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Georgia Department of Natural Resources
Environmental Protection Division • Air Protection Branch
4244 International Parkway • Suite 120 • Atlanta • Georgia 30354
404/363-7000 • Fax: 404/363-7100
Mark Williams, Commissioner
F. Allen Barnes, Director

MAR 25 2011

Tim Bassett, Manager
Waste Management, Inc.
3001 South Pioneer Drive
Smyrna, GA 30083

Re: Application No. 20161, dated January 7, 2011
Chambers R&B Landfill, AIRS No: 01100014
Application For a Landfill Gas-To-Energy Facility

Dear Mr. Bassett:

Technical review of the above referenced application for the construction and operation of a Landfill Gas to Energy facility has progressed. As a result, the Division has the following comments:

1. Typographical Errors: Appendix A of this letter provides a listing of the typographical errors found in the Application.

2. Section 2 – Process Description:
   a. Make it clear whether Chambers R&B Landfill will be the Permittee for the landfill gas to energy project.

   b. Make it clear whether the applicant is requesting operational flexibility to use the existing flares or the IC engines to handle the landfill gases.

3. Section 3 and Appendix B - Particulate Matter (PM, PM10, and PM2.5) Emissions:
   The combustion of any fuel causes the emissions of particulate matter (PM), PM less than 10 microns in aerodynamic diameter (PM10), and PM less than 2.5 microns in aerodynamic diameter (PM2.5), which are regulated New Source Review (NSR) pollutants. We expect that all PM emissions emitted from an internal combustion engine are very small and therefore assume that PM=PM10=PM2.5, as does the applicant.

   The applicant proposes a PM emission factor of 48 pounds per million dry standard cubic feet (dscf) methane, which is about 0.048 pound per million Btu (lb/MMBtu)[1]. If PM = PM2.5 emissions, PM2.5 is assumed to be 0.048 lb/MMBtu. We note that the PM AP-42 emission factor has an "E" rating. The low rating does not disqualify the use of this factor, if it is the only one available. However, if there is a more reliable factor, it should be used. Please discuss the use of this emission factor.

   Georgia EPD is required to address both filterable particulate matter and condensable particulate matter in establishing emissions limits for PM10 and PM2.5 in New Source Review (NSR) permits as of January 1, 2011. The applicant did not indicate whether the proposed PM, PM10, and PM2.5 emissions include

[1] US EPA AP-42 Table 2.4-5.

both filterable and condensable particulate matter. As noted above, the applicant proposed a PM emission factor equivalent to 0.048 lb/MMBtu. EPA's AP-42 Section 3.2.2 for *4-Stroke Lean-Burn Engines burning natural gas* includes a total PM emission factor of 0.00991 lb/MMBtu (which includes both filterable plus condensable PM). Please confirm whether the PM emission factor of 0.048 lb/MMBtu, or any other PM emission factor, includes condensable PM, and can therefore be used as PM10 and PM2.5 emission factors.

The applicant sets the mass emission rate of PM10 to be equal to the mass emission rate of PM from the IC engines. The PM emission factor is stated in units of pounds per million dry standard cubic feet (lb/MM dscf). The applicant uses a flow rate of landfill gas (LFG) to the engine in units of standard cubic feet per minute (scfm). This raises the following questions:

a. As stated above, the PM emission factor is on a dry basis. The applicant uses a flow rate of 589 scfm of LFG to the engine. Does that represent a wet or dry basis?

b. What are the standard temperature and pressure conditions that are assumed for this PM emission factor?

c. What are the standard temperature and pressure conditions that are assumed for the flow rate of LFG to the engine of 589 scfm?

d. If the standard temperature and pressure conditions of the emission factor and flow rate of LFG to the engine are not equivalent please make the appropriate correction(s) to the computation of PM, PM10, and PM2.5 emissions.

