Golder Associates

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BUREAU OF AIR REGULATION

November 17, 2010 093-87674

Jeffrey F. Koerner
Florida Department Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: WASTE MANAGEMENT, INC. OF FLORIDA
AIR PERMIT APPLICATION NO. 0250615-012-AC (PSD-FL-414)
MEDLEY LANDFILL GAS-TO-ENERGY PROJECT
REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Koerner:

Waste Management Inc. of Florida (WMIF) received a request for additional information (RAI) from the Florida Department of Environmental Protection (FDEP) dated September 15, 2010, regarding the PSD air construction permit application for the landfill gas-to-energy (LFGTE) project at the existing Medley Landfill in Miami-Dade County. Each of FDEP's information requests is listed below followed by a response. All supporting documents are attached to this letter.

Comment 1. **Based on information provided in the application, the Department understands the project proposes to install six CAT 3520 lean-burn internal combustion engines and generator sets, which will use landfill gas. The six engines will be capable of generating a total of 9.6 megawatts (MW) of power (1.6 MW per CAT 3520). The landfill currently generates 4,000 standard cubic feet per minute (scfm) of landfill gas. The future landfill gas production rate is estimated to be 7,317 scfm by 2013. The maximum hydrogen sulfide (H_2S) content of the landfill is estimated to be 830 parts per million by volume (ppmv). The two existing flares will be retained and relocated adjacent to the engines as additional combustion devices for landfill gas. The landfill gas will be routed through a landfill gas treatment system and then to the CAT 3520 engines and the remaining landfill gas will be routed to the flares. The gas treatment system includes initial gas dewatering, utilizing a moisture knock-out vessel, gas compressor and blowers, air-to-gas coolers and removal of particulate matter larger than 10 microns from the gas stream. Is this an accurate characterization? Please provide a detailed description and process flow diagram of the landfill gas treatment system.**

Response: FDEP's characterization of the project is accurate. The proposed landfill gas (LFG) treatment system will consist of the following:

- LFG passes through the knockout separator, which mechanically filters the gas in the initial portion of the treatment system. The gas then enters the blowers which supply the WMRE compressors the volume required for reciprocation at full load. LFG in excess of engines design limitations is routed to the flares for destruction. The heat of compression increases the temperature of the gas.
- LFG is dewatered by cooling the gas in the aftercooler. The gas is cooled, which lowers the gas temperature, and causes the water in the gas to condensate, reducing the amount of water vapor present in the gas stream.

- After passing through the air cooled aftercooler, the gas passes through a less than 1. micron coalescing filter. The cooled and filtered gas is then reheated in the Reheater/Economizer to vaporize any remaining moisture before entering the gas plant.

A process flow diagram of the LFG treatment system is presented in Attachment 1.

Comment 2. **The H_2S content, 830 ppmv, was based on "OLI" according to Table 2-1 of the application. What does OLI represent? What is the basis for assuming 830 ppmv of H_2S? Does the Medley Landfill currently measure the H_2S content of the landfill gas? If so, how and where is it measured and at what frequency? Please provide all H_2S data available for Medley. If there is no available data, please take representative samples of the landfill gas at the Medley Landfill and test for H_2S content to verify the estimated H_2S content**

Response: The reference "based on OLI data" is an error and should be corrected as "based on WMIF data."

The LFG maximum H_2S content of 830 ppmv is based on avoiding PSD review, and will result in a SO_2 emissions increase due to the proposed project of not greater than 39 TPY. Since the existing Medley Landfill is a major source of air emissions, an emissions increase of 40 TPY or more would cause SO_2 to be subject to PSD review. The actual Medley LFG H_2S content is much lower than 830 ppmv.

Based on the current Title V air operating permit, the Medley Landfill is not required to measure the H_2S content of LFG. WMIF however takes LFG samples to measure H_2S content along with other parameters for internal purposes only. Copies of available LFG sampling results taken at the facility are presented in Attachment 2. It is noted that prior to 2008, the H_2S samples were taken by Draeger tubes, and the results are highly inaccurate and unreliable. Results were reported as either <100 ppm or >100 ppm. Data taken since 2008 is considered to be valid and accurate data.

Comment 3. **For the initial facility construction, please identify the original landfill design capacity in million megagrams by mass or million cubic meters by volume, the maximum landfill gas generation rate and the potential emissions. Identify each subsequent year in which the landfill design capacity was expanded. For each expansion and using the same units, identify the new landfill design capacity, the maximum landfill gas generation rate and potential emissions. In addition, identify: the year that the original landfill gas collection system was installed; the year each landfill gas control device was installed (flares, engines, etc.); each year the landfill gas collection system was modified; each year a landfill gas control device was installed or modified; and the potential emissions after each change.**

Response: WMIF is not requesting an expansion of the existing permitted landfill. The subject application is solely for the installation of a LFGTE project.

Based on the facility description provided in the current Title V air operating permit, the Medley Landfill is an open Class I Landfill with a design capacity greater than 2.5 million megagrams by mass or 2.5 million cubic meters by volume. This landfill commenced construction prior to 1980 as a limerock quarry that was backfilled with fill and municipal solid waste (MSW) placed above the ground water table. The landfill started receiving waste prior to 1980 and was modified or reconstructed between 1987 and 1993 when Cells 1, 2, and 3 were constructed with geosynthetic liners to accept an estimated 5 million cubic yards of MSW. Between 1997 and 2000, Phase 1, 2, and 3 were developed with geosynthetic liners to accept an estimated 7 million cubic yards. In 2003, the saddle fill was constructed with a geosynthetic liner to provide an additional 2 million cubic yards. Yearly waste acceptance is approximately 700,000 tons. According to the Title V permit, the nonmethane organic compounds (NMOC) emissions are greater than 50 megagrams per year, based on EPA's uncontrolled emission rate estimates.

At the Medley Landfill, landfill gas emissions are collected and controlled through an extraction well field system with flares. Note that the gas collection system expands every year based upon NSPS Subpart WWW requirements.

The first flare (utility flare) was installed in 1990. A second utility flare was installed in December 2002 but was removed in 2007. A third flare (enclosed flare) was installed in October of 2003 and started operation November 5, 2003. The enclosed flare is now the primary flare, and the utility flare serves as back up.

The Medley Landfill is a major source of criteria air pollutants. Based on Annual Operating Report (AOR) data (see Table C-1 of the PSD Report), the facility emitted 250 TPY of SO_2 emissions in 2004 and, therefore, became a major source of criteria pollutants in 2004. Miami-Dade County Department of Environmental Resource Management (DERM) determined in a letter dated November 21, 2008 (attached) that the facility had become major for PSD purposes in 2004.

Comment 4. **Please provide the following information in a table: year; annual waste received (tons); cumulative waste stored (tons); landfill gas generation potential (scfm); landfill covered by landfill gas collection and control system (%); and landfill gas recovered (scfm). Attached is an example (Table 6) from Project No. 093104-014-AC for the Okeechobee Landfill expansion.**

Response: The requested information in a table form was provided in Appendix A of the PSD permit application submitted to FDEP on August 16, 2010.

Comment 5. **Table C-3 in Appendix C gives a summary of test data for the enclosed flare. Please address the landfill gas flow rate variability to the enclosed flare during the tests conducted between the years 2006 – 2010.**

Response: The LFG flow rate varies due to the methane and oxygen content in the LFG, as well as variable waste acceptance rates. The rate of LFG production in the landfill is dependent on biogenic activity and cannot be controlled. As a result, actual LFG flow rates do not match the projected LFG generation rates predicted by LFG generation models like EPA's LandGEM model. Also, the oxygen drawn into the landfill often inflates the LFG flow rate. Attachment 3 shows historical LFG flow data to the enclosed flare (primary flare, EU 005) at the Medley Landfill along with methane and oxygen content for the period 2007 to 2010. As shown, the LFG flow rate varied between 1,752 scfm and 5,638 scfm during the period.

Comment 6. **Please provide the emission factors that were the basis for estimating the two-year average baseline emissions in Table C-2.**

Response: The 2-year average baseline emissions in Table C-2 are based on emissions reported in the AORs for the period 2000 to 2009, which are summarized in Table C-1. For each pollutant, an arithmetic average was calculated for each consecutive 2-year period, which are summarized in Table C-2. Baseline emissions are based on the highest of the consecutive 2-year averages for each pollutant.

It was found that the 2003 and 2009 emissions for EU 001 presented in Table C-1 are not correct. A revised Table C-1 is presented in Attachment 4 with the revised values highlighted. The revised Table C-1 also includes available fugitive emissions from EU 002 for all years.

The baseline actual annual emissions in Table C-2 were revised to include only the 3,000-scfm open flare (EU001) and the 6,000-scfm enclosed primary flare (EU005), since these are the only existing emission units affected by the project. Fugitive emissions from the landfill are not affected by the proposed project, and therefore have been excluded from the PSD applicability analysis. Table C-2 shows the revised 2-year average actual annual emissions.

A revised Table 3-3 is attached, which shows the revised PSD applicability analysis. The calculation for emissions increases due to the project has been revised to include projected actual emissions for VOC, which are presented in new Table 2-7. The Medley Landfill has stack test data available for NMOC from the primary flare (EU005) (see Table C-3). The projected actual VOC emissions are calculated using an emission factor in terms of lb/scf of LFG, calculated from the stack test data. A revised Table 2-2 has been attached which includes the derivation of the projected actual VOC emission factor.

Comment 7. Please describe the emission calculation methods used to estimate the baseline emissions reported in Table C-2 from the activity data identified in Table C-1.

Response: As discussed in the response to Item #6 above, the TPY emissions rates were obtained directly from the AORs for the period 2000 to 2009. For each pollutant, a rolling 2-year arithmetic average TPY was calculated, and the baseline emissions are based on the maximum 2-year average TPY for each pollutant.

Comment 8. Please estimate the baseline actual emissions as defined in Rule 62-210.370, F.A.C. This rule established a hierarchy for emissions calculations (e.g., continuous emission monitoring system (CEMS), mass balance, stack test data and emission factors).

Response: The baseline actual emissions are based on data in the AORs submitted to FDEP for the period 2000 to 2009. Emissions calculations were attached along with the AORs to support the emissions data. As stated in DERM's November 21, 2008 letter (attached), DERM and FDEP previously required the Medley Landfill to use AOR data for PSD applicability. WMIF is following the previous determination.

Comment 9. In 2009, you estimated fugitive emissions of volatile organic compound (VOC)/non-methane organic compounds (NMOC). Please provide similar estimates for previous years in the baseline period.

Response: The revised Table C-1 (see Attachment 4) now shows fugitive VOC and NMOC emissions estimates for all the years (2000 through 2009), which are based on AOR data. Please note that fugitive emissions were not reported by the facility for 2004.

Comment 10. Explain and identify the basis of the VOC and sulfur dioxide (SO_2) emission factors. Why are the baseline emission rates of these pollutants so different?

Response: Basis of the VOC and SO_2 emissions were presented in the emissions calculations provided to FDEP along with the AORs. Please note that the facility became a major source of SO_2 emissions in 2004, and the annual SO_2 emissions provided in the AORs for the period 2004 to 2007 are fairly consistent. Past actual emissions can vary due to variations in LFG quantities and constituents, and available sampling and analysis data, including H_2S data. Prior to 2008, H_2S data for the LFG may not have been accurate or reliable.

Comment 11. Provide the supporting information for assuming the carbon monoxide (CO) and nitrogen oxides (NO_x) emission rates from the flares are similar to units at other facilities.

Response: It is presumed that this comment relates to the baseline emissions calculations. Supporting information for CO and NO_x emissions presented in the AORs were provided to FDEP along with the AORs.

The following emission factors were used to calculate 2009 emission rates:

Enclosed Flare: CO – 0.2 lb/MMBtu; NO_x – 0.06 lb/MMBtu
Open Flare: CO – 0.37 lb/MMBtu; NO_x – 0.068 lb/MMBtu

These factors are based on flare manufacturer specifications.

Comment 12. In 2003, what was the landfill gas flow rate to each flare?

Response: Based on 2003 AOR data, LFG flow to the open flare was 2,100 scfm and to the enclosed flare was 4,200 scfm. The enclosed flare began operation on October 2003.

Comment 13. Please identify the year and project that this landfill became a PSD landfill source.

Response: Based on the AOR data presented in Appendix C of the PSD permit application, actual annual SO_2 emissions in 2004 were 250 TPY. Therefore, the facility became a major source as early as 2004. Please note that WMIF submitted a minor source construction permit application to DERM in June 2008. DERM responded in subsequent RAIs that the facility became major in 2004, and a PSD application needed to be submitted instead of a minor source application. The Miami-Dade County RAIs from July and November 2008 are presented in Attachment 5 as a reference.

Comment 14. What is the projected date to close the landfill?

Response: WMIF is unable to project a closing date for the Medley Landfill. Based on the LFG recovery/generation projection model presented in Appendix A of the application, the landfill is expected to accept waste until 2024. However, actual waste acceptance rates are highly variable and no actual closure date can be estimated.

Comment 15. Based on the additional information provided in response to this request for additional information, the project may be subject to PSD preconstruction review for additional pollutants. Please identify any revised emissions increases and provide the required information related to the Best Available Control Technology (BACT) determination and the ambient air quality analyses. In particular, the application identifies an increase in SO_2 emissions of 39 tons/year, which is just below the PSD significant emission rate of 40 tons/year. Based on the information available at this time, the Department is concerned that an expansion of the landfill resulted in a significant SO_2 emissions increase. Please be prepared to provide vendor information and a specific cost quote on removing sulfur from the landfill gas with a Gas Desulfurization Plant (e.g., LO-CAT® or Paques/THIOPAQ® Process) as required for the expansion of the Okeechobee Landfill owned by Waste

Management Inc. In addition, air quality modeling may be necessary to demonstrate compliance with the new federal SO_2 standard.

Response: A PSD applicability analysis was presented in Table 3-3 of the PSD application. Based on this table and the revised Table 3-3 submitted with this response, the pollutants subject to PSD review are CO, NO_x, and $PM_{10}/PM_{2.5}$. The proposed project will not trigger PSD review for SO_2. The proposed maximum H_2S content of 830 ppmv is based on limiting the SO_2 emissions increase due to the project to 39 TPY and is well above the actual H_2S content of the LFG at the Medley Landfill. With this H2S concentration and the throughputs included in this application, this project will not increase SO2 emissions above the significant threshold. WMIF is well aware that once the H_2S content of 830 ppmv becomes a permit condition, exceeding it would mean violating a PSD permit requirement, which will likely lead to enforcement actions. WMIF intends to avoid such a situation by controlling the types of waste it accepts. As discussed above, this project does not include WMIF expanding the Medley Landfill.

Comment 16. The application states that "commence construction" begins with the placement of an order for the engines. This may be a trigger for notifications, ect.; however, the engines are subject to the applicable requirements of NSPS Subpart JJJJ based on the date the engine was manufactured. Please comment.

Response: In Section 3.5.1 of the PSD Report, WMIF presented excerpts from 40 CFR 60, Subpart JJJJ. According to the subpart, "construction commencement date is the day the engine is ordered by the owner or operator." (40 CFR 60.4230(a)). In Section 3.6.3, WMIF presented emissions standards based on manufacturing date because WMIF may decide to use engines for which an order has already been placed. Requirements in Subpart JJJJ for manufacturers are based on the date the engine was manufactured. Requirements for owners or operators are based on the date construction was commenced on the engines, which is defined as the date that the order was placed for the engines. Please note that whether an order has already been placed or a new order will be placed, the proposed CAT 3520 engines will be subject to 40 CR 60 Subpart JJJJ.

