Appendix C:
List of Materials EPA shared with Small Entity Representatives in 2015

Small Business Advocacy Review Panel on EPA's Planned Proposed Rules
Standards of Performance for Municipal Solid Waste Landfills and Review of Emissions Guidelines for Municipal Solid Waste Landfills

- Briefing on MSW Landfill Emission Guidelines
- Landfill Emission Guidelines Dataset (docket)
- Estimates of Landfill Impacts by Option
- Background on Estimated Impacts
- Relevant public comments received on advanced notice of proposed rulemaking (EG) and notice of proposed rulemaking (NSPS)
- Previous presentation by the EPA Small Business Advocacy Chair on procedural background
- Agenda and logistics for the 4/14/2015 meeting
- List of meeting invitees

SBAR Outreach Briefing:
Municipal Solid Waste (MSW) Landfill Emission Guidelines (EG)

Briefing for SERs

Overview

- Background
- Proposal considerations
- Additional information about various rule parameters
- Next steps

How big is the MSW Landfill Industry?

- Approximately 1,128 active landfills in the United States
- 700 landfills are currently subject to either the New Source Performance Standards (NSPS) or Emission Guidelines (EG)
- Ownership of MSW landfills may be public or private
- Over the next 5 years, 14 new landfills are predicted and 133 landfills are expected to modify
- Screening analysis indicates approximately 123 landfills are small entities potentially impacted by the emission guidelines

Background
Clean Air Act Section 111: Existing Sources

- Clean Air Act Section 111(d) and EPA's implementing regulations set up a partnership between states and EPA
- EPA's role:
  - Establish process for states to issue performance standards for existing sources in the source category
  - Provide emission guidelines to the states based on the best system of emission reductions (BSER)
  - Review and approve state plans
  - Promulgate a Federal plan for states that either don't submit a plan or for which EPA disapproves their plan
- State's role:
  - Develop section 111(d) plan establishing emission standards for the affected sources in their state
  - Submit plan to EPA that is responsive to the EPA guidelines
  - Implement plan, if EPA approves it

Background
Clean Air Act Section 111: Existing Sources

- Section 111(d) provides flexibility to EPA and states to design a program in consultation with diverse range of stakeholders when compared with new source performance standards promulgated under section 111(b)
- EPA may specify different guidelines or compliance times (or both) for different sizes, types, and classes of designated facilities when costs, physical limitations, geographical location, or other factors make subcategorization appropriate 40 CFR § 60.22(b)(5)
- Current EG (40 CFR Subpart Cc) applies to existing landfills that accepted waste on or after November 8, 1987 and commenced construction or modification before May 30, 1991.
  - Proposed revisions to EG apply to existing landfills accepting waste on or after November 8, 1987 and commenced construction or modification before July 17, 2014.

Background continued

- Original emission guidelines and NSPS published in March 1996
- Announcement of Proposed Rulemaking for emission guidelines and proposed NSPS were published on July 17, 2014
  - Both actions outlined in the Administration's Climate Action Plan: Strategy to Reduce Methane Emissions
  - Enhancement of landfill gas energy projects through EPA voluntary programs also covered in Methane Strategy
- Focus of this briefing is on the emission guidelines, but EPA will consider comments received from small entities relevant to the NSPS when developing the final rule
- Consent decree deadline for completing NSPS review is March 30, 2015 (Environmental Defense Fund)
  - Ongoing discussions to secure extension of consent decree deadline for the NSPS to allow EPA to focus on developing the EG proposal

Advanced Notice of Proposed Rulemaking for EG

- Requested comment on:
  - Size and emission thresholds
  - Timing of installation and expansion and removal of gas collection and control system
  - Alternative emission threshold determinations
  - Enhanced surface monitoring
  - Wellhead operating standards and corrective action
  - Treatment
- Introduced consideration of best management practices
- Outlined Next Generation Compliance concepts

Current Rule Requirements

Parameter	Value
Size Threshold (Applicability)	2.5 million megagrams (Mg) (mass) and 2.5 million cubic meters (volume)
Trigger for Controls	50 Mg/yr non-methane organic carbon (NMOC)*
Timing for Controls	30 months
Control Requirements	Open flare, enclosed flare or treatment for beneficial use
Monitoring	Monthly gas extraction well monitoring, quarterly surface monitoring

* July 2014 NSPS Proposal (2.5 million Mg/m3 threshold with 40 Mg/yr NMOC proposed; requested comment on 34 Mg/yr NMOC trigger.)

Regulatory Proposal Options Under Consideration

Size Threshold (Applicability)	Trigger for Controls*
Option 1 2.5 million megagrams (mass) and 2.5 million cubic meters (volume)	40 Mg/yr NMOC
Option 2 2.5 million megagrams (mass) and 2.5 million cubic meters (volume)	34 Mg/yr NMOC
Option 3 2.0 million megagrams (mass) and 2.0 million cubic meters (volume)	34 Mg/yr NMOC

* July 2014 NSPS Proposal (2.5 million Mg/m3 threshold with 40 Mg/yr NMOC trigger proposed; requested comment on 34 Mg/yr NMOC trigger.)

Alternative Emission Threshold Determinations

- Approach 1: Continue to rely on a series of models to make threshold determinations to determine when to install required gas collection and control systems
  - Models may offer less subjective threshold determination and are not as directly affected by factors that may affect surface emissions monitoring (SEM) such as weather factors (e.g., wind speed and precipitation), and equipment calibration and user operation
- Approach 2: Create a new Tier 4 option that will allow site-specific measurements to determine when to install and/or remove required gas collection systems
  - Gas collection system installation would be required upon exceedance of the Tier 4 test
  - Benefits of approach:
    - Provides flexibility in annual emission threshold reporting
    - Ensures environmental protection by basing control requirements on site-specific surface data
    - Consistent with California Landfill Methane Rule
    - Corrective action not allowed
    - Tighter threshold will likely drive the use of best management practices
  - Add site-specific surface emissions monitoring (SEM) demonstration as component of gas collection and control system removal
  - Advocated by industry and SERs with trigger of 500 ppm; also advocated by NGOs but with lower thresholds, enhanced SEM and 200 ppm trigger); Some states contend there is no practical way to review and verify Tier 4 demonstration

EPA seeks input from SERs on methods to verify and validate Tier 4 demonstrations and who should qualify for Tier 4.