The applicant sets the mass emission rate of PM2.5 to be equal to the mass emission rate of PM10 from the applicable pieces of equipment. The applicant also states that PM10 will serve as a surrogate for PM2.5. However, the NSR program requirements for PM10 can no longer be used in Georgia to meet the NSR program requirements for PM2.5. Please conduct a "best available control technology" [BACT] and air impact analyses for PM2.5, as required by NSR.

4. Section 3 and Appendix B - Sulfur Dioxide Emissions:
   a. The applicant uses a "flow rate of LFG" to the engine of 531 cfm, yet uses a value of 589 cfm on page 3 of Appendix B. Which value is correct? We note that the number 589 was associated with the units of scfm in earlier computations. It is not clear which is correct, 589 scfm, or 589 cfm, or 531 cfm. Please make sure that the correct values are used in all computations.

   b. The SO2 emission calculation in Section 3 is not consistent with the calculation in Appendix B. Different flow values are used and values do not seem to be correctly carried through all steps of the calculation. The applicant computed a volume flow rate of sulfur of 1,978.42 cubic meters per year (page 3-4); however, the applicant uses 1,975.42 cubic meters per year and then 2,194.69 cubic meters per year in subsequent calculations. Please correct these calculations.

   c. Section 3 estimates SO2 emissions from each IC engine as 5.7 tpy; whereas, Appendix B and EPD estimate it to be 6.33 tpy. Please correct these calculations.

5. Section 3 and Appendix B - NOx and CO Emissions:
   The applicant states on page 3-1 that emission estimates are based on a CO emission factor of 4.13 grams per bhp-hr. The applicant uses 4.31 grams per bhp-hr to compute emissions in Appendix B of the application. The engine specification sheet has a CO emission factor of 2.5 g/bhp-hr. Which emission factor is correct and why?

6. Section 3 and Appendix B - VOC Emissions:
   a. The applicant is conservatively assuming that non-methane organic compounds (NMOCs) are 100% VOCs. Georgia EPD supports that conclusion; it is conservative because there are NMOCs that are not VOCs. The applicant provides several different VOC emission factors that might be applicable for characterizing VOC emissions from IC engines combusting LFG. Appendix B of this letter lists the various VOC emission factors found in the application.

      A review of the VOC emission factor table in Appendix B of this letter shows that all but one of the VOC emission factors results in potential VOCs exceeding 40 tons per year of VOC. This would make the modification significant for VOC emissions, requiring a BACT analysis. However, the applicant is proposing to avoid PSD review for VOC emissions by limiting VOC emissions to 0.081 lb/MMBtu [or 20 ppmvd NMOC, as hexane at 3% oxygen].

      As indicated above, other VOC engine emission factors indicated emissions could be significantly higher than the applicant calculates. As an example, the New Source Performance Standard (NSPS) 40 CFR 60 Subpart JJJJ limits VOC emissions from such engines to 1.0 g/hp-hr. Each engine is allowed to emit 4.92 lb/hr for a total potential to emit (PTE) of 129.38 tons per year (tpy).

      Georgia EPD finds that all data point to emissions being higher than that and believes that the proposed project triggers PSD because potential VOC emissions exceed 40 tpy. VOC emissions per engine would have to be 0.104 lb/MMBtu or less in order to avoid PSD review for VOC emissions. Absent a demonstration that VOC emissions could be that low, a BACT determination is required to be submitted. We suggest that the applicant obtain a guarantee from the engine manufacturer that the engines will emit no more than 0.104 lb/MMBtu or 0.30 grams per bhp-hr (see Appendix B of this letter – VOC Emission Factor Table). Other demonstrations of being able to meet that limit will be considered.