Comment 17. Under Section 3.6.3 Emissions standards – NSPS Subpart JJJJ you have stated that "Caterpillar has indicated to Waste Management that they cannot certify the CAT 3520 engines when burning landfill gas as fuel"; however, under Section 5.0 Best Available Control Technology Analysis (BACT) – Selection of BACT and Rationale states that the proposed engines will be manufacturer-certified to comply with NSPS Subpart JJJJ emissions standards. Please clarify.

Response: The proposed CAT 3520 engines for Medley Landfill will comply with the 40 CFR 60 Subpart JJJJ emission standards, but will not be manufacturer certified. Therefore, the statement in Section 3.6.3 is correct and the statement in Section 5.2.2 (last sentence of first paragraph) is not correct. WMI requests that the statement on Page 35 under "Selection of BACT and Rationale" be corrected from "the proposed engines will be manufacturer-certified to comply with the NSPS Subpart JJJJ standards" to "the proposed engines will comply with the NSPS Subpart JJJJ standards." Furthermore, based on 40 CFR 60.4243, WMIF will be required to conduct an initial performance test on these engines within 180 days of startup and thereafter, conduct subsequent performance testing every 8,760 hours of operation or 3 years, whichever comes first to demonstrate compliance with the emission standards.

Comment 18. Please provide supporting information that the CAT 3520 engines will destroy 98% of NMOC.

Response: Please note that the proposed CAT 3520 engines are not required to destroy NMOC emissions by 98 percent. According to 40 CFR 60 Subpart WWW, all LFG must be routed to a NSPS control device and according to 40 CFR 60.752(b)(2)(iii)(C), a NSPS control system is:

> *(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or use.*

Emissions from any atmospheric vent from the gas treatment system are subject to the 98-percent reduction requirement of NMOC. The LFG from the Medley Landfill will be routed to a gas treatment system with no atmospheric vent, and the treated gas will be used either by the proposed CAT 3520 engines or in the existing flares. Based on Section 2.4 of AP-42 for Municipal Solid Waste Landfills, control efficiency of IC engines for NMOC ranges between 95 and 99-plus percent.

In addition, Subpart JJJJ sets a VOC emission limit for the engines.

Comment 19. The application states that the following controls are not technically feasible.

- **Oxidation catalyst for the control of CO and VOC emissions; and**
- **Selective catalytic reduction (SCR) and regenerative SCR for the control of NO_x,**

However, these control systems are proven, effective control technologies. The applications states that the landfill gas containers siloxanes, which will poison the catalysis. Please identify the siloxane levels in the landfill gas at the existing Medley Landfill. How does this compare with the other landfills? Provide supporting information that siloxanes at this level will severely affect or prematurely deactivate the catalysts for the above referenced control systems. Provide a cost estimate for a siloxane removal system, an oxidation catalyst and an SCR system.

Response: Please note that based on previous BACT determinations, there are no known applications of an SCR, RSCR, or an oxidation catalyst system on an LFG-fired IC engine. It is currently considered to be technically infeasible since siloxane removal systems do not guarantee or remove enough siloxane to allow for the use of the add-on controls.

As discussed in Sections 5.2.2 and 5.2.3 of the PSD report, the common disadvantage for all catalyst-based pollution control systems such as selective catalytic reduction (SCR) and regenerative SCR for NO_x control, and oxidation catalysts for CO control, is the chemical poisoning of the catalyst, also known as "catalyst fouling." LFG has silicone based compounds called siloxanes in the gas stream. Siloxanes are oxidized to silicon dioxide, a sticky substance that is abrasive and can foul or poison the catalyst very quickly. Fouling of the catalyst's surface by siloxane deposits inhibits the reduction of NO_x or CO and hence failure of the process to meet air emission compliance standards. Frequent catalyst replacement is needed to maintain design efficiency, which is very expensive.

Fouling of the catalysts can occur in as little as a day or two to several weeks or months, depending on the concentration of siloxanes in the gas stream and other factors. In the preamble for NSPS Subpart JJJJ, EPA states – "Both landfill and digester gases contain a family of silicon-based gases collectively called siloxanes. Combustion of siloxanes forms compounds that have been known to foul fuel systems, combustion chambers, and post-combustion catalysts." As a result, catalyst-based control processes

such as a SCR, RSCR, or oxidation catalyst system are considered to be unsuccessful for LFG-fired applications.

A paper on "Siloxanes in landfill and Digester Gas Update" by Ed Wheless and Jeffrey Pierce is attached as a reference in Attachment 6. The paper provides siloxane data from 28 landfills in the country and talks about numerous examples where silicon dioxide (SiO_2) deposits from siloxane have resulted in catalyst deactivation in hours or days. Due to the frequent catalyst replacement, a catalyst-based post-combustion control will not be cost effective.

A silicon test result for the Medley LFG is presented in Attachment 7 and as shown, the silicon level is 54 mg/Nm^3 of CH_4 (23 ppmw). The referenced paper presents siloxane levels in LFG from 28 landfills in Figure 1.

EPA has also evaluated siloxane removal systems related to add-on catalyst control systems for internal combustion engines in the recent proposed revisions to 40 CFR 63, Subpart ZZZZ, NESHAPS for Reciprocating Internal Combustion Engines (Federal Register, March 5, 2009, p. 9706). EPA states:

> *Currently, there are no viable beyond-the-floor options for engines that combust landfill or digester gas. After-treatment controls could theoretically be applied to engines burning waste gas; however, numerous studies have shown that a family of silicon-based compounds named siloxanes present in landfill gas can foul add-on catalyst controls. Such fouling can render the catalyst inoperable within short periods of time. Pre-treatment systems could be applied to clean the fuel prior to combustion theoretically allowing catalysts to be used, but has not shown to be a reliable technology at this time.*

A siloxane removal system applied to LFG will not remove 100 percent of the siloxanes. Some siloxanes will still pass through the system and ultimately foul the catalyst. Previous attempts to use SCR by treating LFG were unsuccessful. To thoroughly remove siloxanes, several siloxane removal systems may have to be installed in series, which would again significantly increase the cost. There are no such examples and, as mentioned above, no LFGTE project has effectively removed siloxanes to make catalyst-based post-combustion controls work properly. There are instances where siloxane removal systems have been placed into service to aid in reducing the effects on the maintenance of the engines. These systems have not proven to remove enough siloxanes yet to allow for a catalyst to operate properly. Please note that NOx and CO emissions from the proposed project are subject to BACT and WMIF does not want to use control technologies that are both untested and cost prohibitive.

WMIF believes that catalyst-based control systems are technically infeasible for LFG-based applications and a BACT cost analysis is therefore not required. A similar cost analysis was recently prepared at the request of FDEP and was submitted in April 2009 for the Okeechobee Landfill's LFGTE project. A siloxane removal system for Medley Landfill is expected to cost more than $1,000,000. WMIF is actively pursuing a quote for a siloxane removal system, noting that these systems currently do not remove all of the siloxanes. If employed, frequent replacement of catalyst media would still be required due to the leftover siloxanes in the gas stream.

The Okeechobee analysis also included estimated costs for SCR and oxidation catalyst systems. For example, costs of a SCR and an oxidation catalyst system for a Solar Titan turbine (flow rate 5,000 scfm) were estimated to be $1.4 million and $300,000, respectively.

It is also noted that a siloxane removal system is not required to properly operate and maintain the CAT 3520 engines at the Medley Landfill, or to meet the Subpart JJJJ standards.

Comment 20. The Department previously issued three PSD permits for CAT 3520 engines firing landfill gas (Trail Ridge Energy, Brevard Energy and Seminole Energy). The Department's CO BACT determination for all of these engines was 2.75

grams/brake horsepower-hour (g/bhp-hour). These facilities have been constructed and the engines have demonstrated compliance with the CO BART standard. Please explain why the CAT 3520 engines proposed for the Medley project cannot achieve the same level of performance. Also note that the previous BACT determination for particulate matter with a mean particle diameter of 10 microns or less (PM_{10}) for these existing projects was 0.24 g/bhp-hour. Stack tests have demonstrated compliance just below this level. The application for the Medley Landfill proposes a PM_{10} BACT standard of 0.173 g/bhp-hour based on the AP-42 emission factors. Please comment.

Response: WMIF has proposed a CO emission limit of 3.50 g/bhp-hr based on experience in operating similar engines elsewhere. Caterpillar technical data sheets were presented in Appendix B of the PSD Report. As presented in the data sheet, Caterpillar provides a nominal CO emissions data of 2.5 g/bhp-hr and a not to exceed CO emissions data of 4.13 lb/bhp-hr. The nominal value is guaranteed only for the first 100 hours of engine operation. WMIF is aware of the CO BACT limits for the projects referenced, but is not sure whether they are consistently meeting the limit. It is certainly possible to meet the limit during initial testing, but may not be feasible to meet the limit every year thereafter based on testing as required by NSPS JJJJ. However, the requested limit of 3.5 g/bhp-hr is less than the value listed for these engines in NSPS JJJJ.

WMIF has investigated the $PM_{10}/PM_{2.5}$ emission rate and decided to revise its proposed emission rate to 0.24 g/bbp-hr. Revised Tables 2-1 and 2-6 in Attachment 8 show the revised potential emissions from the CAT engines and the revised project potential emissions, respectively. An air quality analysis addressing the $PM_{10}/PM_{2.5}$ emission increase is being performed, and revised results will be provided to the Department in the near future.

Comment 21. On August 23, 2010, Golder Associates Inc. attempted to e-mail the link to air quality modeling files related to the project. However, technical issues prevented the Department from receiving this information until September 1, 2010. Therefore, the Department will request any additional information related to the air quality analysis by the end of September.

Response: WMIF has received the Department's additional information request related to air quality analysis and will respond to them separately.

Thank you for consideration of this information. If you have any questions, please do not hesitate to call me at (352)336-5600.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David Buff, P.E.
Principal Engineer

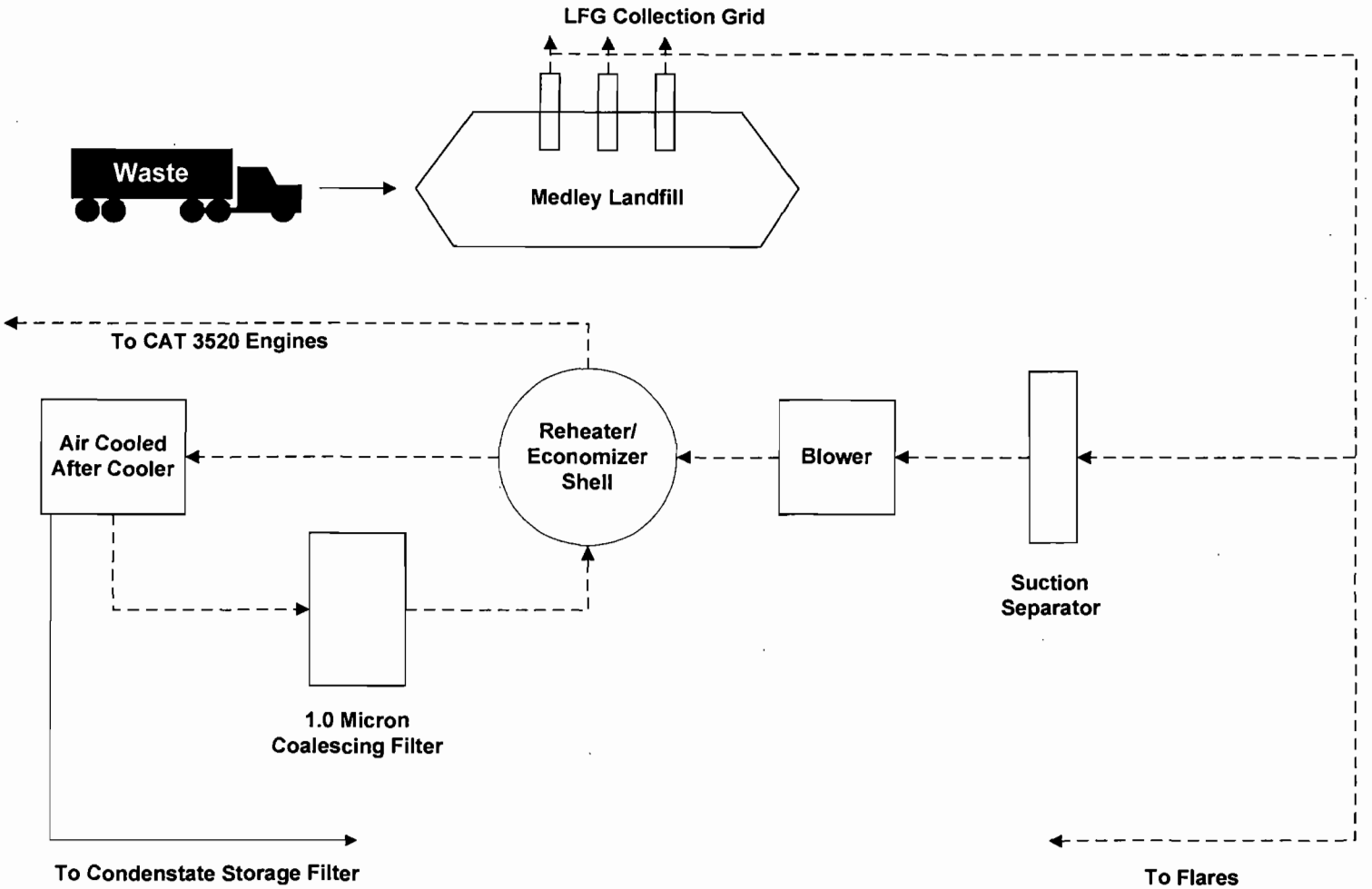
Salahuddin Mohammad
Senior Project Engineer

cc: D. Thorley, WM
J. Kiesel, WM

Attachments
DB/SKM/edk

ATTACHMENT 1

PROCESS FLOW DIAGRAM – LFG TREATMENT SYSTEM



Attachment 1
Process Flow Diagram – LFG Treatment System
Medley Landfill, Inc.
Medley, Florida

Process Flow Legend
Solid/Liquid ——→
Gas - - - →

Golder Associates

ATTACHMENT 2

LFG SAMPLING RESULTS

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Columbia Analytical Services INC.
An Employee - Owned Company

LABORATORY REPORT

September 15, 2008

Steve Wilsey
Conestoga-Rovers & Associates, Incorporated
2055 Niagara Falls Blvd., Suite 3
Niagara Falls, NY 14304

RE: Medley Landfill / 051327-30

Dear Steve:

Enclosed are the results of the samples submitted to our laboratory on September 9, 2008. For your reference, these analyses have been assigned our service request number P0802939.

All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein. Your report contains 8 pages.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; Department of the Navy (NFESC); Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-08-TX. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera

Kate Aguilera
Project Manager

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Columbia Analytical Services INC.
An Employee-Owned Company

Client:	Conestoga-Rovers & Associates, Incorporated	CAS Project No:	P0802939
Project:	Medley Landfill / 051327-30	New York Lab ID:	11221

CASE NARRATIVE

The samples were received intact under chain of custody on September 9, 2008 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Hydrogen Sulfide Analysis

The samples were analyzed for hydrogen sulfide per ASTM D 5504-01 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD).

