horizontal and vertical gas collection lines vented to an open flare, enclosed flare, IC engine, turbine, boiler or other combustion device or vented to a medium or high BTU fuel plant or other fuel conversion technology; also, redirection to a nearby industry for use as fuel.

Industry Recommendations

- A design change is not a “technology!”
- BACT not intended to force design change
- MSW not separated at landfill; landfill does not control content of loads
- For landfills, forced waste separation would be a whole “system” design change
  - MSW landfills are permitted to accept all MSW
  - MSW diversion requires source separation and separate collection for sorting, recycling, composting
  - May violate state/ local laws

Industry Recommendations

- Recommended fugitive emissions not be considered in determining initial PSD applicability for landfills…anywhere
- Recommended biogenic emissions not be included in PTE for landfills…at all
- Recognize that NSPS, Subpart WWW, and BACT are not de facto the same standard
- Recognize that waste separation is a design change which is not appropriate as BACT

Other Issues Raised by Industry

- Multi-Pollutant/competing BACT/LAER:
  - GHG BACT may conflict with a criteria pollutant BACT or LAER-which prevails?
- Common Control:
  - Will facilities with loose business relationship be combined for PSD applicability determinations?
- How will fugitive emissions be modeled:
  - By default 75%/25% or GHG Reporting Rule calculations or site specific/SWICS?

EPA GHG Guidance

- Issued November 2010
- Provides background for GHG permitting
- Includes primer on PSD Applicability and 5-step “Top Down” BACT Analysis
- Re-affirms BACT is case-by-case

EPA GHG Guidance

- Treatment of biomass
- Energy Efficiency improvements as BACT
- Modeling and monitoring not required
- Includes BACT example for MSW Landfill
- GHG Mandatory Reporting Rule not an “applicable requirement” under Title V regulations.

Industry Comments on EPA Guidance

- The EPA Guidance diverges from historic implementation
- Biogenic CO2 emissions should not be subject to control evaluation
- Landfill example not representative and is inconsistent with the Guidance, BACT and NSPS
  - Requires early LFG collection
  - Change in BDT
  - Collateral increase in NSR pollutants “insignificant”
  - BACT selection based on off-site avoided emissions

Addressing GHGs Permit Applications

PSD Applications

- General Do's and Don'ts:
  - Include detailed description of baseline conditions and project changes
  - Use the same PTE basis for GHG & criteria
  - Conduct proper netting analysis for modifications
  - Conduct project-specific BACT analysis
  - Include all contemporaneous increases and reductions
  - Don't address GHG Tailoring Rule unless relevant
  - Don't address fugitives unless requested or required anyway
  - Don't combine biogenic & anthropogenic emissions

Title V Applications

- General Do's and Don'ts:
  - Include a statement of purpose describing what you are adding, why it is correct, why it is complete
  - Use the same PTE basis for GHG & criteria
  - Address mandatory state GHG rules
  - Don't address GHG Tailoring Rule unless relevant
  - Don't address voluntary GHG reporting programs
  - **Don't include EPA Mandatory Reporting Rule**
  - Don't include fugitives unless requested or required anyway
  - Don't combine biogenic & anthropogenic emissions
  - After initial phase, include GHG PSD regs & permit terms

Additional Information

Clean Air Act Permitting for GHGs Web Site: http://www.epa.gov/nsr/ghgpermitting

- Tailoring Rule
- Permitting Guidance document/slides
- GHG Control Measures White Papers
- GHG Mitigation Strategies Database
- RACT/BACT/LAER Clearinghouse
- GHG Permitting Action Team
- Resources for Estimating GHG Emissions

GHG Mandatory Reporting Rule

Implementing GHG Reporting Rule

- Implementation began January 2010
  - Methane Generation of 25,000 MTCO2ENo reduction given for gas collection and control systems (GCCSs)
  - 10% reduction for methane oxidation in soils
  - About 270 cfm of LFG at 50% methane
- Applicability Determination was not Clear
  - Two Methods for Methane Generation Determination in Subpart HH
    - Gas generation model
    - Gas generation estimate using actual recovery data

Amendments

- September 22, 2010 – General Provisions
- October 28, 2010 – Subpart HH
- December 17, 2010 – Subpart A & C
- December 27, 2010 – Reporting Data