      Also note that the applicant needs to include formaldehyde emissions when calculating the VOC emission rate to determine if potential emissions exceed 40 tpy. Natural gas fired engines tend to have high emissions of formaldehyde.

   b. On page 3-5 the parameter Q_{Exstd} is defined as 4,393 standard cubic feet per minute. Does this value represent the IC engine volume flow rate exhaust? What are the temperature and pressure values for "standard"? What is the origin of this value? It should also be noted that in Table B-1a, on page 2 of 25, the exhaust gas flow is 4,875 wet scfm. It does not match air flow values from IC engine technical data sheet, although this may result from using a different standard temperature and pressure than found on the IC engine technical data sheet. Which value is correct?

   c. Table B-2 Concentration Chlorinated Compounds refers to Landfill A and Landfill C. What is meant by Landfill A and Landfill C?

7. Section 4:
The following table shows that there are discrepancies in emission increases between those in Table 4.1 and Appendix B. For each discrepancy, please explain why the two values are not the same and/or indicate which value is correct.

Regulated NSR Pollutant	PTE Table 4-1 (tpy)	PTE Table Appendix B (tpy)	Comments
SO2	34.2	37.95	The values do not match.
NOx	77.62	77.62	N/A
PM	20.09	34.5	The values do not match.
PM10	20.09	34.5	The values do not match.
PM2.5	534.32	34.5	The values do not match.
CO	557.6	557.6	N/A
VOC	31.01	34.41	The values do not match.

8. Section 5:
The applicant presents a BACT analysis for emissions of NOx, CO, PM10, and PM2.5 in Section 5 of the application. This is done using a "top down analysis" via the five-steps listed in EPA's *New Source Review Work Shop Manual Draft*, October 1990. Georgia EPD finds the BACT analyses deficient for the following reasons.

a. The term "BACT" is defined in 40 CFR Part 52.21(b)(12). According to 40 CFR Parts 52.21(b)(12) and 52.21(j), this requires specifying an emissions limitation or work practice standard. The BACT documentation in this application does not include proposed BACT emission limits, nor proposed associated averaging times, test methods, monitoring, record keeping, or reporting for NOx, CO, PM10, and PM2.5. Please resolve this deficiency. Be sure to identify the types of controls and pollution prevention measures required for similar sources permitted by other state and local air pollution control programs. This should include a list of sources that the requirements. The RACT/BACT/LAER Clearinghouse (RBLC) is a good starting place for identifying this information, but if there is information not in the RBLC, that must also be included.

b. As indicated above, Georgia EPD expects that a BACT analysis will be required for VOC emissions. If that is the case, and the applicant submits a VOC BACT analysis, be sure that it is done in accordance with EPA's *New Source Review Workshop Manual* and that it includes supporting documentation for each component of a BACT analysis along with substantiation for any proposed numerical emissions limit or work practice standard. Be sure to include an averaging time for each proposed numerical emission limit along with documentation of the proposed compliance method.

c. The BACT determinations must address startup and shutdown emissions of the IC engines as part of the BACT analysis.

9. Section 6 and Section 8 – Waste Heat Leachate Concentrator
a. Heartland Technology Partners, LLC is the proposed vendor for the Waste Heat Leachate Concentrator to be used at the Chambers R&B Landfill. Georgia EPD has discussed the proposed HCl emission rate with Mr. Bernie Duesel of Heartland Technology Partners, LLC. Heartland Technology Partners, LLC does not support the proposed emission rate of HCl and knows of no

evidence that HCl will even be emitted. With this in mind, does the applicant still want to assume that potential emissions of HCl will equal or exceed 10 tons per year?

b. Assuming HCl emissions exceed 10 tpy, the Waste Heat Leachate Concentrator system is a major source of individual HAP and total HAPs. Please provide a regulatory analysis of 40 CFR Part 63 applicability for these HAP emissions.

c. The applicant defines the facility as an area source in regard to 40 CFR 63 Subpart ZZZZ (page 6-2). If the determination is made that the facility is a major source as described in paragraph b. above, the IC engines must meet the initial notification requirements of 40 CFR 63.6645(f) and the requirements of 40 CFR 63.6625(c), 63.6650(g), and 63.6655(c). Please update the regulatory analysis found in the application as it relates to 40 CFR Part 63 and include these requirements.