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Client: Conestoga-Rovers & Associates, Incorporated
Project: Medley Landfill/051327-30

Service Request: P0802939

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P0802939-001	MEDLEY LFG 1	09/08/08	14:05
P0802939-002	MEDLEY LFG 2	09/08/08	14:08
P0802939-003	MEDLEY LFG 3	09/08/08	14:11

Air - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services, Inc.
An Employee - Owned Company
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P0802939

Company Name & Address (Reporting Information)	Project Name	CAS Contact
HSA 1486A SKEES RD N. PALM BEACH, FL 33411	MEDLEY LANDFILL	
	Project Number: 05127-30	Analysis Method and/or Analytes
Project Manager: BRIAN GARNER	P.O. # / Billing Information	
Phone: (561) 688-9008 / Fax: (561) 688-9005		
Email Address for Result Reporting: ~~BGARNER~~ BGARNER@HSA-ENV.COM	Sampler (Print & Sign): ALEX CHATHAM & alex chatham	

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/ Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	Hydrogen Sulfide & Methane by ASTM D5504	Comments e.g. Actual Preservative or specific instructions
~~MEDLEY LFG 1 AIR SAMPLE 1~~	1	09/08/08	14:05	AIR	6222-708-163			✓	RUSH ANALYSIS! RUN WITHIN 24 HRS OF 14:00 EASTERN TIME!
~~MEDLEY LFG 2 AIR SAMPLE 2~~	2		14:08	AIR	6321-708-197			✓	
~~MEDLEY LFG 3 (DUP) AIR SAMPLE 3 (DUP)~~	3		14:11	AIR	6321-708-157			✓	
~~FIELD SAMPLE 4 (BLANK)~~			~~14:14~~	~~AIR~~					

09/08/08

Y:\Projects\2008\08-93-8674 VM Medley PSD\Corr\Attachments\1

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ____ Tier II - (Results + QC) ____ Tier III - (Data Validation Package) 10% Surcharge ____ Tier V - (client specified) ____
EDD required Yes (No) Type: _____ EDD Units: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
alex chatham	9/8/08	14:30	FEDEX		
Relinquished by: (Signature) FEDEX	Date:	Time:	Received by: (Signature)	Date: 9/9/08	Time: 0735
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank
Temperature _____ °C

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Conestoga-Rovers & Associates, Incorporated Work order: P0802939

Project: Medley Landfill / 051327-30

Sample(s) received on: 9/9/2008 Date opened: 9/9/2008 by: LKUKITA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☐	☒	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☐	☒	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
9	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: Serial # _____ -TB _____			
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P0802939-001.01	1.0 L Tedlar Bag					
P0802939-002.01	1.0 L Tedlar Bag					
P0802939-003.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers):

Sample descriptions do not match for all three samples, part of sample descriptions on chain is "LFG", shown on samples as "LF".

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12);

Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Project ID: **Medley Landfill / 051327-30** CAS Project ID: P0802939

Hydrogen Sulfide

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD Date(s) Collected: 9/8/08
Analyst: Zheng Wang/Wade Henton/Chris Cornett Date Received: 9/9/08
Sampling Media: 1.0 L Tedlar Bag(s) Date Analyzed: 9/9/08
Test Notes:

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	Time Analyzed	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
MEDLEY LFG 1	P0802939-001	0.050	08:24	**490,000**	140	**350,000**	100	
MEDLEY LFG 2	P0802939-002	0.050	08:37	**540,000**	140	**390,000**	100	
MEDLEY LFG 3	P0802939-003	0.050	08:55	**560,000**	140	**400,000**	100	
Method Blank	P080909-MB	1.0	07:58	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 9/11/08

COLUMBIA ANALYTICAL SERVICES, INC.

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **Lab Control Sample** CAS Project ID: P0802939
Client Project ID: **Medley Landfill / 051327-30** CAS Sample ID: P080909-LCS

Test Code: ASTM D 5504-01 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Zheng Wang/Wade Henton/Chris Cornett Date Analyzed: 9/09/08
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	**Result ppbV**	**% Recovery**	CAS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,020	**2,360**	**117**	63-136	

Verified By: _____ Date: 9/11/08

COLUMBIA ANALYTICAL SERVICES, INC.

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **MEDLEY LFG 1**
Client Project ID: **Medley Landfill / 051327-30**

CAS Project ID: P0802939
CAS Sample ID: P0802939-001DUP

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang/Wade Henton/Chris Cornett
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 9/8/08
Time Collected: 14:05
Date Received: 9/9/08
Date Analyzed: 9/9/08
Time Analyzed: 09:12
Volume(s) Analyzed: 0.050 ml(s)

CAS #	Compound	Sample Result		Duplicate Sample Result		Average	% RPD	RPD Limit	Data Qualifier
		µg/m³	ppbV	µg/m³	ppbV	**ppbV**			
7783-06-4	**Hydrogen Sulfide**	490,000	351,000	526,000	378,000	364500	**7**	19	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

Verified By: _____ Date: 9/11/08

CHAIN OF CUSTODY RECORD

Pg 1 of 1

AIR TECHNOLOGY Laboratories, Inc.
18501 E. Gale Avenue, Suite 130
City of Industry, CA 91748
626-964-4032 • Fax: 626-964-5832

Project Name: Medley LF
Project #: 072080 73.00
P.O. #:

FOR LABORATORY USE ONLY

Method of Transport: Walk-in ☐ Courier ☐ UPS ☐ FedEx ☒ ATL ☐

Sample Condition Upon Receipt:
1. CHILLED Y☐ N☒ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☐ N☐
3. CONTAINER INTACT Y☐ N☐ 6. PRESERVED Y☐ N☐

Company: SCS-FS	Address: Tampa 4041 Park Oaks Blvd		TEL: (813) [illegible] 3503
Contact: Mike Knox	City	State FL Zip Code 33610	FAX: ( ) 495

Sampled/Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:
Relinquished by: (Signature and Printed Name) Fedex	Date: 9/11/08	Time: 0900	Received by: (Signature and Printed Name) [illegible]	Date: 9/11/08	Time: 0900
Relinquished by: (Signature and Printed Name)	Date:	Time:	Received by: (Signature and Printed Name)	Date:	Time:

I hereby authorize ATL to perform the work indicated below:
Mike Knox
Project Mgr./Submitter (Print Name) Date
Signature

Send Report To:
Attn: Mike Knox
Co:
Address
City State Zip

Bill To:
Attn: SCS-FS
Co:
Address
City Tampa State Zip

Special Instructions/Comments:
4/8 hour sample time

Unless otherwise requested, all samples will be disposed 14 days after reporting or at Lab's discretion.

Sample Archive/Disposal:
☐ Laboratory Standard
☐ Other
☐ Return To:
* $10.00 FEE PER HAZARDOUS SAMPLE DISPOSAL.

Circle or Add Analysis(es) Requested

CIRCLE APPROPRIATE MATRIX: AIR • VAPOR | INDOOR AIR | LANDFILL GAS | WATER | SOLID • SOIL | OIL • SOLVENT • LIQUID | OTHER

LAB USE ONLY Lab No.	Sample Description Sample I.D.	Date	Time	T03 Gas / BTEX / MTBE	T03 Hexane	T03 Carbon Chain	TO14A VOCs	TO15 VOCs Std or Low Level	15/16 Sulfur Comp Std/Low Level	15/16 H2S Std or Low Level	Fixed Gas D1946 or 3C	25C/3C TNMOC	25.1 TGNMHC	D1945 Natural Gas	RSK 175 Dissolved Gas	EPA 15/16 Sulfur	EPA 3C Fixed Gas	Container(s) TAT	#	Type	PRESERVATION	REMARKS
A8091102-01	Medley 1	9/10/08	3 hr TST												✓	✓						
✓ -01A	Medley 1 Backup	9/10/08	3 hr TST																			

DELIVERABLES: EDD ☐ LEVEL III ☐ LEVEL IV ☐

• TAT starts 8 a.m. following day if samples received after 5 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: B=Tedlar Bag C=Canister V=VOA O= Other

Preservatives: H=Hcl N=None

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

Client: SCS Engineers / Field Services
Attn: Mike Knox

Client's Project: Medley LF, 07208073.00
Date Received: 9/11/2008
Matrix: Air
Units: % v/v

Fixed Gases by EPA Method 3C

Lab No.:		**A8091102-01**									
Client Sample I.D.:		**Medley 1**									
Date Sampled:		**9/10/2008**									
Date Analyzed:		**9/12/2008**									
Analyst Initials:		**DT**									
Data File:		**11sep048/049**									
QC Batch:		**080911GC8A2**									
Dilution Factor:		**1.0**									
ANALYTE	**PQL**	**RL**	**Results**								
Oxygen/Argon	0.50	0.50	6.7								
Nitrogen	1.0	1.0	33								
Methane	0.0010	0.0010	35								
Carbon Dioxide	0.010	0.010	30								

PQL = Practical Quantitation Limit
ND = Not Detected (Below RL).
RL = PQL X Dilution Factor

Reviewed/Approved By: _____ **Date:** 9/15/08
Mark J. Johnson
Air Toxics Operations Manager

The cover letter is an integral part of this analytical report.

QC Batch No.: 080911GC8A2
Matrix: Air
Units: % v/v

QC for Fixed Gases by EPA Method 3C

Lab No.:		Method Blank		LCS		LCSD			
Date Analyzed:		09/11/08		09/11/08		09/11/08			
Analyst Initials:		DT		DT		DT			
Datafile:		11sep031		11seo029		11seo030			
Dilution Factor:		1.0		1.0		1.0			
ANALYTE	PQL	RL	Results	% Rec.	Criteria	% Rec.	Criteria	%RPD	Criteria
Oxygen/Argon	0.50	0.50	ND	91	70-130%	92	70-130%	0.7	<30
Nitrogen	1.0	1.0	ND	102	70-130%	102	70-130%	0.1	<30
Methane	0.0010	0.0010	ND	105	70-130%	99	70-130%	6.3	<30
Carbon Dioxide	0.010	0.010	ND	109	70-130%	107	70-130%	1.4	<30

PQL = Practical Quantitation Limit
ND = Not Detected (Below RL).
RL = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 9/15/08
Mark J. Johnson
Air Toxics Operations Manager

The cover letter is an integral part of this analytical report.

Client: SCS-FS
Attn: Mike Knox

Client's Project: Medley LF, #07208073.00
Date Received: 09/10/08
Matrix: Air
Units: ppmv

EPA 15/16 (Sulfur Compounds in Air)

Lab No.:	A8091102-01
Client Sample I.D.:	Medley 1
Date Sampled:	09/10/08
Date Analyzed:	09/11/08
Analyst Initials:	VM
QC Batch:	080911GC3A1
Dilution Factor:	1.0

ANALYTE	PQL	RL	Results
Hydrogen Sulfide	0.20	40	400
Carbonyl Sulfide	0.20	0.20	0.92
Methyl Mercaptan	0.20	0.20	6.1
Ethyl Mercaptan	0.20	0.20	0.35
Dimethyl Sulfide	0.20	0.20	5.2
Carbon Disulfide	0.20	0.20	0.41
Dimethyl Disulfide	0.20	0.20	0.25

PQL = Practical Quantitation Limit
ND = Not Detected (Below RL)
RL = Reporting Limit = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 9/14/08
Mark J. Johnson
Operations Manager

The cover letter is an integral part of this analytical report.

QC Batch #: 080911GC3A1
Matrix: Air
Units: ppmv

QC for EPA 15/16 (Sulfur Compounds in Air)

		Blank		LCS		LCSD			
Lab No.:									
Date Analyzed:		09/11/08		09/11/08		09/11/08			
Analyst Initials:		VM		VM		VM			
Datafile:		11SEP002		11SEP		11SEP001			
Dilution Factor:		1.0		1.0		1.0			
ANALYTE	PQL	RL	Results	%R	Criteria	%R	Criteria	RPD	Criteria
Hydrogen Sulfide	0.20	0.20	ND	81	70-130	92	70-130	12.6	<30
Carbonyl Sulfide	0.20	0.20	ND	101	70-130	105	70-130	3.3	<30
Methyl Mercaptan	0.20	0.20	ND	96	70-130	101	70-130	5.3	<30
Ethyl Mercaptan	0.20	0.20	ND	98	70-130	105	70-130	6.9	<30
Dimethyl Sulfide	0.20	0.20	ND	106	70-130	107	70-130	0.6	<30
Carbon Disulfide	0.20	0.20	ND	97	70-130	101	70-130	3.5	<30
Dimethyl Disulfide	0.20	0.20	ND	96	70-130	101	70-130	4.1	<30

PQL = Practical Quantitation Limit

ND = Not Detected (Below RL).

RL = Reporting Limit = PQL X Dilution Factor

Reviewed/Approved By: _____ Date: 9/14/18

Mark J. Johnson
Operations Manager

The cover letter is an integral part of this analytical report

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Columbia Analytical Services INC.
An Employee-Owned Company

LABORATORY REPORT

May 12, 2008

Steve Wilsey
Conestoga-Rovers & Associates, Incorporated
2055 Niagra Falls Blvd., Suite 3
Niagara Falls, NY 14304

RE: Medley LF (MD) / 51327-30

Dear Steve:

Enclosed are the results of the samples submitted to our laboratory on April 25, 2008. For your reference, these analyses have been assigned our service request number P0801181.

All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein. Your report contains 9 pages.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; Department of the Navy (NFESC); Pennsylvania Registration No. 68-03307. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera

Kate Aguilera
Project Manager

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Client:	Conestoga-Rovers & Associates, Incorporated	CAS Project No:	P0801181
Project:	Medley LF (MD) / 51327-30	New York Lab ID:	11221

CASE NARRATIVE

The samples were received intact under chain of custody on April 25, 2008 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The Summa canister sample was analyzed for fixed gases (oxygen/argon, carbon monoxide, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD).

Sulfur Analysis

The Tedlar bag sample was analyzed for twenty sulfur compounds per ASTM D 5504-01 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). The sample labeled "LFG-02" was analyzed outside of the recommended holding time for sulfur. All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

Client: Conestoga-Rovers & Associates, Incorporated

Folder: P0801181

Project: Medley LF (MD) 51327-30

Detailed Sample Information

CAS Sample ID	Client Sample ID	Container Type	Pi1 (Hg)	Pi1 (psig)	Pf1	Pi2 (Hg)	Pi2 (psig)	Pf2	Cont ID	Order #	FC ID	Order #
P0801181-001.01	LFG-01	1.0 L-Summa Canister Source		0.4	10.1				1SC00308	8529		
P0801181-002.01	LFG-02	1 L-Tedlar Bag, Unpreserved										

Miscellaneous Items - received

Air - Chain of Custody Record & Analytical Service Request

Page ____ of ____

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P050115[illegible]

Company Name & Address (Reporting Information)	Project Name
Cowstoga - Rovcus + Assoc. 2055 Niagara Falls Blvd Niagara Falls, NY	Medley LF (MD)
	Project Number 51327-30
Project Manager Steve Wilsey	P.O. # / Billing Information
Phone 716-297-6150 / Fax 716-297-2265	
Email Address for Result Reporting: SWilsey@CHAworld.com	Sampler (Print & Sign): Steven D. Wilsey / SteDWils

CAS Contact

Analysis Method and/or Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/ Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	3C - CO, CO_2, O_2, CH_4	SS04 Reduced Sulfur Cmpds.			Comments e.g. Actual Preservative or specific instructions
LFG-01	①	4-24-08	13:00		0033666			X				
LFG-02	②	4-24-08	13:00						X			

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____
EDD required Yes / No
Type: _____ EDD Units: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature) SteDWils	Date: 4-24-08	Time: 13:31	Received by: (Signature) [illegible]	Date: 4/25/08	Time: 0900	Cooler / Blank
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	Temperature °C
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:	

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Conestoga-Rovers & Associates, Incorporated Work order: P0801181

Project: Medley LF (MD) / 51327-30

Sample(s) received on: 04/25/08 Date opened: 04/25/08 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by CAS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
9	Was a **trip blank** received?	☐	☒	☐
	Trip blank supplied by CAS: Serial # _____ -TB _____			
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P0801181-001.01	1.0 L Source Can					
P0801181-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12); Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **LFG-01** CAS Project ID: P0801181
Client Project ID: **Medley LF (MD) / 51327-30** CAS Sample ID: P0801181-001

Test Code:	EPA Method 3C Modified	Date Collected:	4/24/08
Instrument ID:	HP5890 II/GC1/TCD	Date Received:	4/25/08
Analyst:	Zheng Wang	Date Analyzed:	4/25/08
Sampling Media:	1.0 L Summa Canister	Volume(s) Analyzed:	0.10 ml(s)
Test Notes:			
Container ID:	1SC00308		

Initial Pressure (psig): 0.4 Final Pressure (psig): 10.1

Canister Dilution Factor: 1.64

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon ***	**9.41**	0.16	
630-08-0	Carbon Monoxide	ND	0.16	
74-82-8	**Methane**	**28.1**	0.16	
124-38-9	**Carbon Dioxide**	**23.1**	0.16	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = Coeluting compounds.