Amendment Highlights Subpart A

- Reporting of Corporate Parent Information
- Amendment requires facilities and suppliers subject to the GHGRP to report the following in their annual GHG report to EPA:
  - The names and physical addresses of all of a facility/supplier's U.S. parent companies and their respective percentages of ownership

Amendment Highlights Subpart HH

- Measuring Waste Quantity - Scales
- Waste Characterization
- Calculation Clarifications
- Reporting Requirements
- Clarifications based on FAQ’s

Amendment Highlights Subpart A

- Recordkeeping requirements for missing data events
  - remove the requirement to maintain records of the duration of missing events and actions to prevent or minimize occurrence in the future
- Correction and resubmission of annual reports
  - resubmission is triggered only by a “substantive error,” to provide an opportunity for the facility to demonstrate that there is no error
  - opportunity to extend the 45 day period for resubmission
- Calibration accuracy requirements for measurement devices
  - Limit the 5% accuracy requirement to certain flow meters, when required by a specific subpart
    - other measurement devices to meet the accuracy requirements of the relevant subpart(s), or industry consensus standards or manufacturer’s accuracy specifications
  - 5% requirement does not apply where data are gathered from company records or best available information

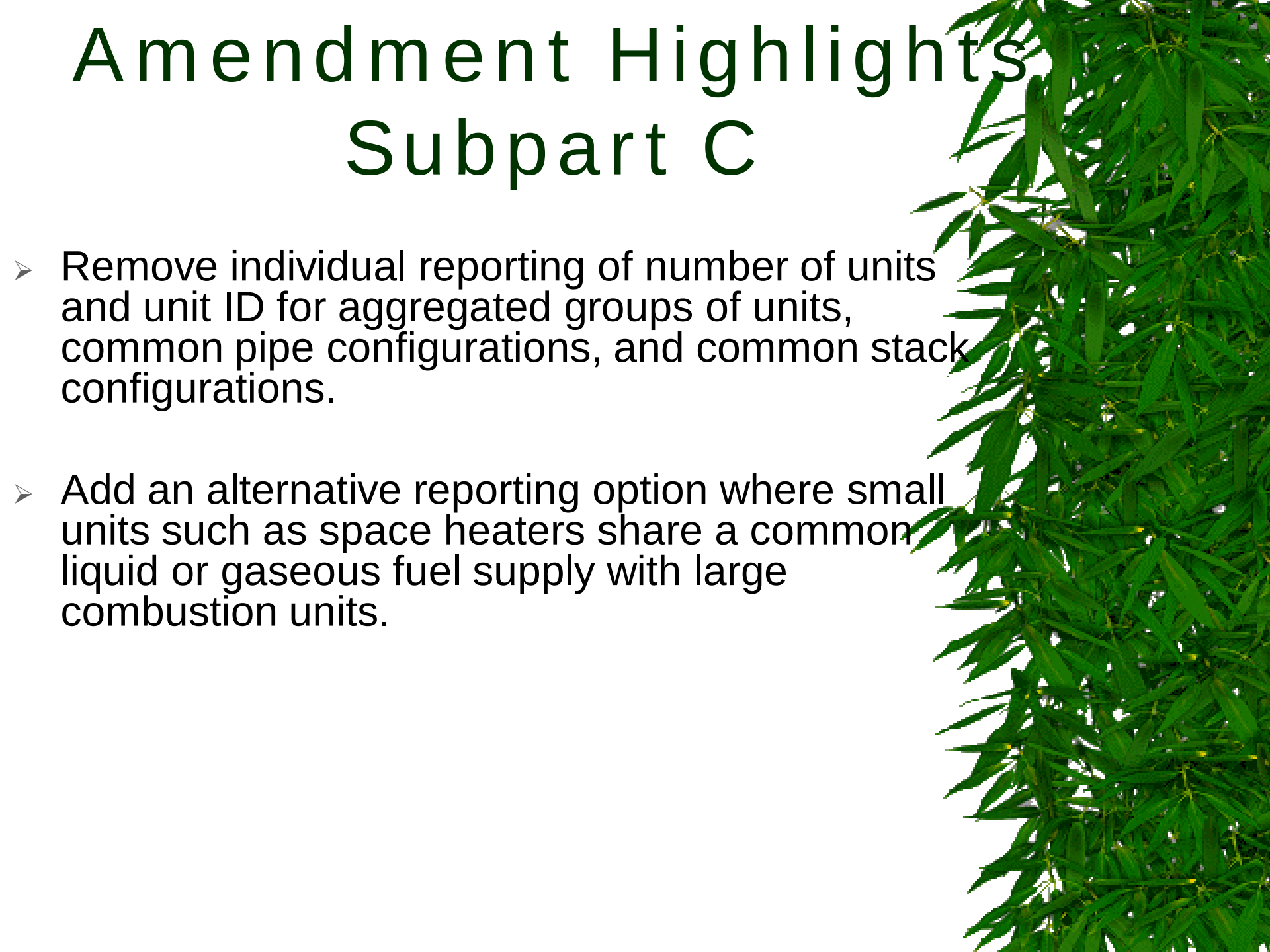
Amendment Highlights Subpart C

- Amend data reporting elements, including:
  - Add methodology start and end dates
- Remove reporting of the customer ID number for units that combust natural gas.
- Add reporting of fuel-specific annual heat input estimates for the purposes of quantifying CH4 and N2O emissions
- Clarify how to use common stack reporting option when one or more units not subject to Subpart C.

Amendment Highlights Subpart C

- Remove individual reporting of number of units and unit ID for aggregated groups of units, common pipe configurations, and common stack configurations.

- Add an alternative reporting option where small units such as space heaters share a common liquid or gaseous fuel supply with large combustion units.



Key Issues Clarified

- Report other Stationary Combustion
  - Exempt: mobile, portable, emergency, exempt
- Annual NMOC Correction
  - Not required for methane meters (i.e. Landtec)
- Thermal Mass Flow Meters Allowed
- Flares under HH exempt under Stationary Combustion
- Passive vents/flares
- Methane Monitoring
  - Allows use of industry standard equipment

Landfill Gas to Energy

- Third-party LFGE not under Common Control (separate facility)CO2 from biomass (e.g., LFG) exempt unless co-fired, but CH4 and N2O included