10. Section 7 – Greenhouse Gas (GHG) Applicability:
    a. The application lists the following emission rates of GHG emissions from biogenic and anthropogenic sources, on a CO2e basis:

Scenario #1	Scenario #2
From Flares = 166,514.54 tpy In Fugitive LFG = 39,546.64 Total = 206,061.18	From IC Engines = 108,816.06 In Fugitive LFG = 25,817.79 Total = 134,633.85

The applicant requests operational flexibility to operate under scenario #1 or scenario #2. Scenario #1 is their current operational mode. Their application is, essentially, a request to include scenario #2 as an operational mode. Since the potential GHG emission rate (in CO2e) from the flares is currently greater than 100,000 tpy, GHG is a regulated NSR pollutant. Because the potential GHG emission rate (in CO2e) is greater than 75,000 tpy, GHG emissions are subject to PSD and require a BACT determination.

b. The applicant's BACT analysis is incomplete because the applicant did not propose a CO2e emission rate from the IC engines. Please provide a CO2e emission rate from the IC engines as part of the BACT proposal. Please be sure to include averaging time and compliance method.

11. Appendix A: Note that SIP Forms 1.00 (page 3) and 4.00 may need to be amended and resubmitted, depending on the final emission calculations.

12. Other:
    a. Was a copy of the PSD application submitted to EPA? If not, the applicant should send a hard copy of the application to:

USEPA Region IV
Air Planning Branch/Air Permits Section
61 Forsyth Street, SW
Atlanta, GA 30308-8960

b. The facility is located 120 km from the Great Smoky Mountains National Park, so notification of the FLM is required. Typically the facility is responsible for contacting the FLM and providing appropriate documentation in the PSD application. Has the FLM been notified? If not, please contact the FLM as soon as possible and copy Georgia EPD on any correspondence.

c. The applicant needs to define the 24-month period (baseline years) to be used for calculating the past actual emissions for the existing flares used in the emission calculations.

d. Please provide the following contact information for local agencies:

   i. County legal organ name, address, and phone number

   ii. City mayor name and address

   iii. County clerk name and address

   iv. County Board of Commissioners – Chairman name and address

e. As of the date of this letter the applicant has not yet submitted:

   i. Toxic Impact Analysis

   ii. Class I and Class II NSR Air Impact Analysis.

Please submit these portions of the application as soon as possible.

The Division requests an updated application in response to these comments by May 13, 2011. Failure to respond by this date will result in the return of this application to the facility. If you have any questions or need more information, please contact:

Tracey Hiltunen at (404) 362-2522 or via email at tracey.hiltunen@dnr.state.ga.us;
Susan Jenkins at (404) 362-4598 or via email at susan.jenkins@dnr.state.ga.us;

Sincerely,

Tracey Hiltunen
Environmental Engineer
Stationary Source Permitting Program

c: Peter Courtney, Georgia EPD Planning & Support Program
Susan Jenkins, Georgia EPD Stationary Source Permitting Program
John Yntema, Georgia EPD Stationary Source Permitting Program
William Apple, SAGE Environmental Consulting

Appendix A

Typographical Errors

Section 3.2.1: "3.35 tpy PM10 Emissions (per engine)" should read "3.714 tpy PM10 Emissions (per engine)".

Section 3.2.2 -Equation 3 should be stated as "Emission Rate of S" rather than "Emission Rate of SO2".

Section 3.2.3 -NOx and CO emission equations as shown on page 3-5 in application:

$$P_e \text{ X EF} \div 453.59$$

The equation is missing a conversion factor [(8760hr/yr)(ton/2000lb)]. The stated NOx and CO numerical calculation and result are correct.

Section 3.2.5 -Typo in HCl emission calculation. 35.7 ppmv should be 53.5 ppmv. The final result is correct.