Verified By: RC Date: 5/9/08

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **Method Blank** CAS Project ID: P0801181
Client Project ID: **Medley LF (MD) / 51327-30** CAS Sample ID: P080425-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Zheng Wang Date Analyzed: 4/25/08
Sampling Media: 1.0 L Summa Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon *	ND	0.10	
630-08-0	Carbon Monoxide	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = Coeluting compounds.

Verified By: RC Date: 5/9/08

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **LFG-02**
Client Project ID: **Medley LF (MD) / 51327-30**

CAS Project ID: P0801181
CAS Sample ID: P0801181-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang/Wade Henton/Chris Cornett
Sampling Media: 1.0 L Tedlar Bag
Test Notes: **H**

Date Collected: 4/24/08
Time Collected: 13:00
Date Received: 4/25/08
Date Analyzed: 4/25/08
Time Analyzed: 15:28
Volume(s) Analyzed: 0.010 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	**Hydrogen Sulfide**	**810,000**	700	**580,000**	500	
463-58-1	**Carbonyl Sulfide**	**3,000**	1,200	**1,200**	500	
74-93-1	**Methyl Mercaptan**	**25,000**	980	**13,000**	500	
75-08-1	**Ethyl Mercaptan**	**5,900**	1,300	**2,300**	500	
75-18-3	**Dimethyl Sulfide**	**16,000**	1,300	**6,200**	500	
75-15-0	**Carbon Disulfide**	**880**	780	**280**	250	
75-33-2	**Isopropyl Mercaptan**	**3,900**	1,600	**1,200**	500	
75-66-1	tert-Butyl Mercaptan	ND	1,800	ND	500	
107-03-9	n-Propyl Mercaptan	ND	1,600	ND	500	
624-89-5	Ethyl Methyl Sulfide	ND	1,600	ND	500	
110-02-1	**Thiophene**	**5,600**	1,700	**1,600**	500	**W**
513-44-0	Isobutyl Mercaptan	ND	1,800	ND	500	
352-93-2	Diethyl Sulfide	ND	1,800	ND	500	
109-79-5	n-Butyl Mercaptan	ND	1,800	ND	500	
624-92-0	**Dimethyl Disulfide**	**8,800**	960	**2,300**	250	
616-44-4	3-Methylthiophene	ND	2,000	ND	500	
110-01-0	**Tetrahydrothiophene**	**1,200**	1,800	**330**	500	**J**
638-02-8	2,5-Dimethylthiophene	ND	2,300	ND	500	
872-55-9	2-Ethylthiophene	ND	2,300	ND	500	
110-81-6	Diethyl Disulfide	ND	1,200	ND	250	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
H = Sample analyzed outside of holding time.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.
W = Result quantified but corresponding peak was detected outside of generated retention time window.

Verified By: RL Date: 5/9/08

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Conestoga-Rovers & Associates, Incorporated**
Client Sample ID: **Method Blank**
Client Project ID: **Medley LF (MD) / 51327-30**

CAS Project ID: P0801181
CAS Sample ID: P080425-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang/Wade Henton/Chris Cornett
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 4/25/08
Time Analyzed: 09:44
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: Re Date: 5/9/08

Certificate of Analysis No. H9-9709927-01

Medley Landfill
9350 NW 89th Ave
Miami, FL 33178
ATTN: Steven Urich

DATE: 12/16/97

PROJECT: Total Sulfur
SITE:
SAMPLED BY: Medley Landfill
SAMPLE ID: Flare Sample

PROJECT NO:
MATRIX: AIR
DATE SAMPLED: 09/18/97
DATE RECEIVED: 09/19/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfur by Dohrman-VAPOR Method ASTM D-3246 Analyzed by: CD Date: 09/19/97	7.5		ppmw

Notes:

QUALITY ASSURANCE: These analyses are performed in accordance with ASTM, UOP, or GPA guidelines for quality assurance.

Fred DeAngelo, Laboratory Manager

HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9709927-01

Medley Landfill
9350 NW 89th Ave
Miami, FL 33178
ATTN: Steven Urich

DATE: 02/18/98

PROJECT: Collier Flare
SITE: Collier County RDF
SAMPLED BY: Medley Landfill
SAMPLE ID: Flare Sample

PROJECT NO:
MATRIX: AIR
DATE SAMPLED: 09/18/97
DATE RECEIVED: 09/19/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sulfur by Dohrman-VAPOR Method ASTM D-3246 Analyzed by: CD Date: 09/19/97	7.5		ppmw

Notes:

QUALITY ASSURANCE: These analyses are performed in accordance with ASTM, UOP, or GPA guidelines for quality assurance.

Fred DeAngelo, Laboratory Manager

ATTACHMENT 3

HISTORICAL LFG FLOW DATA

ATTACHMENT 3
HISTORICAL LFG FLOW DATA

Device ID	Date Time	CH_4 (Methane) (%)	CO_2 (Carbon Dioxide) (%)	O_2 (Oxygen) (%)	Balance Gas (%)	Initial Static Pressure (H_2O)	Adjusted Differential Pressure (H_2O)	Initial Temperature (°F)	System Pressure (H_2O)	Initial Flow (SCFM)
MEDLFLR3	11/26/2007 14:38	48.2	35.7	2.9	13.2	-10.7	10.55	112		2850
MEDLFLR3	12/3/2007 16:07	46.1	37	2.8	14.1	-27.4	27.12	116		4850
MEDLFLR3	3/10/2008 13:47	38.3	33.8	4.8	23.1	-29	28.94	118		5432
MEDLFLR3	1/10/2008 14:34	38.4	32.1	4.2	25.3	-28		114		4619
MEDLFLR3	1/21/2008 15:12	34.8	31.9	3.2	30.1	-26.9		110		3949
MEDLFLR3	1/14/2008 16:07	34.2	31.4	3.7	30.7	-27.9		114		4238
MEDLFLR3	1/18/2008 15:45	34.3	31.2	3.1	31.4	-27.8		117		4069
MEDLFLR3	12/10/2007 11:19	45.3	38.1	2.9	13.7	-21		115		4200
MEDLFLR3	11/2/2007 9:13	45.3	39.1	2.4	13.2	-15		115		2850
MEDLFLR3	11/16/2007 8:41	42.1	39	3.1	15.8	-17		114		3200
MEDLFLR3	11/9/2007 11:02	44.2	38.9	2.7	14.2	-25		116		4200
MEDLFLR3	12/18/2007 15:46	39.3	31.8	3.4	25.5	-17.7	17.66	112		4655.14
MEDLFLR3	12/20/2007 11:11	39.8	31.5	3.4	25.3	-15.5	15.6	114		4414.98
MEDLFLR3	12/21/2007 15:45	46.5	35.6	2.6	15.3	-28.4	28.36	113		5638
MEDLFLR3	12/26/2007 10:50	37.1	30.4	3.2	29.3	-27.1	27.27	116		5171
MEDLFLR3	12/31/2007 9:58	35.2	30.3	3.6	30.9	-24		115		4625
MEDLFLR3	1/22/2008 13:46	34.8	31.1	3	31.1	-25.5	25.46	113		3939
MEDLFLR3	2/1/2008 8:36	36.3	30.9	3	29.8	-24.3		114		3659
MEDLFLR3	2/4/2008 15:29	36.1	31.7	2.6	29.6	-31	30.93	115		3927
MEDLFLR3	2/6/2008 14:40	37.1	32.4	2.2	28.3	-25	13.37	114		3518
MEDLFLR3	2/12/2008 11:44	35.6	30.1	3.2	31.1	-24.7	24.75	116		3525
MEDLFLR3	2/18/2008 16:23	38.9	33.1	2.8	25.2	-24.9	24.86	115		3249
MEDLFLR3	3/6/2008 7:12	40.7	33.4	3.4	22.5	-24.2	24.19	121		4562
MEDLFLR3	3/20/2008 9:09	43.6	27.6	2.8	26	-28.5	28.52	117		5324
MEDLFLR3	3/24/2008 14:26	45.5	36.6	2.6	15.3	-29.9	29.75	119		5438
MEDLFLR3	3/24/2008 14:56	45.4	36.7	2.7	15.2	-30.5	30.41	119		5487
MEDLFLR3	3/24/2008 15:28	45.7	36.7	2.6	15	-30.5	30.61	120		5467
MEDLFLR3	3/24/2008 16:02	45.6	36.4	2.9	15.1	-30.9	30.73	118		5429
MEDLFLR3	3/24/2008 17:11	45.7	35.9	2.9	15.5	-30.9	30.91	119		5488
MEDLFLR3	4/11/2008 15:41	40.8	37.3	3	18.9	-33.1	-32.32	117		5264
MEDLFLR3	4/14/2008 14:40	38.1	33.7	3.8	24.4	-33.5		115		5332
MEDLFLR3	4/3/2008 10:14	44.2	35.6	3	17.2	-32.2		119		5369
MEDLFLR3	4/16/2008 15:35	44.2	37	2.3	16.5	-26.2		116		4882
MEDLFLR3	4/21/2008 15:11	57.9	39.2	2.5	0.4	-26.1	26.1	117		4435
MEDLFLR3	4/22/2008 9:45	40.4	34.4	2.9	22.3	-26.5	26.77	115		4381
MEDLFLR3	4/25/2008 15:50	39	34.1	3	23.9	-33.7		116		4230
MEDLFLR3	5/2/2008 15:30	41	34.4	2.6	22	-35		116		4138
MEDLFLR3	5/8/2008 8:32	36.2	32.1	3.1	28.6	-42.3	-23.32	115		4196
MEDLFLR3	5/15/2008 14:00	33.9	30	3.4	32.7	-29.3		119		3886
MEDLFLR3	5/22/2008 8:26	37.1	31.7	3.8	27.4	-34.4		117		4090
MEDLFLR3	6/6/2008 14:35	39.7	33.2	4.1	23	-34.6		118		3978
MEDLFLR3	6/9/2008 11:04	40.6	33.7	4.1	21.6	-43.1		117		4325
MEDLFLR3	6/17/2008 16:11	40.5	34.7	3.3	21.5	-43.2		118		4237
MEDLFLR3	6/19/2008 15:36	41.5	35.6	2.9	20	-44.5		119		4293
MEDLFLR3	6/23/2008 11:22	41.7	34.3	3.1	20.9	-44.3		117		4122
MEDLFLR3	7/10/2008 13:40	40.7	35.4	3.1	20.8	-44.8	-20.88	118		4126
MEDLFLR3	7/15/2008 15:17	43.3	36.1	2.3	18.3	-44.1	-21.53	115		4091
MEDLFLR3	7/25/2008 14:03	44.4	35.5	2.5	17.6	-40.4				4180
MEDLFLR3	8/1/2008 10:20	42.3	36.2	2.6	18.9	-39		114		3867
MEDLFLR3	8/8/2008 9:11	41.9	37.1	2.5	18.5	-40		114		3722
MEDLFLR3	8/19/2008 9:10	40.8	38.2	2.4	18.6	-42		114		3989
MEDLFLR3	8/28/2008 9:52	39.8	37.9	3.4	18.9	-40		116		3650
MEDLFLR3	9/11/2008 5:25	32.9	28.9	6.3	31.9	-39.1	-27	115		3048
MEDLFLR3	9/11/2008 12:34	38.8	32.8	3.7	24.7	-41.2	-25.13	116		3099
MEDLFLR3	9/12/2008 11:51	39.1	32.4	3.5	25	-40.2		114		3120
MEDLFLR3	9/23/2008 10:28	45.6	39.7	3.2	11.5	-40.3		115		2987