- LFGE under Common Control Must report under Stationary Combustion

Implementation Challenges

- Many Sites Required Equipment Calibration
  - Scheduling while equipment down
- Installing and/or Relocating Additional Flow Meters
- 3rd Party Coordination

Monitoring Challenges

- Methane Monitoring
  - Continuous or Weekly
  - Weekly
    - Once per Calendar Week
    - At Least 3 Days Between
- Multiple Destruction Devices
- Location of Flow/Methane Readings

Key Implementation Resources

- GHG Monitoring Plan
  - Provides framework for complying
  - Use for clarification
- EPA FAQ document
  - Review

Electronic Registration

- e-GGRT
  - Made available in December 2010

- Comprehensive web-based system for user registration, facility and supplier registration, and facility and supplier reporting required under 40 CFR 98

- Provides step-by-step instructions to guide you through the reporting process

Registration Deadline

- Facility Registration
  - Start Early!

- For Reporting Year 2010, each facility or supplier must submit a Certificate of Representation to EPA by January 30, 2011 (60 days in advance of the reporting deadline).

- EPA process 10 business days for EPA to process your Electronic Signature Agreement and grant access to e-GGRT

Certificate of Representation

- Certificate of Representation

- The Certificate of Representation
  - electronic document that establishes one DR as the legal representative of the owner(s) or operator(s) of a facility or supplier
  - It may list one ADR for the facility or supplier who acts on behalf of the DR.

- Using e-GGRT
  - the DR or ADR must electronically certify, sign and submit a Certificate of Representation.

Report

- Facility/Supplier Reporting

- Submit its annual GHG report to EPA by March 31, 2011
  - Reporting program not available yet
  - Supports reporting of GHG emissions using web forms or XML files (bulk file reporting)

Challenges

- Late availability of Electronic System
- Revise Oxidation Factor to be more reflective
- Integration with existing GHG Reporting Protocols
  - EPA's GHG Mandatory Reporting Rule does not preempt States from regulating or requiring reporting of GHGs
- Increased capital/operational costs
- Confidential Business Information
- Certification requirements and CAA penalties
- For Sites with GCCS:
  - Extensive data management and responsible party documentation
- No state delegation provided
  - GHG MRR should NOT be included in Title V permit

Additional Information

- EPA Website: http://www.epa.gov/climatechange/emissions/ghgrulemaking.html
  - Questions to EPA: GHGMRR@epa.gov or (877) GHG-1188
  - *MSW Landfill Applicability Tool*: "MSW Landfill Utility"
    - Fact Sheets (available on website):MSW Landfills
    - Stationary Fuel Combustion Sources
    - General Provisions