Enhanced Surface Monitoring*

- Approach 1: Retain current approach
  - Traverse at 30 meters (98 ft)
  - Monitor during typical meteorological conditions
- Approach 2: Propose elements of enhanced surface monitoring
  - Tighten traverse from 30 meters (98 ft) to 25 ft
  - Integrated reading of 25 ppm over 50,000 sq ft grids
  - No monitoring when wind speed exceeds 10 mph instantaneous or 5 mph average
  - Industry asserted that SEM would not achieve additional reductions and involves greater costs
  - Some states agreed with enhanced surface monitoring while others suggests an offsetting traverse pattern for the current approach
  - NGOs support enhanced surface monitoring, but suggest perhaps that it be done twice per year instead of quarterly

*Cost estimates are provided on slide 12

EPA seeks data on the efficacy of enhanced surface monitoring from the SERs.

Costs Associated with Enhanced Surface Monitoring

Comparison of Baseline Surface Monitoring Versus Enhanced Surface Monitoring in 2025 (2012$)

Control option	Surface monitoring type	Number of landfills controlling	Annual Cost	Incremental Cost	Total Cost per controlled landfill	Incremental cost per controlled landfill
Baseline	No change (30 meter traverse)	565	6,260,000	NA	11,100	NA
	Enhanced (25-foot traverse, integrated sample)		46,625,000	40,365,000	82,500	71,400
Option 2.5/40	No change (30 meter traverse)	647	6,867,000	607,000	10,600	1,100
	Enhanced (25-foot traverse, integrated sample)		50,968,000	44,708,000	78,800	69,100
Option 2.5/34	No change (30 meter traverse)	709	7,380,000	1,120,000	10,400	1,700
	Enhanced (25-foot traverse, integrated sample)		54,706,000	48,446,000	77,200	68,300

Adjusting Wellhead Operating Standards

- Approach 1: Retain current approach of monitoring, recording and reporting wellhead temperature and oxygen/nitrogen
  - Take corrective action for exceedances
  - Report exceedances in annual reports
- Approach 2: Remove the operational standards for wellhead temperature and oxygen/nitrogen
  - Continue to monitor and keep records of these parameters to inform operation of the gas collection and control system (GCCS)
  - No corrective action or reporting of exceedances
  - Benefits of approach
    - Enables collection of additional landfill gas (early collection, horizontal collectors, collect from leachate removal system)
    - Reduces requests for higher operating values and burden on regulatory authority and affected landfill
  - Some state comments were received about safety concerns associated with removing the standards; while other states support removal or reduced frequency of monitoring

EPA seeks information from the SERs on paperwork related to the current wellhead operating standards relative to any data on how often exceedance of these standards results in an expansion of a GCCS, identification of a fire, or other types of GCCS adjustments.

Landfill Gas Treatment

- Approach 1*: Adopt non-numeric requirements (filter, dewater, and compress) for landfill gas treatment and require creation of a site-specific monitoring plan
  - Approach is consistent with feedback from affected landfills, state agencies and SERs that expressed concern with meeting numeric requirements for chiller-based systems, which they say can be expensive
  - Monitoring plan would ensure environmental protection and accommodate site-specific and end-use specific treatment requirements
- Approach 2*: Adopt numeric requirements for landfill gas treatment
  - 10 micron filtration, dew point reduction to at least 45° F, compression of gas
  - Continuous monitoring: pressure drop across filter, temperature for chiller-based dewatering system, dew point for non chiller-based systems
  - Feedback indicated treatment is site and end-use specific.
  - Numeric approach would require equipment such as chillers with associated costs.**

*Approaches 1 and 2 above represent new emission guidelines provisions

**Industry commenters estimate the capital cost of chillers are approximately $500,000 with added capital costs of $100,000 to $150,000 for instrumentation, continuous monitoring and controls. Chiller maintenance and monitoring costs are projected to be at least $60,000 per year per project. Finally operations costs are expected to run between $30,000 and $60,000 annually.

EPA seeks information regarding how non-numeric definition could be enforceable and the impacts of having to meet numeric requirements.

Best Management Practices

- Approach 1*: Encourage GCCS best management practices (BMPs) and organics diversion in the rule framework, but do not mandate
  - Acknowledge GCCS BMPs and alternative oxidative controls can achieve reductions while recognizing site-specific factors
  - Acknowledge existing state/local organics diversion programs
  - Highlight benefits of delayed compliance for landfills diverting waste (e.g., longer period to trigger emission threshold)
  - Incorporate BMPs into voluntary program outreach by offering technical assistance
  - Highlight flexible monitoring and reporting mechanisms to encourage more widespread adoption of GCCS BMPs and diversion (Tier 4 and wellhead flexibility)
  - Consider approaches to incentivize BMPs and organics diversion and explore flexible monitoring, recordkeeping and reporting requirements for landfills using BMPs and organics diversion
- Approach 2*: Mandate organics diversion
  - Alternative thresholds for landfills diverting waste
    - Infrastructure not currently in place to handle organic waste
    - Need to develop mechanisms to compute diversion rate to ensure a source would qualify for a compliance alternative
  - Alternative modeling inputs for waste diversion
    - Many sites lack capacity to track degradable waste; potentially labor/cost intensive
  - Industry does not agree with mandating organics diversion; not efficient under CAA; federal, state and waste officials will actually handle organics diversion
  - NGOs advocate and assert this approach is demonstrated, extremely effective and cost effective

*Approaches 1 and 2 above represent new emission guidelines provisions

EPA seeks information from SERs on effective methods of incentivizing organics diversion and other BMPs.

Information from the SERs

- Proposed changes to the emission guidelines will be based on EPA's evaluation of the Best System of Emission Reductions and the more and better data EPA has, the more effective that evaluation will be.
- In any future notice of proposed rulemaking, EPA will seek information and data on the following:
  - Input on methods to verify and validate Tier 4 demonstrations and who should qualify for Tier 4
  - Data on the efficacy of enhanced surface monitoring
  - Information on paperwork related to the current wellhead operating standards relative to any data on how often exceedance of these standards result in an expansion of a gas collection and control system, identification of a fire, or other types of GCCS adjustments
  - Information regarding how non-numeric landfill gas treatment could be enforceable and the impacts of having to meet numeric requirements
  - Information on effective methods of incentivizing organics diversion and other best management practices

Next Steps

- Written comments will be accepted by the panel (EPA, OMB, and SBA) from the SERs
- Final report of this panel process will be developed in the April timeframe
- Proposal of the emission guidelines planned for summer 2015

Background Information for Estimating Cost and Emission Impacts of Emission Guidelines Regulatory Options

To estimate the cost and emission impacts of each regulatory option, the EPA determined the landfills that met the design capacity and emission rate cutoffs for each regulatory option. EPA then calculated the annual emission reductions and costs for each landfill for each year from 2014 through 2063 under each regulatory option using the equations described below. The resulting costs and emission reductions incurred by each landfill in year 2025 were used to assess the overall impacts of each option.