ATTACHMENT 3
HISTORICAL LFG FLOW DATA

Device ID	Date Time	CH_4 (Methane) (%)	CO_2 (Carbon Dioxide) (%)	O_2 (Oxygen) (%)	Balance Gas (%)	Initial Static Pressure (H_2O)	Adjusted Differential Pressure (H_2O)	Initial Temperature (°F)	System Pressure (H_2O)	Initial Flow (SCFM)
MEDLFLR3	10/1/2008 7:15	44.1	36	2.4	17.5	-41.5	-24.15	0		3035
MEDLFLR3	10/1/2008 8:19	43.6	35.7	2	18.7	-41.5	-24.18	0		3021
MEDLFLR3	10/15/2008 9:02	40.1	34.1	3.4	22.4	-43.1		113		2948
MEDLFLR3	10/5/2008 11:15	38.5	30.2	3.9	27.4	-40.6		112		2890
MEDLFLR3	11/24/2008 13:19	37.6	30.8	4.6	27	-30.8		106		3172
MEDLFLR3	12/5/2008 8:28	39.6	32	4.9	23.5	-15.3	13.45	105		2086
MEDLFLR3	12/10/2008 9:00	40.9	33.8	4.5	20.8	-13.1	13.36	107		1752
MEDLFLR3	12/10/2008 11:02	44.4	35.4	3.8	16.4	-17.3	17.34	105		2250
MEDLFLR3	12/12/2008 9:24	48.2	38.4	1.6	11.8	-18.9	18.82	109		2178
MEDLFLR3	12/12/2008 12:35	51.3	39.5	0.9	8.3	-27.9	27.84	0		3175
MEDLFLR3	12/22/2008 8:04	40.8	35.8	2.7	20.7	-23.6	23.75	108		2137
MEDLFLR3	12/22/2008 12:11	42.2	35.6	2.4	19.8	-23.2	23.26	109		2314
MEDLFLR3	12/26/2008 8:42	40.1	35.8	2.5	21.6	-23.5	23.51	110		2236
MEDLFLR3	1/14/2009 8:23	39.7	34.8	2.4	23.1	-21.6	21.76	102		2605
MEDLFLR3	1/23/2009 8:31	37.4	32.3	3.6	26.7	-34.4	-31.1	105		2600
MEDLFLR3	1/23/2009 15:40	41.8	35.1	2.3	20.8	-36.7	-29.09	117		2600
MEDLFLR3	1/27/2009 8:51	43.9	35.2	2.4	18.5	-31.1	30.89	108		2263
MEDLFLR3	2/24/2009 8:43	43.8	35	2.9	18.3	-46.9	-17.39	119		2911
MEDLFLR3	3/3/2009 8:14	38.7	32.7	3.2	25.4	-37.7	-27.95	100		2375
MEDLFLR3	3/4/2009 16:16	44.1	35.4	1.8	18.7	-38	-27.51	115		2601
MEDLFLR3	3/5/2009 8:15	42.4	35.6	2.1	19.9	-37.9	-28.38	110		2510
MEDLFLR3	2/9/2009 8:16	54.5	35.2	3.3	7					2238
MEDLFLR3	2/16/2009 8:34	38.2	32.1	3.1	26.6					2355
MEDLFLR3	2/11/2009 8:33	54.9	35	2.6	7.5					2250
MEDLFLR3	2/12/2009 12:33	52	34.7	4.1	9.2					2479
MEDLFLR3	2/23/2009 9:38	45.6	35.5	2.5	16.4					2326
MEDLFLR3	2/10/2009 8:32	55	34.7	3.3	7					2136
MEDLFLR3	2/17/2009 8:34	39	32.4	3.1	25.5					2561
MEDLFLR3	2/18/2009 8:35	39.6	32.6	3.3	24.5					2461
MEDLFLR3	2/19/2009 8:37	39.3	32.2	3.1	25.4					2423
MEDLFLR3	2/20/2009 8:37	40	32	3.5	24.5					2572
MEDLFLR3	3/6/2009 10:42	44.2	34.7	1.9	19.2	-37.8	-27.88	111		2538
MEDLFLR3	3/9/2009 14:35	41.5	33.8	2.5	22.2	-38.6	-26.78	100		2601
MEDLFLR3	3/10/2009 8:17	35	28.2	5.2	31.6	-22.2	-26.35	100		2577
MEDLFLR3	3/11/2009 8:00	34.6	29.5	5.8	30.1	-22.7	-26.07	110		2677
MEDLFLR3	3/12/2009 15:09	49	35.4	2	13.6	-38.7	-27.86	119		2640
MEDLFLR3	3/13/2009 10:26	40.5	34.5	1.9	23.1	-38.7	-26.86	110		2526
MEDLFLR3	3/16/2009 11:57	41.9	34.6	2.5	21	-38.8	-27.2	120		2592
MEDLFLR3	3/16/2009 13:26	44.5	35.1	1.9	18.5	-38.9	-26.82	118		2595
MEDLFLR3	4/2/2009 9:16	43.8	36.3	1.8	18.1	-38	-27.62	100		2051
MEDLFLR3	4/17/2009 13:18	45.2	38.2	2.1	14.5	-33.6	-28.87	100		2198
MEDLFLR3	4/20/2009 10:17	42.3	36.1	2.8	18.8	-33.4	-30.56	100		2124
MEDLFLR3	4/22/2009 9:29	41.9	35.6	2.7	19.8	-39.2	-27.39	100		2128
MEDLFLR3	4/29/2009 16:05	41.2	34.3	2.9	21.6	-42.3	-24.34	100		2138
MEDLFLR3	5/1/2009 13:43	44.4	37.2	2.1	16.3	-43.7	-23.06	100		2170
MEDLFLR3	5/4/2009 9:42	44.2	36.9	1.8	17.1	-44.4	-22.39	100		2229
MEDLFLR3	5/5/2009 8:19	43.3	37	1.9	17.8	-44.7	-21.02	100		2196
MEDLFLR3	5/7/2009 15:39	44.2	36.9	1.7	17.2	-43	-22.68	100		2060
MEDLFLR3	5/11/2009 11:38	43.5	35.1	2	19.4	-42.7	-22.96	100		2072
MEDLFLR3	5/18/2009 9:38	42.6	36.9	2	18.5	-43.8	-21.81	100		1958
MEDLFLR3	6/1/2009 10:40	43.1	36.4	2.5	18	-44.5	-20.99	100		2183
MEDLFLR3	6/2/2009 8:58	43.7	36.5	2.3	17.5	-38.3	-27.32	100		2025
MEDLFLR3	6/4/2009 9:10	42.2	34.1	2.2	21.5	-38.3	-27.27	100		2128
MEDLFLR3	6/15/2009 10:55	37.3	32.7	2.6	27.4	-37.7	-27.86	100		2377
MEDLFLR3	6/17/2009 11:19	44.1	36.1	1.8	18	-37.9	-27.71	100		2241
MEDLFLR3	6/25/2009 13:27	44.4	35.7	2.1	17.8	-38.1	-27.59	100		2429

ATTACHMENT 3
HISTORICAL LFG FLOW DATA

Device ID	Date Time	CH_4 (Methane) (%)	CO_2 (Carbon Dioxide) (%)	O_2 (Oxygen) (%)	Balance Gas (%)	Initial Static Pressure (H_2O)	Adjusted Differential Pressure (H_2O)	Initial Temperature (°F)	System Pressure (H_2O)	Initial Flow (SCFM)
MEDLFLR3	7/1/2009 11:05	46	35.6	2.5	15.9	-38.7	-26.99	100		2328
MEDLFLR3	7/3/2009 15:00	45.6	35.8	2	16.6	-38.4	-27.26	100		2350
MEDLFLR3	7/6/2009 15:16	46	35	1.9	17.1	-38.6	-27.15	100		2345
MEDLFLR3	7/7/2009 15:19	45.3	34.9	1.8	18	-38.3	-27.27	100		2299
MEDLFLR3	7/8/2009 14:49	48.8	34.5	2.1	14.6	-38.5	-26.98	100		2212
MEDLFLR3	7/9/2009 14:30	47.9	36.7	2.1	13.3	-38.5	-27.09	100		2221
MEDLFLR3	7/10/2009 7:59	46.9	35.8	2	15.3	-38.6	-27.01	98		2204
MEDLFLR3	7/14/2009 14:44	49.8	36.8	1.5	11.9	-38.3	-27.38	100		2633
MEDLFLR3	7/31/2009 14:47	46.8	37.6	1.9	13.7	-39.4	-26.25	100		2277
MEDLFLR3	8/3/2009 10:56	46.1	34.4	1.6	17.9	-39.9	-25.71	100		2297
MEDLFLR3	8/6/2009 11:24	46.6	35.2	1.9	16.3	-40.6	-25.07	100		2353
MEDLFLR3	8/7/2009 14:51	42.9	34.9	1.5	20.7	-41.7	-24.02	100		2390
MEDLFLR3	8/10/2009 9:45	47.4	36.7	1.7	14.2	-42.3	-23.27	100		2495
MEDLFLR3	8/12/2009 11:01	45.6	35	1.8	17.6	-42.6	-23.07	100		2463
MEDLFLR3	9/1/2009 14:54	45.4	35.4	1.8	17.4	-44.7	-21.49	100		2310
MEDLFLR3	9/8/2009 14:20	47.2	37.9	1.6	13.3	-46.9	-18.7	100		2350
MEDLFLR3	9/9/2009 15:51	49.3	36.4	1.6	12.7	-48.3	-17.42	100		2295
MEDLFLR3	9/15/2009 15:25	49.4	37.3	1.5	11.8	-48.2	-17.48	100		2336
MEDLFLR3	9/16/2009 15:13	46.5	36.5	1.6	15.4	-46.8	-19.2	100		2258
MEDLFLR3	10/7/2009 10:30	47.5	36.3	2.2	14	-44.6	-21.21	100		1984
MEDLFLR3	10/23/2009 15:37	45	35.4	2.5	17.1	-44.7	-20.91	100		2445
MEDLFLR3	10/26/2009 15:19	46.2	35.8	1.7	16.3	-44.5	-21.25	100		2488
MEDLFLR3	11/4/2009 14:03	46.9	36.4	1.8	14.9	-45.2	-20.38	100		2447
MEDLFLR3	11/11/2009 10:25	47.4	38.3	1.5	12.8	-46.1	-19.68	100		2335
MEDLFLR3	12/17/2009 12:48	50.5	37.9	1	10.6	-48.1	-17.48	100		2693
MEDLFLR3	1/1/2010 8:05	51.3	38.8	1.1	8.8	-36	-29.72	100		2169
MEDLFLR3	1/5/2010 5:54	48.1	37.3	1.6	13	-35.6	-29.61	100		2256
MEDLFLR3	5/26/2010 12:55	45.6	36.4	1.8	16.2	-49.2	-16.5	115		2791
MEDLFLR3	6/30/2010 14:33	41	42.7	2.4	13.9	-51.9	-22.42	110		2680
MEDLFLR3	7/2/2010 8:03	43.9	35	2.6	18.5	7.9	-7.94	100		2531
MEDLFLR3	7/30/2010 9:29	44.2	37.2	1.7	16.9	-36.3	-28.93	100		2221
MEDLFLR3	8/6/2010 7:32	49.4	37.6	1.6	11.4	3.9	-3.89	100		1945
MEDLFLR3	8/9/2010 12:28	45.3	35.8	3.1	15.8	5.5	-5.65	100		2259
MEDLFLR3	8/10/2010 15:32	44	34.2	3.5	18.3	6.6	-6.66	100		2431
MEDLFLR3	8/11/2010 15:34	43.4	34.2	3.5	18.9	6.9	-7.02	100		2468

ATTACHMENT 4

REVISED TABLES 3-3, C-1, AND C-2
AND NEW TABLE 2-7

TABLE 2-7
PROJECTED ACTUAL ANNUAL EMISSIONS FOR DESIGN LFG FLOW (7,317 scfm)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Scenario/Emission Source	No. of Units	LFG Flow per Unit (scfm)	Total LFG Flow (scfm)	Units	Pollutant								
					CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	NMOC	HAP
Emission Factors													
CAT 3520 Engine	–	–	–	TPY/unit	75.5	12.9	5.17	5.17	5.17	21.3	3.52	3.52	0.088
6,000 scfm Enclosed Flare	–	–	–	lb/scf	1.00E-04	3.00E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	5.59E-07	5.59E-07	5.68E-07
3,000 scfm Open Flare	–	–	–	lb/scf	1.85E-04	3.40E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	2.66E-06	2.66E-06	5.68E-07
Annual Operating Scenarios (TPY)													
Scenario 1: Six CAT 3520 engines + 3,789 scfm LFG combusted in the enclosed flare													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	31.0	31.0	31.0	127.7	21.1	21.1	0.53
6,000 scfm Enclosed Flare	1	3,789	3,789	TPY	99.6	29.9	8.5	8.5	8.5	137.2	0.6	0.6	0.6
3,000 scfm Open Flare	1	0	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			7,317		552.4	107.5	39.5	39.5	39.5	264.9	21.7	21.7	1.09
Scenario 2: Six CAT 3520 engines + 3,789 scfm LFG combusted in the flares													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	31.0	31.0	31.0	127.7	21.1	21.1	0.5
6,000 scfm Enclosed Flare	1	789	789	TPY	20.7	6.2	1.8	1.8	1.8	28.6	0.1	0.1	0.1
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		619.4	110.6	39.5	39.5	39.5	264.9	23.4	23.4	1.09
Scenario 3: 6,000 scfm LFG in enclosed flare + 1,317 scfm LFG in open flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	6,000	6,000	TPY	157.7	47.3	13.4	13.4	13.4	217.2	0.9	0.9	0.9
3,000 scfm Open Flare	1	1,317	1,317	TPY	64.0	11.8	2.9	2.9	2.9	47.7	0.9	0.9	0.2
			7,317		221.7	59.1	16.3	16.3	16.3	264.9	1.8	1.8	1.09
Scenario 4: 3,000 scfm LFG in open flare + 4,317 scfm LFG in enclosed flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	4,317	4,317	TPY	113.5	34.0	9.6	9.6	9.6	156.3	0.6	0.6	0.6
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		259.3	60.8	16.3	16.3	16.3	264.9	2.7	2.7	1.09
Worst-Case Scenario Annual Emissions (TPY)					**619.4**	**110.6**	**39.5**	**39.5**	**39.5**	**264.9**	**23.4**	**23.4**	**1.1**
Worst-Case Scenario CAT Engine Emissions (TPY)					**452.8**	**77.6**	**31.0**	**31.0**	**31.0**	**127.7**	**21.1**	**21.1**	**0.5**
Worst-Case Scenario Flare Emissions (TPY)					**166.6**	**33.0**	**8.5**	**8.5**	**8.5**	**137.2**	**2.2**	**2.2**	**0.6**

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TABLE 3-3
PSD APPLICABILITY ANALYSIS
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Emission Source	Pollutant Emission Rate (TPY)						
	CO	NO_X	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC
Proposed Potential Emissions[a]							
CAT Engine emissions	452.8	77.6	31.0	31.0	31.0	127.7	21.1
Flare emissions	166.6	33.0	8.5	8.5	8.5	137.2	23.2
Total facility potential emissions	619.4	110.6	39.5	39.5	39.5	264.9	44.3
Projected actual emissions[b]							
Worst-case CAT Engine emissions	452.8	77.6	31.0	31.0	31.0	127.7	21.1
Worst-case flare emissions	166.6	33.0	8.5	8.5	8.5	137.2	2.2
Total projected actual emissions	619.4	110.6	39.5	39.5	39.5	264.9	23.4
Baseline Actual[c]							
Highest two-year average (EU001 and EU005)	165.1	32.6	8.5	8.5	8.5	225.9	2.9
Increase Due to Project (Projected Actual - Baseline)	**454.3**	**78.1**	**31.0**	**31.0**	**31.0**	**39.0**	**20.4**
PSD Significant Emission Rate	100	40	25	15	10	40	40
PSD Review Triggered? (Y/N)	Yes	Yes	Yes	Yes	Yes	No	No

Note: Baseline PM_{10} and $PM_{2.5}$ emissions assumed to be the same as baseline PM emissions.

[a] Rerpesents worst-case emission scenario from Table 2-6.

[a] Rerpesents worst-case emission scenario from Table 2-7.

[c] See Table C-2.