Notes for Table B-1a and Table B-1b contain typos in references to other Appendices or Tables. (Examples: Note 6 refers to Appendix F, which should be D. Chloride concentration refers to Table C-7 & C-8; there are no such tables in application.)

Appendix B: Scenario 2, Leachate Concentrator and Engine Emissions Table B-1b (page 5 of 25) – Engine sample calculation for annual PM emission rate is 9.29 tpy, should be 4.09 tpy based on values as presented.

Appendix B: Scenario 2, Leachate Concentrator and Engine Emissions Table B-1b (page 5 of 25) – Engine sample calculation for HCl shows an hourly emission rate of 0.17 lb/hr, but uses an hourly emission rate of 5.78 lb/hr in calculating the annual emission rate. What is the correct emission rate?

Appendix B

Emission Factor Table for IC Engine Combusting Landfill Gas

Volatile Organic Compounds

Source	Emission Factor Per Engine	Notes	Potential to Emit for 6 IC Engines (tpy)
Applicant	20 ppmvd as hexane at 3% oxygen 1.31 lb/hr 0.081 lb/MMBtu 0.233 g/bhp-hr	40 CFR 60.752(2)(iii)(B) (In Subpart WWW) from collection and control device for LFG SIP Application SIP Application	34.42
Applicant – Technical Specification Sheet for IC Engine	0.88 g/bhp-hr at 100% load 4.33 lb/hr 0.29 lb/MMBtu	2,233 bhp 242,216 Btu/min	113.85
AP-42 Section 3.2.2 4-Stroke Lean-Burn Engine burning natural gas	0.118 lb/MMBtu with a C rating 1.90 lb/hr	AP-42 specifies an emission factor as lb/MMBtu From SIP Application: 16.12 MMBtu/hr/engine	49.93
40 CFR 60 Subpart JJJJ	2.0g/hp-hr or 80 ppmvd at 15% oxygen 0.693 lb/MMBtu	From Subpart JJJJ Based on 6,354 Btu/bhp-hr	129.38
PSD Avoidance	0.104 lb/MMBtu 0.30 g/bhp-hr	Mathematical Derivation-Back calculation Based on 6,354 Btu/bhp-hr and 39 tpy	39

Particulate Matter (PM, PM10, PM2.5) Filterable Plus Condensable

Source	Emission Factor Per Engine	Notes	Potential to Emit for 6 IC Engines (tpy)
Applicant from AP-42 Table 2.4-5	48 lb PM/MMdscf methane 0.048 lb PM/MMBtu 0.773 lb/hr based on 16.12 MMBtu/hr/engine	Methane is about 1000 Btu/dscf Emission factor has "E" rating PM=PM10=PM2.5 from AP-42	20.31
AP-42 Section 3.2.2 4-Stroke Lean-Burn Engine burning natural gas	0.00991 lb/MMBtu with a D rating 0.160 lb/hr based on 16.12 MMBtu/hr/engine	Includes condensable PM=PM10=PM2.5 from AP-42	4.2

Nitrogen Oxides (NOx)

Source	Emission Factor Per Engine	Notes	Potential to Emit for 6 IC Engines (tpy)
Application page 3-1	0.6 g/bhp-hr 0.202 lb/MMBtu 2.95 lb/hr	2,233 bhp 242,216 Btu/min	77.62
Application – Technical Specification Sheet	0.5 g/bhp-hr 0.169 lb/MMBtu 2.46 lb/hr	2,233 bhp 242,216 Btu/min	64.68
AP-42 Table 2.4-5	250 lb/MMdscf methane 0.254 lb/MMBtu 4.09 lb/hr	Methane is about 1000 Btu/dscf Emission factor has "D" rating	107.60
40 CFR 60 Subpart JJJJ	2.0 g/hp-hr 150 ppmvd at 15% oxygen		258.75
Rule 391-3-1-.02(2)(mmm)	80 ppm @15% oxygen, dry basis 0.29 lb/MMBtu	Applicable Regulation for each IC engine	110.76