General Assumptions and Procedures

- The baseline represents the emission reductions and costs associated with the requirements of the current rule. Each alternative regulatory option was compared to this baseline option.
- Landfill would install gas collection and control systems (GCCS) when the landfill exceeds the emission rate and design capacity cutoffs.
- Landfill would remove GCCS when the actual emissions are below the emissions cutoff, the landfill is closed, and the controls have been in place for at least 15 years.
- Costs were annualized using a 7 percent interest rate, which is consistent with EPA guidance for cost evaluations.

Alternative regulatory options varied the emission rate cutoffs, design capacity cutoffs, initial lag time to install GCCS, and expansion lag time for GCCS:

- **Emission rate cutoff.** Baseline = 50 megagram (Mg) nonmethane organic compounds (NMOC) per year. The alternative regulatory options include alternative NMOC cutoffs of 40 and 34 Mg NMOC.

- **Design capacity cutoff.** Baseline **=** 2.5 million Mg (mass) and 2.5 cubic meters (volume). The alternative regulatory options include no change to capacity cutoff and an alternative landfill size cutoff of 2.0 million Mg and 2.0 cubic meters.

- **Initial lag time.** Baseline = 30 months, modeled at 3-years because the first-order decay equation used to model emissions is on an annual, instead of monthly basis. Further, NMOC emission reports under the current rule are required to be submitted in June of the following year (6 months), thus the landfill would get 30 months after the submittal of its NMOC emission report to install the GCCS. The total time to install a GCCS would be approximately 36 months after the excess emissions occurred. Based on previous feedback from the small entity representatives (SERs), the EPA did not propose an alternative to shorten the initial lag times.

- **Expansion lag time.** Baseline = 2 or 5 years, modeled at 4 years. Expansion lag time is the amount of time until the landfill expands the GCCS into waste being placed in new areas of the landfill. The current rule allows 2 years after initial waste placement in closed areas and 5 years after initial waste placement in active areas of the landfill, so the actual lag time varies by landfill depending on how quickly expansion areas are filled and closed. More landfills probably tend toward the 5 years. Therefore, a 4-year expansion lag time was assumed to represent the baseline. Based on previous feedback from the SERs, the EPA did not propose an alternative to shorten the initial lag times.

Estimating Annual Emissions

Estimating Waste

- If a landfill's annual waste acceptance rate (WAR) and waste in place (WIP) values were available in the landfill dataset and associated with a particular year, then those values were extrapolated to estimate the landfill's WAR and WIP for each year.
- If WIP and WAR values were not available in the landfill dataset, the annual WAR was estimated using the landfill open and closure years and the landfill capacity assuming a constant WAR over the lifetime of the landfill. The annual waste in place was calculated by summing the waste acceptance rate over time.

Estimating Annual Emissions

- Estimated annual methane emissions from each landfill for each year during the period of 2014-2063 using Equation 1.

Equation 1 $$CH_{4_t} = k \times L_0 \times M \times e^{-kt}$$

Where:

CH_{4t}	=	Methane, ft^3 in year t
k	=	Methane generation rate, $year^{-1}$
L_0	=	Potential methane generation capacity, ft^3 methane per ton
M	=	Mass of waste accepted in year t, tons
t	=	Analysis year (year 1 through 50), year

- Estimated the volume of LFG produced by a landfill using Equation 2.

Equation 2 $$LFG_t = CH_{4t} \times 2$$

Where:

LFG_t	=	Landfill gas, ft^3 in year t
CH_{4t}	=	Methane, ft^3 in year t
2	=	Multiplier to convert methane to LFG (assuming that LFG is 50 percent methane), unitless

- Estimated the mass of NMOC emissions produced by each landfill, based on the amount of LFG produced at the landfill, using Equation 3.

Equation 3 $$NMOC_t = LFG_t \div 35.32 \times 595 \times 3.6E^{-9}$$

Where

$NMOC_t$	=	NMOC in year t, Mg in year t
LFG_t	=	Landfill gas, ft^3 in year t
35.32	=	Conversion, ft^3 per cubic meter (m^{3})
595	=	Concentration of NMOC in LFG, parts per million (ppm) NMOC by volume as hexane
3.6E-9	=	Conversion factor, Mg NMOC per m^3 LFG

- Estimated the mass of methane emissions, in terms of carbon dioxide equivalents, produced by each landfill using the Equation 4.

Equation 4 $$\text{Mg } CO_2eq = CH_{4t} \times 0.0423 \div 2000 \div 0.90718 \times GWP_{CH4}$$

Where:

Mg CO_2eq_t	=	Carbon dioxide equivalents, Mg in year t
CH_{4t}	=	Methane, ft^3 in year t (From Equation 1)
0.0423	=	Density of methane, lb per ft^3
2000	=	Conversion, lb per short ton
0.90718	=	Conversion, short ton per Mg
GWP_{CH4}	=	25, Global Warming Potential of Methane

Calculating Emissions Using New Source Performance Standards (NSPS)/Emission Guidelines (EG) and AP-42 Default Values

The current NSPS/EG require the use of Tier 1 default value for the potential methane generation capacity (L_0) and methane generation rate (k) to determine when the landfill exceeds the 50 Mg NMOC per year emission rate cutoff. To determine when landfills may remove controls, the current rules allow landfills to measure the actual collected gas flow rate as well as the concentration (instead of relying on Tier 1 default L_0 and k values).

Installing controls. The combination of the Tier 1 defaults for k and L_0 and the NMOC concentration of 595 parts per million volume (ppmv) were used to represent how landfills currently calculate NMOC emissions to determine, if they have to install controls under the NSPS/EG. These values, known as $LFG_{NSPS/EG}$ and $NMOC_{NSPS/EG}$, tend to provide higher end screening level estimates of emissions at most landfills (due to the higher L_0 and k values).

Landfills have conducted Tier 2 tests and gotten much lower values that are consistent with the AP-42 average NMOC concentration of 595 ppmv. The use of AP-42 L_0 and k values in the emission calculation produces results that more closely match landfill emissions. The use of these values, in combination with the NMOC concentration of 595 ppmv, result in estimates of LFG and NMOC that are in accordance with the AP-42; in this evaluation these estimates were called LFG_{AP-42} and $NMOC_{AP-42.}$ This is likely a higher end estimate since EPA is considering a flexible Tier 4 mechanism based on surface emissions that are not predicted by the model.