TABLE C-1
ACTUAL ANNUAL EMISSIONS FROM ANNUAL OPERATING REPORTS (2000 - 2009)
MEDLEY LANDFILL (FACILITY ID NO. 0251625), MEDLEY, FLORIDA

Data Source	EU ID No.	SCC	Operating Hours (hrs/yr)	Annual Activity Factor	Actual Annual Emissions (TPY) CO	NO_x	PM	PM_{10}	SO_2	VOC	NMOC	HAP
2000 AOR	001	Flare System	8,705	545.8 MMcf LFG/yr	86.59	4.63	0.00	0.00	22.24	0.258	0.00	0.00
	002	Fugitives	8,784		–	–	–	–	–	30.4	30.4	0.00
2000 TOTAL (EU001)					86.59	4.63	0.00	0.00	22.24	0.26	0.00	0.00
2001 AOR	001	Flare System	8,352	657.2 MMcf LFG/yr	112.67	5.84	0.00	0.00	27.46	0.318	0.00	0.00
	002	Fugitives	8,760		–	–	–	–	–	34.7	34.7	0.00
2001 TOTAL (EU001)					112.67	5.84	0.00	0.00	27.46	0.32	0.00	0.00
2002 AOR	001	Flare System	8,634	1,276.15 MMcf LFG/yr	215.90	11.54	0.00	0.00	129.51	0.626	0.00	0.00
	002	Fugitives	8,760		–	–	–	–	–	39.9	39.9	0.00
2002 TOTAL (EU001)					215.90	11.54	0.00	0.00	129.51	0.63	0.00	0.00
2003 AOR	001	3000-SCFM Open Flare	6,576		84.30	15.49	0.00	3.56	83.23	0.44	1.12	6.89
	002	Fugitives	8,760		–	–	–	–	–	0.21	0.53	0.00
	005	6000-SCFM Enclosed Flare	2,184		30.0	9.1	0.00	2.40	55.3	0.29	0.74	4.60
2003 TOTAL (EU001 and EU005)					114.30	24.59	0.00	5.96	138.53	0.73	1.86	11.49
2004 AOR	001	3000-SCFM Open Flare	52	0 MMcf LFG/yr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	002	Fugitives	8,760		–	–	–	–	–	0.0	0.0	0.00
	005	6000-SCFM Enclosed Flare	8,407	36.3 MMcf LFG/yr	125.0	37.5	9.8	0.00	250	3.07	0.00	0.00
2004 TOTAL (EU001 and EU005)					125.00	37.50	9.80	0.00	250.00	3.07	0.00	0.00
2005 AOR	001	3000-SCFM Open Flare	15	2.7 MMcf LFG/yr	0.2	0.04	0.01	0.00	0.27	0.0	0.00	0.0
	002	Fugitives	8,760		–	–	–	–	–	0.0	25.0	6.00
	005	6000-SCFM Enclosed Flare	8,507	2,042.0 MMcf LFG/yr	92	27.6	7.2	0.00	201.6	2.8	0.00	17.0
2005 TOTAL (EU001 and EU005)					92.20	27.64	7.21	0.00	201.87	2.80	0.00	17.00
2006 AOR	001	3000-SCFM Open Flare	93	14.26 MMcf LFG/yr	0.79	0.24	0.05	0.00	1.5	0.004	0.00	0.0011
	002	Fugitives	8,760		–	–	–	–	–	17.0	43.6	2.88
	005	6000-SCFM Enclosed Flare	8,575	1,863.0 MMcf LFG/yr	84.55	25.37	6.86	0.00	200.85	0.49	0.00	0.15
2006 TOTAL (EU001 and EU005)					85.34	25.61	6.91	0.00	202.35	0.49	0.00	0.15
2007 AOR (Revised)	001	3000-SCFM Open Flare	5	0.78 MMcf LFG/yr	0.07	0.01	0.0	0.00	0.08	0.00	0.00	0.0001
	002	Fugitives	8,760		–	–	–	–	–	19.1	49.0	2.85
	005	6000-SCFM Enclosed Flare	8,345	2,182.0 MMcf LFG/yr	119.7	35.91	8.27	0.00	241.93	0.59	0.00	0.18
2007 TOTAL (EU001 and EU005)					119.77	35.92	8.27	0.00	242.01	0.59	0.00	0.18
2008 AOR	001	3000-SCFM Open Flare	2	0.336 MMcf LFG/yr	0.0282	0.00518	0.00117	0.00	0.0106	0.00016	0.00	0.000048
	002	Fugitives	8,760		–	–	–	–	–	12.9	33.1	5.30
	005	6000-SCFM Enclosed Flare	8,546	1,994.0 MMcf LFG/yr	82.33	24.7	6.92	0.00	69.9	0.975	0.00	0.293
2008 TOTAL (EU001 and EU005)					82.36	24.71	6.92	0.00	69.91	0.98	0.00	0.29
2009 AOR	001	3000-SCFM Open Flare	20	3.31 MMcf LFG/yr	0.278	0.051	0.0125	0.0125	0.106	0.00161	0.00	0.000483
	002	Fugitives	8,760		–	–	–	–	–	13.1	33.6	5.37
	005	6000-SCFM Enclosed Flare	7,956	1,127.0 MMcf LFG/yr	50.7	15.2	4.26	4.26	36.2	0.55	0.00	0.17
2009 TOTAL (EU001 and EU005)					50.98	15.25	4.27	4.27	36.31	0.55	0.00	0.17

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TABLE C-2
ACTUAL ANNUAL EMISSIONS, TWO-YEAR AVERAGES (2000 - 2009)
MEDLEY LANDFILL (FACILITY ID NO. 0251625), MEDLEY, FLORIDA

Data Source	2-Year Average Annual Emissions (TPY)							
	CO	NO_X	PM	PM_{10}	SO_2	VOC	NMOC	HAP
2000 - 2001 Average	99.6	5.2	0.0	0.0	24.9	0.3	0.0	0.0
2001 - 2002 Average	164.3	8.7	0.0	0.0	78.5	0.5	0.0	0.0
2002 - 2003 Average	165.1	18.1	0.0	3.0	134.0	0.7	0.9	5.7
2003 - 2004 Average	119.7	31.0	4.9	3.0	194.3	1.9	0.9	5.7
2004 - 2005 Average	108.6	32.6	8.5	0.0	225.9	2.9	0.0	8.5
2005 - 2006 Average	88.8	26.6	7.1	0.0	202.1	1.6	0.0	8.6
2006 - 2007 Average	102.6	30.8	7.6	0.0	222.2	0.5	0.0	0.2
2007 - 2008 Average	101.1	30.3	7.6	0.0	156.0	0.8	0.0	0.2
2008 - 2009 Average	66.7	20.0	5.6	2.1	53.1	0.8	0.0	0.2
Highest Consecutive 2-Year Average	165.1	32.6	8.5	3.0	225.9	2.9	0.9	8.6

Note: Emissions do not include EU002 (fugitives).

ATTACHMENT 5

MIAMI-DADE COUNTY DERM DETERMINATION REGARDING MAJOR SOURCE STATUS FOR THE MEDLEY LANDFILL

MIAMI-DADE COUNTY

Carlos Alvarez, Mayor

Environmental Resources Management
Air Quality Management Division
701 NW 1st Court • 8th Floor
Miami, Florida 33136-3912
T 305-372-6925 F 305-372-6954

miamidade.gov

November 21, 2008

CERTIFIED MAIL NO. 7006 0810 0000 7059 7693
RETURN RECEIPT REQUESTED

Mr. Tim Hawkins
Market Area Vice President
Waste Management Inc. of Florida d.b.a. Medley Landfill
2700 NW 48 Street
Pompano Beach, FL 33073

Subject: Additional Information Request for the Air Construction Permit Application Received June 27, 2008 for the Medley Landfill facility located at 9350 NW 89 Avenue, Miami, FL 33178.
[Reference Project No.: 0250615-009-AC; Request for Additional Information Sent July 25, 2008; Additional Information Received October 24, 2008]

Dear Mr. Hawkins,

The Department of Environmental Resources Management (DERM) has reviewed the above-referenced document and determined that the application is incomplete. Pursuant to Sections 120 and 403, Florida Statutes (F.S.), and Chapters 62-4 and 62-209 through 62-297 of the State of Florida Administrative Code (F.A.C.), a completed Air Permit Application is required. Therefore, please be advised of the following:

In the 2004 Annual Operating Report (AOR), the facility reported actual SO_2 emissions of 250 TPY for the enclosed flare, and the DERM determined that the facility became major for the purpose of Prevention of Significant Deterioration (PSD) at that time. Therefore, emissions expected to result from a subsequent construction or modification proposed at the facility must be compared to Rule 62-210.200(280), F.A.C., significant emissions rates for each pollutant to determine if PSD Review will apply to that project.

According to information provided in the above-referenced application, the installation of eight (8) generators will result in an emissions increase for CO, NO_x, and SO2 in the amount of 239.4 TPY, 133 TPY, and 62.8 TPY, respectively. The DERM's review indicates that the increases in emissions due to the proposed project exceeds the significant emissions rate for each of these pollutants.

Therefore, the DERM determines that the proposed is a PSD project and requests that you withdraw this application and submit a completed application for PSD review, along with a processing fee of $7,500.00, to the Florida Department of Environmental Protection (FDEP) in Tallahassee. Provide the DERM Office with a copy of your correspondence to Tallahassee.

Furthermore, concerns noted during the DERM review of your application are provided below:

1. The facility's application for the air construction permit for Enclosed Flare #3 (processed in 2003), included a Landfill Gas (LFG) model to estimate the potential LFG recovery rate using an in-house model, similar to the U.S. EPA Landfill Gas Emissions Model (LandGEM). The model predicted that the landfill gas production rate would peak in the year 2013 with a maximum LFG rate of 8,477 scfm at an estimated amount of 22,175,615 tons of refuse. However, a similar model used by the applicant in the current project predicted the peak year as 2025. The DERM staff compared the data submitted in 2003 with that provided in 2008 on a year to year basis. The 2008 data shows that the refuse rate is estimated to increase over a million tons per year (over the 2003 estimate), while the gas collection rate is decreased by over 1,000 scfm each year. Since similar models are used in both cases, this discrepancy raises serious concerns as to reliability or accuracy of the modeling data.

2. Pursuant to discussions with the FDEP staff, the in-house model used by the applicant does not estimate the potential impacts. Moreover, the model does not fulfill the Class I and II modeling criteria required for PSD projects. It is suggested that the facility use either the AERMOD or CALPUFF model in the PSD application. Questions regarding air modeling can be directed to Mr. Cleve Holladay, the FDEP staff in Tallahassee at (850) 488-0114.

3. In the Revised AOR for 2007 submitted October 1, 2008, emissions were calculated using an H_2S concentration derived from analytical testing conducted in April, 2008. Be advised that the facility cannot use test data from 2008 to calculate the annual emissions for the year 2007.

If you have any questions regarding the information provided in this letter, please contact Rick Garcia or Anthony Radhay in the Air Facilities Section Office at 305-372-6925.

Sincerely,

Mallika Muthiah 11/21/08

Mallika Muthiah, P.E., Chief Date
Air Facilities Section
Miami-Dade County DERM

Copy: Suzanne Thomas-Cole, P.E., Earth Tech, 10 Patewood Drive, Suite 500, Bldg 6, Greenville, SC 29615 [Suzanne.thomas@earthtech.com]
Syed Arif, Bureau of Air Regulation [syed.arif@dep.state.fl.us]
Cleve Holladay, Bureau of Air Regulation [cleve.holladay@dep.state.fl.us]

MIAMI-DADE COUNTY

Carlos Alvarez, Mayor

Environmental Resources Management
Air Quality Management Divsion
701 NW 1st Court • 8th Floor
Miami, Florida 33136-3912
T 305-372-6925 F 305-372-6954

miamidade.gov

July 25, 2008

CERTIFIED MAIL NO. 7003 1010 0002 0221 9248
RETURN RECEIPT REQUESTED

Mr. John Casagrande
Vice President
Waste Management Inc. of Florida d.b.a. Medley Landfill
2700 NW 48 Street
Pompano Beach, FL 33073

Subject: Additional Information Request for Air Construction Permit Application Received June 27, 2008 for the Medley Landfill facility located at 9350 NW 89 Avenue, Miami, FL 33178. [Reference Project No.: 0250615-009-AC]

Dear Mr. Casagrande,

The Department of Environmental Resources Management (DERM) has reviewed the above-referenced document and determined that the application is incomplete. Pursuant to Sections 120 and 403, Florida Statutes (F.S.), and Chapters 62-4 and 62-209 through 62-297 of the State of Florida Administrative Code (F.A.C.), a completed Air Permit Application is required. Therefore, address each of the following items:

1. Considering the information listed below in items a, b and c, the DERM has reason to believe that the facility is a Prevention of Significant Deterioration (PSD) major source for emissions of sulfur dioxide (SO_2) and carbon monoxide (CO). Therefore, provide a PSD applicability analysis for this project along with the necessary emissions calculations.

   a) According to the 2007 AOR, reported actual SO_2 emissions for the enclosed flare were 242 TPY, with an average gas flow rate of 4,357 scfm and operating 8,345 hours. Therefore, considering just the enclosed flare with a design flow rate of 6,000 scfm, the calculated potential emissions would be greater than the PSD applicability threshold of 250 tons/year.

   b) Based on our review of records on file, the facility previously estimated an increase in SO_2 emissions of 380 TPY due to the installation of the enclosed flare (Project No. 0250615-004-AC). Please provide an explanation of the differences between the calculations provided in the certified application for permit No. 0250615-004-AC and the calculations provided with the current certified application.

   c) The facility has two (2) flares installed on-site, Utility Flare #1 and Enclosed Flare #3, and there are no permit conditions restricting the simultaneous operation of both flares. Therefore, in calculating the potential emissions, both flares must be taken into account. This would place the facility as a major source for PSD for SO_2 and CO emissions

We note that in the facility response dated January 7, 2003 regarding the enclosed flare permit application it was stated that "... gas modeling for the NMOC and design reports indicated that the landfill is predicted to produce a peak gas rate of 9,000 cfm in the peak year 2013". Both the enclosed flare and the utility flare will be used to handle the load.
We also note the enclosed flare is rated for a maximum flow of 6,000 cfm and that the design capacity for the proposed gas engines is 2,400 cfm. At peak gas production, it is assumed that the plan is for the remaining 600 cfm to be controlled through the use of Utility Flare #1.
When providing the PSD applicability analysis requested above, potential emissions must be based on the potential gas production rate of 9,000 cfm. Provide calculations for current potential emissions based on the combustion of 9,000 cfm of landfill gas using the existing flares. Provide calculations and compare this to the future potential emissions that are expected to result when 2,400 cfm of the landfill gas is combusted in the proposed engines.

2. According to Table 2 of the application, emission factors used to calculate NO_x and CO emissions from the eight (8) gas engines were based on sampled values. Provide appropriate documentation to support the information provided.

3. The emissions data provided in the summary page of this application (143 TPY of SO_2) is significantly different from emissions information provided by the facility in the 2007 AOR (242 TPY of SO_2). Please explain this discrepancy.

Be advised that should this project trigger PSD, this application will have to be withdrawn, and a completed PSD Application along with a processing fee of $7,500.00 must be submitted to the Florida Department of Environmental Protection (FDEP) in Tallahassee.

In order to continue processing your application, the aforementioned information is required. If you have any questions regarding this letter or if you need to schedule a meeting to discuss the incompleteness of your application, please contact Rick Garcia or Anthony Radhay in the Air Facilities Section Office at 305-372-6925.

Sincerely,

Mallika Muthiah 7/25/08

Mallika Muthiah, P.E., Chief Date
Air Facilities Section
Miami-Dade County DERM

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ATTACHMENT 6

REFERENCE MATERIAL FOR SILOXANES IN LANDFILL GAS

Siloxanes in Landfill and Digester Gas Update

Ed Wheless
Los Angeles County Sanitation Districts
Whittier, California

Jeffrey Pierce
SCS Energy
Long Beach, California

ABSTRACT

Siloxanes are a family of man-made organic compounds that contain silicon, oxygen and methyl groups. Siloxanes are used in the manufacture of personal hygiene, health care and industrial products. As a consequence of their widespread use, siloxanes are found in wastewater and in solid waste deposited in landfills. At wastewater treatment plants and landfills, low molecular weight siloxanes volatilize into digester gas and landfill gas. When this gas is combusted to generate power (such as in gas turbines, boilers or internal combustion engines), siloxanes are converted to silicon dioxide (SiO_2), which can deposit in the combustion and/or exhaust stages of the equipment.

The Los Angeles County Sanitation Districts (Districts) have collected siloxane data from their wastewater treatment plants and landfills, plus other facilities, and conducted pilot testing on various methods of siloxane removal. The Districts reported on the findings of this program at the SWANA 2002 Landfill Gas Symposium[1].

The landfill gas data presented previously has been updated to include additional data provided by SCS and other sources. This paper will focus on the measurement of siloxanes, the presence of siloxanes in landfill gas, the different siloxane removal systems available, and the cost of siloxane removal.

INTRODUCTION

Digester and landfill gases are widely used as fuel to produce electricity, drive pumps and fire boilers. Unlike natural gas, these gases are normally saturated with moisture, and carry varying quantities of compounds that contain sulfur, chlorine, and silicon. This, however, has not deterred the successful use of both digester and landfill gases on a large number of biogas utilization projects. In general, combustion turbines, reciprocating engines, and boilers have operated with no provisions for removal of these contaminants.