Sulfur Dioxide

Source	Emission Factor Per Engine	Notes	Potential to Emit for 6 IC Engines (tpy)
Application page 3-1	maximum sulfur concentration of 275 ppmv 5.76 tpy per engine 0.267 g/bhp-hr 1.32 lb/hr		34.56

Carbon Monoxide

Source	Emission Factor Per Engine	Notes	Potential to Emit for 6 IC Engines (tpy)
Application page 3-1	4.13 g/bhp-hr 1.39 lb/MMBtu 20.33 lb/hr		534.31
Application page 3-5	4.31 grams per bhp-hr 1.45 lb/MMBtu 21.21 lb/hr		557.60
Application-Technical Specification Sheet	2.5 g/bhp-hr 0.846 lb/MMBtu 12.30 lb/hr		323.43
AP-42 Table 2.4-5	470 lb/MMdscf 0.47 lb/MMBtu 7.58 lb/hr	Methane is about 1000 Btu/dscf	199
40 CFR 60 Subpart JJJJ	5.0 g/hp-hr 610 ppmvd at 15% oxygen		646.88

Appendix C

GHG Applicability for WMRE LFGTE Project at Chambers R&B Landfill
GHG Applicability for Existing Sources

From Appendix B of Application

Source of GHG Emissions Existing Facility	Total PTE As CO2e Short tons per year or US tons per year
Flare (800 scfm) Biogenic + Anthropogenic CO2	24,466.79
Flare (2150 scfm) Biogenic + Anthropogenic CO2	65,589.04
Flare (2500 scfm) Biogenic + Anthropogenic CO2	76,458.71
Uncollected CH4 emitted through cover	9,082.45
Uncollected CO2 emitted through cover	27,689.00
CO2 emitted through cover from oxidized methane	2,775.19
Total	206,061.18

Source of GHG Emissions Modification with 6 IC Engines and No Flares	Total PTE As CO2e Short tons per year or US tons per year
Flare (800 scfm) Biogenic + Anthropogenic CO2	0
Flare (2150 scfm) Biogenic + Anthropogenic CO2	0
Flare (2500 scfm) Biogenic + Anthropogenic CO2	0
Uncollected CH4 emitted through cover	5,929.42
Uncollected CO2 emitted through cover	18,076.60
CO2 emitted through cover from oxidized methane	1,811.77
CAT Engine 3520 CO2	18,136.01
CAT Engine 3520 CO2	18,136.01
CAT Engine 3520 CO2	18,136.01
CAT Engine 3520 CO2	18,136.01
CAT Engine 3520 CO2	18,136.01
CAT Engine 3520 CO2	18,136.01
Total	134,633.85

- Will the permit be issued on or after July 1, 2011? Yes
- Is this modification subject to PSD permitting for a regulated NSR pollutant other than GHGs? Yes
- Determine the past actual (baseline) in tons per year for units that are part of the modification for each of the six GHG pollutants. For new units, the past actual emissions are zero. Physical modification consists of adding six IC engines that will combust LFG with the flares being used on an as needed basis.
- Determine the new source's potential to emit (PTE) in tons per year for each of the six GHG pollutants taking into account enforceable limits. Calculate the GHG emissions on a CO2 equivalent (CO2e) basis using the global warming potential factors applied to the mass of each of the six GHG pollutants. New CO2e after modification are approximately 134,633.85
- Are the potential GHG emissions on a CO2e basis equal to or greater than 100,000 tpy? Yes, although the Potential after – Potential Before = 71,427.33 tpy if flare will no longer be used.
- Is this a new stationary source subject to PSD for a regulated NSR pollutant other than GHGs? Yes

- Are the potential GHG emissions equal to or greater than 75,000 tpy on a CO2e basis? Yes
- Are GHG Emissions subject to PSD review for this modification?Yes