Removing controls. LFG_{AP-42} and $NMOC_{AP-42}$ are used to determine when landfills would remove controls. The current rules allow landfills to measure the actual collected gas flow rate as well as the concentration (instead of relying on Tier 1 default L_0 and k defaults). Because the AP-42 values for L_0 and k produce results that more closely match actual gas flow rates and emissions, AP-42 values were used to determine when landfills would remove controls. This approach may result in higher end estimates of the number of years the controls must remain installed; we are exploring a flexible Tier 4 mechanism for removing/decommissioning of equipment based on surface emissions monitoring.

Applying Landfill-Specific k Factors

The k values depend on the amount of precipitation at the landfill. For this evaluation, precipitation data by county from the PRISM Climate Group were obtained that covers the period 1981-

2010.[1] These average precipitation factors were matched to the county-level location of each landfill. The PRISM data include the lower 48 contiguous states. A separate dataset for 25 counties in Alaska, Hawaii, Puerto Rico, and the Virgin Islands was obtained from the National Climatic Data Center for years 1996-2014.[2] The k factors were assigned to each landfill based on the resulting amount of precipitation at each landfill.

Estimating Emission Reductions

- To estimate emission reductions, the amount of LFG and NMOC emitted at each landfill was estimated using Equations 1-3 shown above.
- The model assumes that the collection equipment is installed and operational at the landfill after the initial lag time of the regulatory option.
- As the landfill is filled over time, the model assumes the landfill expands the GCCS into new areas of waste placement in accordance with the expansion lag time of the regulatory option. See Table 1, below.
- Once the landfill has reached the maximum gas production and the gas production starts to decrease, the analysis assumes that the GCCS will collect all of the emitted gas.
- To determine the amount of LFG and NMOC collected, the analysis uses the $LFG_{AP\text{-}42}$ and $NMOC_{AP\text{-}42,}$ estimates with the appropriate lag times, because this is the best estimate of actual gas collected.
- The emission reductions are equal to the amount of collected NMOC or methane that is combusted, which is estimated by multiplying the amount of collected gas by a destruction efficiency of 98 percent.

Table 1. Example of Collected NMOC Estimate at a Landfill with an Initial Lag Time of 3 Years and an Expansion Lag Time of 4 Years

Year	$NMOC_{NSPS/EG}$	$NMOC_{AP\text{-}42}$	Collected NMOC
1	50.2	27.7	0.0
2	50.4	27.9	0.0
3	50.6	28.0	0.0
4	50.8	28.2	28.2
5	51.0	28.3	28.2
6	51.1	28.5	28.2
7	51.3	28.6	28.2
8	51.5	28.7	28.7
9	51.6	28.9	28.7
10	51.7	29.0	28.7
11	51.9	29.1	28.7
12	52.0	29.2	29.2
13	52.1	29.3	29.2
14	52.2	29.4	29.2
15	52.3	29.5	29.2

Estimating Control Costs

The cost equations used in this regulatory evaluation were derived from EPA's Landfill Gas Energy Cost Model (LFGcost-Web), version 3.0, which was developed by EPA's Landfill Methane Outreach Program (LMOP).

[1] PRISM 30-year normals data are available online at: http://www.prism.oregonstate.edu/normals/
[2] NCDC. Annual Climatological data are available online at: http://www.ncdc.noaa.gov/cdo-web/

- LFGcost-Web estimates costs for gas collection, flare, and energy recovery systems and was developed based on cost data obtained from equipment vendors and consulting firms that have installed and operated numerous gas collection and control systems.
- LFGcost-Web encompasses the types of costs included in the EPA OAQPS control cost manual including capital costs, annual costs, and recovery credits.
    - Total capital costs include purchased equipment costs, installation costs, engineering and design costs, costs for site preparation and buildings, costs of permits and fees, and working capital.
    - Total annual costs include direct costs, indirect costs, and recovery credits.
    - Direct annual costs are those that are proportional to a facility-specific metrics such as the facility's productive output or size.
    - Indirect annual costs are independent of facility-specific metrics and may include categories such as administrative charges, taxes, or insurance.
    - Recovery credits are for materials or energy recovered by the control system.

For this evaluation, all costs are presented in 2012$. The costs included in LFGcost-Web are in 2013$ and were de-escalated to 2012$ using an escalation factor of 2 percent for capital costs and 2.5 percent for O&M costs.

The analysis presents the annualized capital cost of flares, wells, wellheads (including piping to collect gas), and engines over the lifetime of the equipment. The equipment is assumed to be replaced when its lifetime is over, so the annualized capital costs are incurred as long as the landfill still has controls in place. In order to calculate the annualization factors, flares, wells, well heads, and engines are assumed to have a 15-year lifetime. In addition, there is a mobilization/installation charge to bring well drilling equipment on site each time the gas collection system is expanded. Because the landfill will be drilling wells to expand the control system during the expansion lag year, this capital installation cost is assumed to have a lifetime equal to the expansion lag time.

A number of the capital costs equations depend on the number of wells at each landfill. In order to estimate the number of wells at each landfill, EPA estimated the number of acres that have been filled with waste for each landfill for each year. EPA assumed that the percent of design area filled (acres) would track the ratio of waste in place/design capacity (e.g., if a landfill has a waste-in-place amount equivalent to 40 percent of design capacity, then 40 percent of the planned acreage is filled). In addition, EPA assumed that each landfill would install one well per acre, consistent with the guidelines provided in the LFGcost-Web model, and that the number of wells would increase periodically based on expansion lag time.

Capital Costs

The equations used in this evaluation to calculate capital costs for flares, wells, wellheads (including gas collection piping), mobilization/installation, and engines are presented below. All costs equations are shown on an individual landfill and year basis. To assess the capital costs of each regulatory option, the capital costs for all landfills assumed to install a GCCS under each regulatory option were summed if those capital costs were incurred in 2025.

Flare Capital Costs

Flares are the primary control device used at landfills. All landfills that are required to comply with the regulatory options are assumed to install flares; even landfills using engines would have flares as the back-up control device for periods when the engines are not operating. The capital flare costs are estimated using the equation below, which is based on the installed cost of the knockout, blower, and flare system as determined in LFGcost-Web. The flares are sized based on the maximum LFG flow rate over the 15-year flare lifetime.