Evidence of siloxanes in biogas is found in the form of a white powder in gas turbine hot section components, as a light coating on various types of heat exchangers, in deposits on combustion surfaces in reciprocating engines, and as a light coating on post-combustion catalysts. The white powder is primarily silicon dioxide (SO_2), a product of siloxane combustion. Microturbine and catalyst failures have focused industry-wide attention on siloxanes. Manufacturers of combustion turbines and reciprocating engines are expressing an increasing desire for siloxane control -- despite almost two decades of successful experience without such controls. There is no doubt that some maintenance cost benefit can be realized by siloxane removal (and through the incidental removal of other biogas contaminants that will occur during siloxane removal); however, it does not currently appear that siloxane removal is cost effective in most cases.

Common volatile siloxanes are listed in Table 1. Due to the length of the names of the various siloxanes, abbreviations are commonly used to identify the compounds. Siloxanes that are cyclic in structure have a single abbreviation of D. Siloxanes that have a linear structure have two abbreviations using either an L or M nomenclature. Table 1 also identifies the molecular weight, vapor pressure, boiling point, chemical formula, and water solubility of these compounds.

SAMPLING AND ANALYSIS OF SILOXANES

A major obstacle to understanding siloxanes continues to be difficulty in the accurate measurement of siloxanes. The individual siloxane compounds are commonly near or below their limits of detection in raw biogas samples. The siloxanes in digester gas appear to be predominately D_4 and D_5, representing over 90 percent of the total.

TABLE 1
SELECTED CYCLIC AND LINEAR ORGANOSILOXANE PROPERTIES

Name	Formula	MW	Vapor Pressure mmHg 77° F	Abbreviations	Boiling Point ° F	Water Solubility (mg/l) 25° C
Hexamethylcyclotrisiloxane	$C_{12}H_{18}O_3Si_3$	222	10	D_3	275	1.56
Octamethylcyclotetrasiloxane	$C_8H_{24}O_4Si_4$	297	1.3	D_4	348	0.056
Decamethylcyclopentasiloxane	$C_{10}H_{30}O_5Si_5$	371	0.4	D_5	412	0.017
Dodecamethylcyclohexasiloxane	$C_{12}H_{36}O_6Si_6$	445	0.02	D_6	473	0.005
Hexamethyldisiloxane	$C_6H_{18}Si_2O$	162	31	L_2, MM	224	0.93
Octamethyltrisiloxane	$C_8H_{24}Si_3O_2$	236	3.9	L_3, MDM		0.035
Decamethyltetrasiloxane	$C_{10}H_{30}Si_4O_3$	310	0.55	L_4, MD_2M		
Dodecamethylpentasiloxane	$C_{12}H_{36}Si_5O_4$	384	0.07	L_5, MD_3M		

Siloxane concentrations are generally higher in digester gas than in landfill gas. As a result, it is somewhat easier to reliably quantify siloxanes in digester gas. Landfill gas may contain significant quantities of other siloxane compounds such as D_3 and D_6, plus L_2 through L_5. D_4 and D_5 may represent only slightly more than a majority of the siloxanes in some landfill gases to over 90 percent of the total in others. Infrequently siloxanes not listed on Table 1, such as trimethylsilanol, are found.

The most common commercially available analysis for siloxane involves collecting a sample by passing the sample through midget methanol impingers followed by determination of the captured siloxanes by GC/MS. The method that is employed by the Districts involves sample collection in a metal canister followed by analysis by GC/MS. At least one contract laboratory allows collection of the sample with a Tedlar bag and subsequent analysis using GC/MS. The above methods are discussed in more detail below.

Two other test methods used in the past involved collection of the sample in carbon tubes, and a method, preferred by Caterpillar, that used a mineral oil. Neither of these methods are in use presently.

Methanol Impinger - GC/MS

ESS Laboratories (Cranston, Rhode Island) and Air Toxics (Folsom, California) use a procedure where the sample is drawn through two methanol filled, chilled impinger tubes in series. A GC/MS is used to identify siloxanes. Air Toxics currently targets five of the compounds in Table 1 (L_2, L_3, D_4, D_5, and D_6).

Air Toxics recommends the use of midget impingers with 6 ml of methanol in each. The sample is drawn at a rate of 112 ml/min for 3 hours (producing the equivalent of a 20 liter sample). The concentration of siloxane in the methanol, in ug/ml, and the ppmv in the gas can be calculated from the volume of methanol and the volume of the gas quantity passed through the impingers. The stated reporting limit is 16 to 49 ppbv for individual siloxanes, but in practice limits of detection vary from 19 ppbv to 189 ppbv.

ESS uses impingers containing 20 ml of methanol with a sampling rate of 1 liter/min for 20 minutes (20 liter sample). This procedure produced reporting limits that generally ranged from 500 to 1,000 ppbv for tests conducted by the Districts on landfill gas. In limited side-by-side testing, the Districts and ESS results were in general agreement.

ESS is also able to measure total silica. In side-by-side testing on the Districts' landfill gas, the total reported silica was 2 to 5 times the valued measured by the Districts' method. Additional testing is being conducted to further define the usefulness of total silica testing.

Metal Canister – GC/MS

The Districts have developed a sampling procedure that utilizes metal canisters to collect samples, which are then analyzed in one of the Districts' in-house laboratories. Samples are collected in a 6-liter metal Summa canister that is then analyzed by a GC/MS after being pressurized for 24 hours. The Districts currently target all eight of the siloxanes listed on Table 1. This procedure has been compared with the methanol impinger procedure with mixed results. In early 2003 Air Toxics conducted side-by-side testing of digester gas involving multiple samples[2]. Air Toxics results agreed with the Districts' results except for D_4 and D_5. For these siloxanes, Air Toxics reported values three times the Districts' results. In subsequent side-by-side testing on landfill gas, the Districts identified more polymers than Air Toxics with concentrations (including D_4 and D_5) about 50% to 80% higher than Air Toxics.

In May of 2003 the Districts obtained a new GC/MS (Leco Pegasus III Time of Flight) that has consistently provided reporting limits in the 20 to 40 ppb range.

Tedlar Bag - GC/MS

AtmAA, Inc. (Calabasas, California) can perform what they call a "semi-quantitative measurement of volatile organic silicon components" by collecting a gas sample in a Tedlar bag for subsequent GC/MS analysis. This method by AtmAA is not considered accurate and is of dubious value. A second lab, Analytical Solutions (Willowbrook, Illinois), uses a similar method to determine siloxane polymers as well as total organic silica by atomic emission detection. The Districts are working with Analytical Solutions to verify the procedure.

Conclusions

Different laboratories and different researchers use different sampling techniques and do not use a consistent set of target compounds. The limits of detection vary at an individual laboratory over time and between laboratories. The reporting limits at commercial labs can be as low 20 ppb but can be as high as ten times this value for a single polymer.

In addition to problems with accuracy and detection limits, the impinger sampling procedure is very labor intensive. Three hours to obtain a single simple is excessive where duplicate samples are required for at least two and sometimes five locations. This is the reason the Districts developed a procedure that requires only a few minutes to obtain a sample. The Districts will continue to work with interested parties and labs to develop a lower cost, less time consuming, and more accurate detection method.

QUANTITY OF SILOXANES IN BIOGAS

Siloxane data is expressed in ppmv, mg/m^3 and mg Si/mmBtu. While the latter expression is not commonly used, it is actually the most useful expression of siloxane data. It accounts for the varying fraction of the weight that silicon contributes to the molecular weight of each form of siloxane and adjusts for the varying methane content (energy value) of the fuel. While the methane content of digester gas is generally within a fairly narrow range (i.e., 57 percent to 64 percent), landfill gas is quite variable (i.e., 35 percent to 57 percent). Expression in terms of mg Si/mmBtu allows the true loading rate of silicon, the deleterious precursor, to be tracked as a function of fuel consumption. Expression of the data as ppmv is useful since this is the most common way gaseous contaminants are reported in the United States, and the data is expressed in units that are easily understood. Data presented in this paper are in mg/m^3 because different polymers can be directly added to obtain a total siloxane quantity as well as an estimate of the total Si.

Figure 1 provides siloxane data from twenty-eight landfills. The landfills represented in Figure 1 cover open and closed landfills, landfills in arid climates (10 inches precipitation) and wet climates (45 inches precipitation), and landfills containing relatively old and new waste. The data has been normalized to 50% methane. The first letter of the site name indicates the type of data collection as follows:

D	Districts method
S	SCS data collected in impingers and analyzed by Air Toxics
C	Samples collected by CAT as total Si reported as siloxane
G	Samples collected in Carbon tubes

A few generalizations can be made about the data:

- Landfills with older average waste ages generally have lower siloxane levels. It may be that this is due to the gradual exhaustion of siloxane over time or it may be because there was less siloxane in the waste to begin with since the use of siloxane has increased in recent years
- Active landfills generally have higher siloxane levels than closed landfills. This finding may simply be an alternative manifestation of the above finding;
- D_3, D_4, D_5, L_2 and L_3 are the only siloxanes generally observed above detection limits at landfills. On an average basis, D_4 is the largest contributor to total siloxane (about 60 percent of total), followed by L_2, D_5 and L_3 in that order.
- In general, landfill gas contains L_2 and L_3 and digester gas does not. One theory explaining this difference between the two biogases is the relative solubility. L_2 is much more water-soluble than D_4 and D_5. L_3 is more water-soluble than D_5 and is comparable to D_4.

WHY SILOXANE REMOVAL?

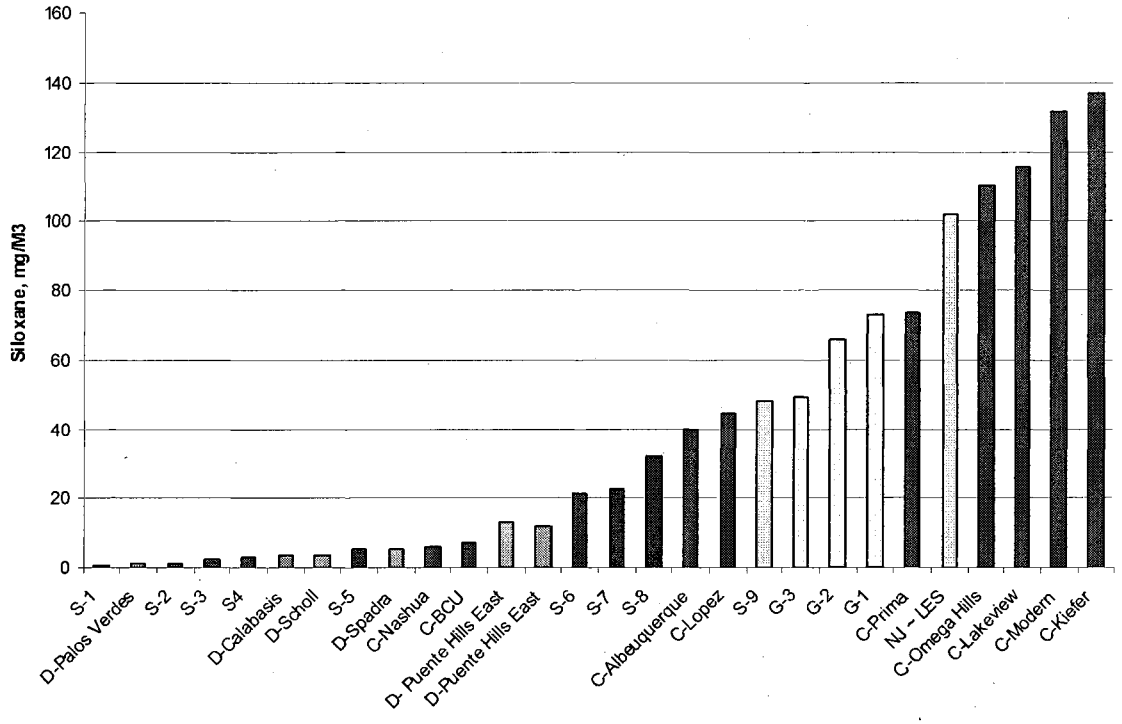
As noted in the introduction, the presence of siloxanes in biogas has been known for many years. Rather than removing siloxanes, most chose to accept the increased maintenance costs associated with the use of biogas since the increase is being offset by the use of low cost or no cost fuel.

Over the past 20 years there has periodically been a desire to employ a post-combustion oxidation catalyst and/or selective catalytic reduction to reduce air emissions from biogas fueled power equipment. This interest was primarily motivated by air permitting barriers. The result of the test programs was a failure of the catalyst after a few days of operation and in some cases only hours of operation. It is believed that the principal reason for these failures was siloxane.

As discussed below, relatively new technologies are available for biogas fueled power generation (e.g., microturbines and fuel cells). The suppliers of this equipment feel that these technologies may not be able to tolerate siloxanes. These technologies offer performance advantages or economic returns that may justify the cost and associated with siloxane removal.

In a more disturbing trend, manufacturers of technologies with decades of successful service in the biogas markets (e.g., reciprocating engines and combustion turbines) now feel obligated to impose siloxane standards where they have not been imposed before.

Figure 1, Siloxane in Landfill Gas



Until recently the inability to measure siloxanes reliably made the development of removal technologies virtually impossible. Although reliable siloxane detection is still problematic, experimentation and testing on siloxane removal is now possible.

Microturbines

Capstone and Ingersoll-Rand offer microturbines in the 30 to 250 kW ranges. The principal advantage of microturbines is their low air emissions. They also can operate with relatively low heating value fuels. One disadvantage of microturbines is a relatively low efficiency (30 percent). Low efficiency increases power production cost when using high priced fuels such as

natural gas or diesel but is less important with low cost biogas. Biogas fuel applications may represent the best market for microturbines.

Capstone has experienced siloxane induced turbine failures at multiple sites. As a result, Capstone has established a fuel specification that requires less than 5 ppbv (~ .03 mg/m^3) of siloxane. A 100 percent effective siloxane removal system is, therefore, required by Capstone for all biogas applications. In actual practice, Capstone turbines are tolerant of limited amounts of siloxane and have operated continuously for many months on biogas prior to failure. The prolonged exposure to untreated biogas results in a progressive loss of performance due to silica buildup in the combustor and recuperater. Ultimately the silica will build up to a larger mass that breaks off and causes the turbine wheel to seize. Once silica buildup has affected performance or caused a seizure, the power unit must be replaced to restore full performance.

Ingersoll-Rand has not confirmed a problem with siloxanes, but maintains an official fuel restriction of 10 ppbv of siloxane. Ingersoll-Rand requires siloxane removal on new installations, while accumulating operational hours on two facilities that fire untreated landfill gas. The testing may determine that siloxane removal is not needed, may be selectively needed, or may be required.

Gas Turbines

Solar Turbines has extensive experience with biogas dating back to a Centaur unit that the Districts started up in 1984 that is still in continuous operation. Over 35 turbines at landfills, plus other turbines operating on digester gas, followed this initial installation. Unfortunately, Solar encountered problems a few years ago with silica buildup on their new Taurus units. Solar's solution was a de-rating of this model and the re-evaluation of their fuel specification. The result was a Product Information Letter[3] dated April 25, 2003 which called for a "zero" tolerance for siloxane. A maximum allowable concentration of approximately 87 ppbv (~.1 mg/m^3) was established since this value was incorrectly judged the "lowest detectable concentration."