Equation 5 $$\text{Flare}_{\text{capital}} = z_{15,y} \times \left(\frac{\text{LFG}_{15\text{yr max}}}{525{,}600} \right)^{0.61} \times 4{,}600 \times (1.02)^{-1}$$

Where:

Flare $_{\text{capital}}$	=	Installed annualized cost of knockout, blower, and flare system, 2012$
$z_{15,y}$	=	Annualization factor where x=15 years and y=interest rate (0.07), unitless
$\text{LFG}_{15\text{yrmax}}$	=	Maximum LFG collected for 15 year project period, ft^3 per year
525,600	=	Conversion factor, minutes per year
$4,600	=	Installed capital cost of knockout, blower, and flare system, 2013$ per ft^3/min LFG
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless[3]

Vertical Gas Extraction Well Capital Costs

The vertical well capital costs are based on a dollar per linear foot of well depth installed estimate from LFGcost-Web. As shown in the equation below, wells are assumed to have a depth of 10 feet less than the landfill depth. The method used to estimate the number of wells at the landfill each year is described above.

Equation 6 $$\text{Well}_{\text{capital}} = z_{15,y} \times (\text{Depth} - 10) \times 85 \times \text{Wells}_{\text{annual}} \times (1.02)^{-1}$$

Where:

Well $_{\text{capital}}$	=	Installed annualized cost of wells, 2012$
$z_{15,y}$	=	Annualization factor where x=15 years and y=interest rate (0.07), unitless
Depth	=	Landfill waste depth, feet
10	=	feet
$85	=	Installed capital cost of one vertical well, 2013$ per foot of well depth
Wells $_{\text{annual}}$	=	Number of vertical wells operated each year
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless[4]

[3] De-escalation equation uses a formula of $(1+\text{de-escalation}/100)^t$, where capital cost escalation is assumed to be 2 percent and t is equal to -1 year

[4] De-escalation equation uses a formula of $(1+\text{de-escalation}/100)^t$, where capital cost escalation is assumed to be 2 percent and t is equal to -1 year

Wellhead Capital Costs

The capital wellhead cost covered the equipment associated with each well, including the wellhead and pipe gathering system (and any additional fittings/installations connecting the wells, and was dependent on the number of wells. In addition, this capital cost encompasses engineering, permitting, and surveying fees associated with the well field installation that are also dependent on the number of wells. The capital wellhead costs at each landfill were estimated using a dollar per well installed cost from LFGcost-Web for wellheads, pipe gathering system, engineering, permitting, and surveying and the number of wells at each landfill.

Equation 7 $$\text{Wellhead}_{\text{capital}} = z_{15,y} \times 17{,}700 \times \text{Wells}_{\text{annual}} \times (1.02)^{-1}$$

Where:

$\text{Wellhead}_{\text{capital}}$	=	Installed annualized cost of wellheads, 2012$
$z_{15,y}$	=	Annualization factor where x=15 years and y=interest rate (0.07), unitless
$17,700	=	Installed capital cost of one wellhead, 2013$ per well
$\text{Wells}_{\text{annual}}$	=	Number of wells operated each year
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless[5]

Mobilization/ Installation Costs for Wellfield Expansion

The cost occurs upon installation of a new gas collection system (i.e., wellfield) and each time the wellfield is expanded into new areas of the landfill. This means the frequency is dependent on the expansion lag time. This cost is independent of the number of wells being added. It includes costs such as planning, set-up, and mobilization costs to get the well drilling rig and pipe crew on site. This cost was estimated using the following equation from LFGcost-Web:

Equation 8 $$\text{Installation}_{\text{capital}} = z_{x,y} \times 20{,}000 \times (1.02)^{-1}$$

Where:

$\text{Installation}_{\text{capital}}$	=	Mobilization/installation annualized cost, 2012$
$z_{x,y}$	=	Annualization factor where x=expansion lag time in years and y=interest rate (0.07), unitless
$20,000	=	Mobilization/Installation costs, per occurrence, 2013$
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless[6]

Engine Capital Costs

Engines are assumed to be installed only at landfills that produce enough LFG to power the engine and only when the electricity buyback rates allow the operation of the engine to be profitable. Standard engines used at landfills have approximately 1 MW capacity, which equates to 195 million ft^3 per year of collected LFG (at 50 percent methane). Therefore, engines were assumed to be installed at landfills that have at least 195 million ft^3 per year of collected LFG for at least 15 years.

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[5] De-escalation equation uses a formula of $(1+\text{de-escalation}/100)^t$, where capital cost escalation is assumed to be 2 percent and t is equal to -1 year

[6] De-escalation equation uses a formula of $(1+\text{de-escalation}/100)^t$, where capital cost escalation is assumed to be 2 percent and t is equal to -1 year

EPA calculated and summed the engine capital and operation and maintenance (O&M) equations to determine at what electricity buyback rate an engine is profitable. The profitable electricity buyback rate is greater than $0.0594 per kWh at 7 percent interest. It was assumed engines were only installed in states with buyback rates exceeding those values.

Multiple engines may be present at a landfill when there is sufficient gas flow to support additional engines. As noted above, one engine requires 195 million ft^3 per year of collected LFG, so in order to have two engines on site, the landfill must have double that amount of LFG (390 million ft^3 per year) for at least 15 years.

The capital costs for engines are based on the capital costs for standard reciprocating engine-generator sets in LFGcost-Web. These costs include gas compression and treatment to remove particulates and moisture (e.g., a chiller), reciprocating engine and generator, electrical interconnect equipment, and site work including housings, utilities, and total facility engineering, design, and permitting.

Equation 9 $$\text{Engine}_{\text{capital}} = z_{15,y} \times 2{,}650{,}000 \times (1.02)^{-1} \times \text{Engine}_{\text{multiplier}}$$

Where:

$\text{Engine}_{\text{capital}}$	=	Installed annualized cost of engines, 2012$
$z_{15,y}$	=	Annualization factor where x=15 yrs and y=interest rate (0.07), unitless
$2,650,000	=	Installed capital cost of one reciprocating engine-generator set, 2013$ per engine
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless
$\text{Engine}_{\text{multiplier}}$	=	Number of engines needed

Operation and Maintenance (O&M) Costs

The following equations were used to calculate O&M costs for flares, wells, electricity, and engines. All cost equations are shown on an individual landfill and year basis. These costs for all landfills were summed by year and the resulting annual sums were used to estimate net present value (NPV) costs.

To accurately estimate annual electricity costs and engine revenue from the generation and sale of electricity, two electricity prices were needed. Landfills must purchase electricity to operate the blowers used to collect LFG. EPA used 2012 commercial average retail electricity prices by State from the U.S. Energy Information Administration to estimate electricity purchase prices at the landfill.

Landfills utilizing engines generate revenue from the sale of the LFG-produced electricity. The amount of revenue generated depends primarily on the buyback rate negotiated between the landfill (or third party developer) and the electric company purchasing the LFG-generated power. Average wholesale prices were used for each State that were calculated using 2012 resale generation and revenue data from EIA to estimate electricity buyback rates[7]. These wholesale prices generally fit in the range of typical buyback prices for LFG of $0.025 - $0.07/kWh, as discussed in LMOP's Project Development Handbook. Additionally, LFGcost-Web uses a default buyback rate of $0.06/kWh and the U.S. average of the wholesale prices used is $0.0655/kWh.

EIA wholesale data were not available for three States (HI, RI & WV). For these States,

[7] U.S. DOE/EIA. Electric power sales, revenue, and energy efficiency Form EIA-861 detailed data files. 2012 Operational Data (Formerly File 1). Released October 29, 2013. http://www.eia.gov/electricity/data/eia861

electricity purchase price data from EIA were used to estimate buyback rates[8]. The buyback rates were estimated by first determining the ratio of each State's purchase price to the overall average U.S. purchase price. This ratio was then multiplied by the calculated average U.S. wholesale price to estimate a buyback rate. Electricity price data for the U.S. territories of Guam, Puerto Rico, and the Virgin Islands were not found. Therefore, EIA profile analyses for these three territories were used to escalate U.S. average prices to estimate electricity prices for each island[9].

Flare O&M Costs

An estimate of the flare O&M costs from LFGcost-Web was used to estimate the flare annual costs, as shown in the equation below:

Equation 10 $$\text{Flare}_{\text{O\&M}} = 5{,}100 \times (1.025)^{-1}$$

Where:

$\text{Flare}_{\text{O\&M}}$	=	Flare annual O&M costs, 2012$
$5,100	=	Annual O&M flare cost, 2013$
$(1.02)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless

Well O&M Costs

An estimate of the well O&M costs from LFGcost-Web was used to estimate the well annual costs, as shown in the equation below:

Equation 11 $$\text{Well}_{\text{O\&M}} = 2{,}600 \times \text{Wells}_{\text{annual}} \times (1.025)^{4\text{-}1}$$

Where:

$\text{Well}_{\text{O\&M}}$	=	Well annual O&M costs, 2012$
$2,600	=	Annual O&M well costs, 2013$ per well
$\text{Wells}_{\text{annual}}$	=	Number of wells operating each year
$(1.025)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless

Electricity O&M Costs

The electricity cost of operating the blowers was calculated using the electricity usage of blowers and the electricity purchase price.

Equation 12 $$\text{Electricity}_{\text{O\&M}} = 0.002 \times \text{Electricity}_{\text{purchase}} \times \text{LFG}_{\text{collected}}$$

Where:

$\text{Electricity}_{\text{O\&M}}$	=	Electricity annual O&M costs, 2012$
0.002	=	Electricity usage by blowers, kWh per ft^3 LFG
$\text{Electricity}_{\text{purchase}}$	=	Electricity purchase price, 2012$ per kWh
$\text{LFG}_{\text{collected}}$	=	Amount of LFG collected, ft^3 per year

[8] U.S. DOE/EIA. Electricity: Detailed State Data, Annual Data for 2012. Average Price by State by Provider (EIA-861), 1990-2012. Released November 12, 2013. http://www.eia.gov/electricity/data/state

[9] U.S. DOE/EIA. Territory Profile and Energy Estimates (for Guam, Puerto Rico, and the U.S. Virgin Islands). Profile Analysis, Electricity. December 18, 2013. http://www.eia.gov/state

Engine O&M Costs

For landfills with engines installed, the O&M costs of the engine were estimated using the annual costs for standard reciprocating engine-generator sets from LFGcost-Web, and taking into account the amount of time that the engine is operating each year (assumed gross capacity factor in LFGcost-Web for engines) and the number of engines on site.

Equation 13 $$\text{Engine}_{\text{O\&M}} = 0.025 \times 1{,}000 \times 8{,}760 \times 0.93 \times (1.025)^{-1} \times \text{Engine}_{\text{multiplier}}$$

Where:

$\text{Engine}_{\text{O\&M}}$	=	Engine annual O&M costs, 2012$
0.025	=	Annual O&M engine cost, 2013$ per kWh
1,000	=	Amount of electricity as kW produced by a 1 MW engine, kW per engine
8,760	=	Conversion factor, hours per year
0.93	=	Fraction of time that the engine is online, unitless
$(1.025)^{-1}$	=	Adjustment from 2013$ to 2012$, unitless
$\text{Engine}_{\text{multiplier}}$	=	Number of engines

Engine Revenue Costs

For landfills with engines installed, the revenue of the electricity produced was calculated by the engines using the equation below. This equation assumes that all electricity generated is sold to the grid instead of some of the electricity generated being used to power the GCCS.

Equation 14 $$\text{Engine}_{\text{revenue}} = 1{,}000 \times 8{,}760 \times 0.93 \times \text{Electricity}_{\text{buyback}} \times \text{Engine}_{\text{multiplier}}$$

Where:

$\text{Engine}_{\text{revenue}}$	=	Engine annual revenue, 2012$
1,000	=	Amount of electricity as kW produced by a 1 MW engine, kW per engine
8,760	=	Conversion factor, hours per year
0.93	=	Fraction of time that the engine is online, unitless
$\text{Electricity}_{\text{buyback}}$	=	Electricity buyback rate, 2012$ per KWh
$\text{Engine}_{\text{multiplier}}$	=	Number of engines

Estimating Testing and Monitoring Costs

EPA estimated testing and monitoring costs for uncontrolled and controlled landfills. The types of testing and monitoring required by the proposed amendments differ depending on whether the landfill is required to control its emissions. Table 2 shows the various testing and monitoring requirements that would apply to controlled and uncontrolled landfills.

Table 2: Applicability of Various Testing and Monitoring Requirements

Testing and Monitoring Requirement	Applicability
NMOC Emission Rate • Annual (Tier 1) • Once every 5 years (Tier 2)	Uncontrolled Landfills
Initial Performance Tests • NMOC % destruction or control device outlet parts per million dry value (ppmvd) • Oxygen	Controlled Landfills
Continuous Combustor Monitoring • Temperature • Flow rate	Controlled Landfills
Monthly Wellhead Monitoring • Nitrogen or oxygen • Gauge pressure • Temperature	Controlled Landfills
Quarterly Surface Monitoring	Controlled Landfills

Table 3 summarizes the testing and monitoring costs for controlled and uncontrolled landfills. These costs are added to the control costs in order to develop a total cost for each regulatory option.

Table 3. Summary of Annual Testing and Monitoring Costs for Categories of Affected Landfills

Affected Landfill[a]	Annualized Initial Performance Test ($)[b]	Continuous Combustor Monitoring	Monthly Wellhead Monitoring	Quarterly Surface Monitoring			NMOC Testing ($)[c]
				Equipment Calibration ($/yr)	Equipment Rental ($/period)	Annual Labor Cost ($/acre)	
	Uncontrolled Landfills						
Using Tier 1	NA	NA	NA	NA	NA	NA	$680
Using Tier 2	NA	NA	NA	NA	NA	NA	$2,700
	Surface Monitoring						
Controlled (<=95 acres)	$1,105	Already included[d]	Already included[d]	$414/year	$125/day	$50.48	NA
Controlled (>95 acres up to 472 acres)	$1,105	Already included[d]	Already included[d]	$414/year	$350/week	$50.48	NA
Controlled (> 472 acres)	$1,105	Already included[d]	Already included[d]	$414/year	$350/week	$50.48	NA

[a] The listed acreages correspond to the length of time a monitor would need to be rented to complete surface monitoring for a landfill (daily, weekly, monthly).

- 1 hour/acre for 25-foot traverse pattern.
- Loaded Labor Rate of 49.69 per hour for Civil Engineering Technician. US Bureau of Labor and Statistics. May 2012 Occupational Employment Statistics. http://www.bls.gov/oes/current/oes_nat.htm#17-0000 (May 2012)
- Equipment Rental Rates for TVA1000b. http://usenvironmental.com/air/fids/thermo-tva-1000b/
- Based on shipped costs of calibration gas and hydrogen fuel purchase for TVA1000b. Assumes a 620 liter of hydrogen fuel. For calibrations, assume 105 liter of CH4-500 ppm; and 105L of zero gas. Quote from Pine Environmental.

[b] Cost of Method 25 test, USEPA Monitoring Costs Assessment Tool. November 30, 2009. $10,067, annualized over 15 years.
[c] 8 hours for Tier 1, every year; 12 hours for Tier 2, every 5 years.

- Loaded Labor Rate of for Civil Engineer $84.95 per hour. US Bureau of Labor and Statistics. May 2011 Occupational Employment Statistics. http:/stat.bls.gov/oes/home.htm.
- Cost of Method 25 test, USEPA Monitoring Costs Assessment Tool. November 30, 2009. $10,067, annualized over 5 years.

[d] Already included in the control cost estimates for O&M.

Public Comments received on Prior EPA Landfill Rulemaking Proposals and Advanced Notices of Proposed Rulemaking

The relevant Document Control Numbers (DCN) are listed below for each topic area. Comments are available electronically at http://www.regulations.gov/ with the exception of those for the 5/23/02 proposal (67 FR 36476) that are available upon request from the EPA Docket Center http://www.epa.gov/dockets/index.htm

1) State comments that address Tier 4 review and validation

CO DEQ (DCN EPA-HQ-OAR-2003-0215-0082)
WI DNR (DCN EPA-HQ-OAR-2003-0215-0088)

2) Benefits associated with enhanced surface monitoring

Ohio (DCN EPA-HQ-OAR-2003-0215-0079)
Oklahoma (DCN EPA-HQ-OAR-2003-0215-0085)
Wisconsin (DCN EPA-HQ-OAR-2003-0215-0088)
Louisville Metro Air Pollution Control (DCN EPA-HQ-OAR-2003-0215-0091)
EDF (DCN EPA-HQ-OAR-2003-0215-0095)
NC Conservation Network (DCN EPA-HQ-OAR-2003-0215-0116)
Friends of the Earth (DCN EPA-HQ-OAR-2003-0215-0121)

3) State comments on wellhead standards

OH EPA (DCN EPA-HQ-OAR-2003-0215-0079.1)
NC DAQ (DCN EPA-HQ-OAR-2003-0215-0089)
OK DEQ (DCN EPA-HQ-OAR-2003-0215-0085)
WI DNR (DCN EPA-HQ-OAR-2003-0215-0088.1)

4) Landfill gas numerical treatment requirements comments

5/23/2002 (67 FR 36476) – available from the EPA Docket Center upon request
http://www.epa.gov/dockets/index.htm
Docket A-88-09, (Category VIII-D; Comment numbers VIII-D-6; VIII-D-7; VIII-D-11; VIII-D-12; VIII-D-20; VIII-D-25)
Docket A-88-09, (Category VIII-D; Comment numbers VIII-D-6; VIII-D-11; VIII-D-12)
Docket A-88-09, (Category VIII-D; Comment numbers VIII-D-12; VIII-D-25)
Docket A-88-09, (Category VIII-D; Comment numbers VIII-D-20; VIII-D-23)

9/8/2006 (71 FR 53272)
(DCN EPA-HQ-OAR-2003-0215-0016, EPA-HQ-OAR-2003-0215-0016-0033)
(DCN EPA-HQ-OAR-2003-0215-0013, -0017, -0018, -0020, -0023, -0027, -0028, -0029, -0030)

5) NGO comments that address the emissions from alternative disposal of organic diversion

EDF (DCN EPA-HQ-OAR-2003-0215-0095.1)

Commenter Center for Biological Diversity and Friends of the Earth (DCN EPA-HQ-OAR-2003-0215-0121)
NC Conservation Network (DCN EPA-HQ-OAR-2003-0215-0116)
Covanta (DCN EPA-HQ-OAR-2014-0451-0044.1)
International Brotherhood of Teamsters (DCN EPA-HQ-OAR-2014-0451-0045.1)
California Resource Recovery Association (DCN EPA-HQ-OAR-2014-0451-0034.1)
Center for a Competitive Waste Industry (DCN EPA-HQ-OAR-2003-0215-0098.1)[1]
Hennepin County (DCN EPA-HQ-OAR-2014-0451-0034.1)

[1] Comments on considering diversion as a control strategy are in the context of the NESHAP standard and not the NSPS standard. This commenter does indicate EPA should look at organics diversion.

An Overview of the Small Business Advocacy Review Panel Process

Alexander Cristofaro, Small Business Advocacy Review Chair (SBAC)
Pre-Panel Outreach Meeting, October 30, 2013

Office of the Administrator
Office of Policy
Office of Regulatory Policy and Management
http://www.epa.gov/op/orpm.html

Today, I’ll answer these questions...

- What is a Small Business Advocacy Review (SBAR) Panel?
- How does a Panel fit into the rulemaking process?
- How do Small Entity Representatives (SERs) participate in the Panel process?
- What is the difference between this Pre-Panel meeting and the future Panel meeting?
- What does the Panel do with SER recommendations?

What is an SBAR Panel?

- Chaired by EPA's Small Business Advocacy Chair (EPA's SBAC from Office of Policy)
- Other Panel members consist wholly of federal employees from:
  - agency authoring the regulation (SBAC, plus program office manager);
  - Office of Management and Budget (Office of Information and Regulatory Affairs (OIRA) Director); and
  - Small Business Administration, Chief Counsel for Advocacy.

What is an SBAR Panel? (cont'd.)

- SBREFA amended the 1980 Regulatory Flexibility Act (RFA), which requires agencies to:

  "assure that small entities have been given an opportunity to participate in the rulemaking process"[1] for any rule "which will have a significant economic impact on a substantial number of small entities."[2]

[1] 5 USC 609(a)

[2] 5 USC 602(a)(1)

What is an SBAR Panel? (cont'd.)

"the panel shall review **any material the agency has prepared**..., including any draft proposed rule, **collect advice and recommendations** of each individual small entity representative identified by the agency after consultation with the Chief Counsel [for Advocacy of the Small Business Administration], on issues related to"[1] the following:

- Who are the small entities to which the proposed rule will apply? [2]
- What are the anticipated compliance requirements of the upcoming proposed rule? [3]
- Are there any existing federal rules that may overlap or conflict with the regulation? [4]
- **Are there any significant regulatory alternatives that could minimize the impact on small entities?** [5]

[1] 5 USC 609(b)(4)
[2] 5 USC 603(b)(3)
[3] 5 USC 603(b)(4)
[4] 5 USC 603(b)(5)
[5] 5 USC 603(c)

How do SERs participate?

"collect advice and recommendations"

- You have the opportunity, because of your status as a small entity expected to be regulated by this rule, to influence the decisions senior EPA officials make about the forthcoming regulation
- Advice and recommendations collected via two Outreach meetings with SERs:
  - EPA holds a pre-panel outreach meeting with potential SERs (this one), and
  - after the Panel convenes, the Panel itself will hold an outreach meeting with SERs.

How do SERs participate? (cont'd.)

- You will have an opportunity to submit written comments as well as the verbal comments you provide in the meetings.
- Reminder: Those of you joining this meeting to assist a potential SER (aka "helpers") are asked to limit your input to representation of the small entity you are assisting.

Pre-Panel vs. Panel Outreach Mtg.?

- Pre-Panel Outreach Meeting
  - Conducted by EPA with SBA and OMB as invitees
  - Overview of the RFA, how the Panel process works, and the role of SERs
  - Background and overview of proposed rulemaking
- Panel Outreach Meeting
  - Chaired by SBAC, but all Panel members have active role
  - Bulk of meeting spent discussing regulatory alternatives and input of SERs

What does the Panel do with your recommendations?

- EPA, OMB, and SBA prepare a joint Panel report:
  - Submitted to the EPA Administrator
  - Considered during senior-management decision-making prior to the issuance of the proposed rule
  - Placed in the rule's docket when the proposed rule is published

Panel within the rulemaking process?

"any material the agency has prepared"

- It is EPA's policy to host SBAR Panels like this one well before a proposed rule is written so we have adequate time to incorporate your advice and recommendations into senior management decision-making about the proposed rule.
- EPA will not provide draft proposed rule text, though we expect to discuss regulatory alternatives in as great a detail as we can.
- Participation in the outreach meetings does not preclude or take the place of participation in the normal public comment period at the time the rule is proposed.

Thank You

- We realize that small entities make significant sacrifices to participate
- Thank you for taking time and effort away from your business or organization to assist the Panel in this important work

Small Business Advocacy Review Panel Meeting with Small Entity Representatives for Municipal Solid Waste Landfill Emission Guidelines

Date: Tuesday, April 14, 2015

Time: 1:00 – 3:00 p.m. Eastern

Location: WJC North Room 7530 or call toll-free (866) 299-3188; access code 202 566 2372

Agenda:

1:00	Welcome and Introductions
1:10	Background on Municipal Solid Waste (MSW) Landfill Emission Guidelines (EG) and related New Source Performance Standards for MSW Landfills – New and Modified Sources
1:30	Discussion
2:50	Summary and Closing

Toll-free Teleconference dial-in number: (866) 299-3188
Conference code: 202 566 2372

Dial the toll-free teleconference number listed above. At the prompt, enter the conference code followed by the pound [#] sign. Note: You will hear music until the leader dials into the call.

Attending the meeting in person:

This meeting will be held at EPA Headquarters in **William J. Clinton North, Room 7530 at 1200 Pennsylvania Ave. NW, Washington DC**. Any invited Small Entity Representative may attend in person if desired.

We are unable to pay for travel expenses to Washington, DC for the meeting.
If you would like to attend in person, you must RSVP with Caryn Muellerleile at (202) 564-2855 or muellerleile.caryn@epa.gov for directions and building access information.

Small Business Advocacy Review Panel Outreach Meeting Invitees
for Municipal Solid Waste Landfill Emission Guidelines

Small Entity Representatives

Name	Affiliation
1. Alek Orloff	Alpine Waste & Recycling Colorado
2. Donald Pyle	Solid Waste Authority for Delta County, Michigan
3. Susan McIntyre	Solid Waste Division of Delaware County Department of Public Works, New York
4. Anne Germaine	Representing Caroline County, Maryland
5. Matt Stutz	Representing Ponca City Landfill, Oklahoma
6. Larry Sweetser	Rural Counties’ Environmental Services Joint Powers Authority
7. Todd Green	American Environmental Landfill, Inc., Oklahoma
8. Michael Michaels	Representing City of Riverview, Michigan
9. Robert Lee	Eco-Tech operates Clark-Floyd Landfill, Indiana also member of the National Solid Waste Management Association (NSWMA)
10. Kimberly Smelker	Granger Waste Services Wood Street Landfill and Disposal Center Lansing, MI
11. Curt Publow	Decatur Hills, Inc. Greensburg, IN