The principal problem reported by Solar was accumulation of deposits on turbine nozzles (blades). It should be noted that the turbine blades on a microturbine are relatively crude, compared to a larger combustion turbine, and microturbines should be more tolerant to impurities in biogas.

Internal Combustion Engines

There is extensive experience with internal combustion (IC) engines operating on biogas. In the few evaluations undertaken to date, the expected cost of siloxane removal has exceeded the increased engine maintenance caused by SiO_2 deposits. In spite of the success of IC engines in biogas applications, IC engine manufacturers now impose siloxane fuel restrictions. The current limits of four IC Engine manufacturers are presented in Table 2. The limits seem to be somewhat arbitrary since the engine operation and maintenance would not change with siloxane levels slightly above or below the limit. In fact, IC engines appear to operate over a very broad concentration of siloxanes with a general, but undefined, trend of increasing maintenance with increasing levels of siloxane.

Catalysts

In IC engine or turbine applications where selective catalytic reduction or oxidation catalysts are being considered or required for emission control, siloxane removal is a necessity. There are numerous examples where SiO_2 deposits from siloxane have resulted in catalyst deactivation in hours or days. The inability to continuously monitor siloxanes coupled with their rapid destructive effect makes this a difficult application. Other constituents in the biogas are present that can foul the catalyst, and this further complicates the study of siloxane impact. Sorge[4] very recently reported on a failed attempt to use a catalyst on landfill gas.

Fuel Cells

Fuel cells use catalysts to convert methane in biogas to hydrogen and therefore, require high quality biogas, perhaps as clean as applications using selective catalytic reduction or oxidation catalysts. Standards governing fuel cells are still under development. One fuel cell manufacturer has called for a siloxane limit of 100 ppbv.

SILOXANE REMOVAL TECHNOLOGIES

Although there is an increasing list of possible siloxane removal technologies, carbon adsorption is still the only proven method now in commercial operation. The following provides a discussion of the capabilities of this technology and other potential removal technologies.

TABLE 2,
MANUFACTURER SILOXANE LIMITS

Engine Manufacturer	Siloxane, mg/m^3 in Landfill Gas
Caterpillar	28
Jenbacher	10
Waukesha	25
Deutz	5
Solar Turbines	0.1
IR Microturbines	0.06
Capstone Microturbines	0.03

Carbon Adsorption

Activated carbon has been widely used for the removal of a variety of substances from air and gas for decades. In 2001, the Districts conducted extensive testing of various types/grades of carbon including coconut shell and graphite on compressed and dried digester gas (365 psig, 40° F dew point). The results indicated that carbon under these conditions could adsorb approximately 1.0 percent to 1.5 percent siloxanes by weight or 10,000 to 15,000 mg siloxanes per kilogram of carbon. Adsorption capacity is defined as the point where siloxane breakthrough can be detected. If the process is allowed to continue, siloxanes will continued to be removed, but the siloxane exit quantity will continue to rise. Wheless[1] previously reported on details of this test program.

Laboratory experiments by Schweigkofler[5] in Munich confirmed loadings, at breakthrough, of greater than one percent for charcoal and silica gel, but noted that relative humidity could have a significant effect on loading.

After a year of operation at the Calabasas microturbine facility, the Districts have experienced a loading of approximately 0.4 percent on coconut shell and on graphite activated carbon. The conditions at Calabasas are a gas at a dew point of 40° F and a pressure of 75 psig.

In a similar application to Calabasas, Sorge[4] obtained 0.6 percent loading on graphite. This was a low pressure application with a chiller to reduce the dew point to 40° F prior to the activated carbon. This application used a graphite-based activated carbon for siloxane removal. L_2 was the first siloxane form to break through. The most disturbing observation was that the concentration of L_2 at the discharge of the removal device was much higher than the inlet concentration. It is speculated that previously adsorbed L_2 was being bumped off by other compounds.

The same L_2 phenomena (higher L_2 at exit of carbon treatment than in the inlet L_2) was observed at Calabasas, and it was first speculated that the high L_2 was due to the release of previously accumulated L_2. At Calabasas, the carbon system was run for several weeks after L_2 breakthrough on one occasion. More L_2 was discharged than could have been accounted for by the total L_2 captured prior to breakthrough. This indicates that this phenomenon needs further research.

It is important to note that all the loading data presented above is for carbon following a chiller that produces a 40° F dew point gas prior to reheat above the dew point. Chilling of biogas prior to treatment with activated carbon benefits the life of activated carbon in two ways. First, the chiller can be expected to remove some of the siloxanes. Second, the adsorption loading of the carbon is influenced by the relative humidity and temperature of a gas.

Refrigeration

The Districts have documented a 50 percent removal of total siloxane at a full scale digester gas compression/chiller facility. The gas is chilled to 40° F and is at a pressure of 365 psig.

A compressor/chiller facility has been in operation at the Calabasas Landfill microturbine facility for over a year. Long-term siloxane removal averaged 32 percent. Removal rates were actually somewhat higher since the chilled gas was often reported at limits of detection. At Calabasas, the greatest percentage removal was seen on D_4.

Limited data from two installations similar to Calabasas had siloxane removals of 15 percent and 49 percent. The operable siloxane removal mechanism is not specifically known. It is probably largely a scrubbing effect with gaseous siloxane compounds being dissolved into the condensate being formed, rather than condensation of the siloxane compounds themselves.

Advanced Refrigeration

The Districts previously reported[1] on bench-scale research on the benefits of advanced refrigeration on siloxane removal. A 95 percent removal of total siloxane was seen at a temperature of -20° F. At least two firms are attempting to commercialize this process for biogas siloxane removal. Commercialization requires overcoming problems associated with icing. IR will place a commercial unit in operation during the second quarter

of 2004 at the Districts' Lancaster wastewater treatment plant to condition digester gas prior to a 250 kW microturbine.

Liquid Absorption

The methanol impinger sampling concept is predicated on the notion that siloxane can be completely removed by liquid absorption. If liquid absorption of siloxane works on a micro-scale, it should work on a large scale.

The Mountain Gate Landfill has a gas processing plant that uses liquid absorption and activated carbon polishing for removal of hydrogen sulfide, volatile organic compound and siloxane. A continuously regenerable solvent is used in a counter current tray tower. This solvent is Selexol, a dimethylether of polyethylene glycol. About 99 percent of the siloxane is removed in the tray tower with the remainder removed by carbon. The plant currently has a throughput of about 1,500 scfm, and liquid absorption may be cost effective for large installations.

Researchers have conducted testing using other liquids, including carbon dioxide.

Silica Gel

Schweigkofler[5] conducted siloxane removal experiments on several organic and inorganic adsorption materials including polymer beads. Schweigkofler found silica gel to have a higher affinity for L_2 than carbon. The Districts obtained a 50% increase in removal capacity as compared to carbon on digester gas. Silica gel may prove to be a better adsorbent in landfill gas applications than activated carbon because of the reported greater affinity for L_2. The Calabasas Landfill microturbine removal system has been loaded with silica gel in the first vessel and carbon in the second to verify the experimental test results.

REMOVAL ECONOMICS

Activated carbon

Two costs must be considered -- initial capital cost and ongoing replacement cost of the activated carbon. The capital cost includes the cost of the vessels and piping associated with holding the activated carbon, and the cost of the initial change of the activated carbon. The capital cost is a function of the somewhat arbitrary selection of the desired frequency of activated carbon changeout (e.g., three months versus six months). On a life cycle basis, the cost of the vessels becomes increasingly less important. The cost of the activated carbon replacement dominates the cost of siloxane removal.

The two factors governing activated carbon exhaustion are siloxane mass loading rate and the activated carbon's siloxane adsorption capacity. The siloxane mass loading rate is a function of gas flow rate (scfm or m^3/min) and siloxane concentration (ppmv or mg/m^3). The siloxane mass loading rate can be expressed in units of lbs/day, grams/day or other expressions of the accumulation rate.

The adsorption capacity can be expressed as a weight to weight ratio -- lb siloxane absorbed per lb of activated carbon, or mg of siloxane absorbed per gram of activated carbon. The absorption capacity is generally defined as the mass loading to the point of initial detection of siloxane at the outlet of the treatment vessel (breakthrough). Some applications, such as microturbines, call for a non-detect level of siloxane. Mass loading to the point of breakthrough is in agreement with this requirement. Other applications, such as reciprocating engines, sometimes call for siloxane limitations over limits of detection. In such applications, residual adsorption capacity exists beyond breakthrough. Outlet siloxane concentrations generally increase rapidly after breakthrough and this additional capacity is very limited. A mass loading rate, based on breakthrough, can also be used to approximate the requirements of the more tolerant applications.

Activated carbon's siloxane absorption capacity is affected by several factors including:

- Siloxane speciation (the relative concentration of the various forms of siloxane that are present);
- The presence of other compounds in the gas that may compete with siloxane for activated carbon "pore space;"
- Gas physical condition (moisture content, temperature, and relative humidity); and
- Activated carbon type.

It is the authors' observation that adsorption capacity varies with the type of siloxane being removed. The lighter, straight molecular forms, particularly L_2, break through sooner than the heavier, cyclic molecular forms. A gas with no L_2, or little L_2, would have a much higher adsorption capacity than a gas having more L_2. A similar phenomenon is seen in activated carbon's removal of more "traditional" organic compounds. Vinyl chloride, for example, is much more difficult to remove with activated carbon than carbon tetrachloride.

Landfill gas and digester gas contain a number of compounds, other than siloxanes, that activated carbon will remove, including hydrogen sulfide and a group of

compounds known as volatile organic compounds. In general, the concentration of volatile organic compounds in landfill gas is significantly higher than in digester gas. Hydrogen sulfide in digester gas can vary from 25 ppmv to over 1,000 ppmv, while hydrogen sulfide in landfill gas usually varies from 10 ppmv to over 100 ppmv. When siloxane adsorption capacity is determined on a pilot-scale or full-scale basis with landfill gas and digester gas, at least some of the pore space is being consumed by compounds other than siloxane. Hydrogen sulfide appears to present the greatest problem since its concentration is generally relatively high. One strategy to extend activated carbon life may includes use of potassium permanganate or sodium hydroxide impregnated activated carbon in the first vessel, or in a layer in a single vessel where the biogas first contacts the activated carbon. Impregnated activated carbon can remove ten times as much hydrogen sulfide than un-impregnated activated carbon. If the hydrogen sulfide concentration is very high, it may be more cost-effective to use a pretreatment step such as SulfaTreat or an iron sponge.

As a general statement, the performance of activated carbon is affected by gas temperature and moisture. Activated carbon performs better on a dry, cool/warm gas than on a wet, hot gas. Biogas processing schemes that incorporate a refrigeration-based moisture removal process prior to the activated carbon step should be expected to experience longer carbon life. In addition, refrigeration will generally achieve some siloxane removal and reduce the mass load of siloxane to the activated carbon.

Several types and grades of activated carbon are commercially available. Activated carbon is manufactured for commercial use predominately from one of two feed stocks -- coconut shells and bituminous coal. Depending on the manufacturer, there is some variability in size and shape of the granules or pellets. It is reasonable to assume that one type of activated carbon may be more effective than another under theoretical and, perhaps, under practical conditions. It is the authors' opinion that this difference in performance is yet to be demonstrated in actual practice. It is difficult to quantify the performance of various grades of activated carbon when so many other variables are changing, and given current limits of detection for siloxanes.

As can be inferred by the above discussion, the siloxane adsorption capacity has the potential to vary greatly from site to site. Based on available information on landfill gas, adsorption capacity of activated carbon can vary substantially. Two examples of operating costs are the Calabasas Landfill microturbines and the experimental work of Waukesha[4]. Both of these removal systems chilled landfill gas to 40° F prior to carbon absorption.

	Calabasas	Waukesha
Capital Cost, $/kw	85	82
Siloxane inlet Concentration, mg/m3	2	34
Carbon Cost, cents/kwh	.3	1.5

For the Calabasas case with a very low siloxane concentration the cost of removal are acceptable. For the Waukesha case that is more representative of expected siloxane concentrations the operating costs are excessive.

Districts pilot testing with digester gas suggests a siloxane loading for carbon that is approximately 3 times the .6% mass loading experienced by Waukesha but this is expected with the L_2 present in landfill gas. If, in fact, the Waukesha loading is typical, siloxane removal would be cost prohibitive for most landfill gas applications.

CONCLUSIONS

It appears that microturbine and engine manufacturers are setting and tightening siloxane standards. The equipment manufacturers should proceed with caution. While siloxane removal may reduce the cost of maintenance of their equipment, the total cost of plant operation/maintenance may increase. Decisions to proceed or not proceed with projects are based on the total cost of plant operation/maintenance.

Siloxane sampling and analysis methods vary from one laboratory to another. Limits of detection are highly variable, both from one laboratory to another, and temporarily at the same laboratory. As a minimum, the industry needs to reach a consensus on a sampling methodology and a target compound list.

Siloxane levels vary greatly from one landfill to another. While there seems to be some relationship to waste age, higher waste ages do not guarantee lower siloxane levels.

References

1) Wheless and Gary, Siloxanes in Landfill Gas and Digester Gas, SWANA Landfill Gas Symposium, March 2002.

2) A Summary of Available Analytical Methods For The Determination of Siloxanes in Biogas,

Hays, Graening, Saced, Kao, SWANA Landfill Gas Symposium, March 2003.

3) Product Information Letter No. 176, Siloxanes in Fuel Gas, 25 April 2003, Solar Turbines.

4) Gregory W. Sorge, Bryan R. Johnson, and Donald Smith, Waukesha Engine and ONYX Waste Services, Low Emission Challenges on a Landfill Gas to Energy Application, WASTECON 2003.

5) Schweigkofler and Niessner, Removal of Siloxanes in Biogas, Journal of Hazardous Materials, September 2000.

ATTACHMENT 7

MEDLEY LFG SILOXANE TEST RESULT

JET-CARE INTERNATIONAL INC

3 Saddle Road
Cedar Knolls
NJ 07927
USA

t. +1 973 292 9597
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e. enquiries@jet-care.com
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SiTest SILICON SAMPLE REPORT

~Attention: Randy Beck

~Tel: 713-265-1672

~Company: Waste Management Renewable Energy
~Address: 1001 Fannin, Suite 4000
Houston, TX 77002

~Fax: 866-302-0759

~Email: RBeck3@wm.com
~Site: Medley
~Equipment Registration:
~Position:
~Hours:

Report Date: 09-16-10
Analysis Date: 09-16-10
Date Received: 09-015-10

~ indicates information supplied by customer

The tests are carried out in accordance with 'in house' documented methods. Wear Elements by Inductively Couple Plasma, carried out using M019 results quoted in ppm or wt %.
Results are issued under the authority of A. Hadowanetz, Laboratory Manager.

Summary issue no:	1					
~Sample Date:	09-14-10					
~Sample ref:	2801					
~*Methane %:	49.5%					
Lab ref no: Lab result:	M10I602 9.23					
Lab ref no: Lab result:	M10I603 4.91					
Lab ref no: Lab result:	M10I604 6.14					

NOTE: *As previously agreed, original silicon results are then sub-contracted to Bio-Engineering Services for **SiTest** result values using Methane Values* as supplied with submitted samples. µg/BTU conversion and **SiTest** values are provided under the authority of Mark Downing. This service is outside the scope of UKAS accreditation.*

SiTest Silicon (mg/Nm^3CH_4)	**54.63**					
Silicon (ppm)	**23.11**					
µg/Btu	**1.61**					

Comments:

Approved by: Alison Hadowanetz
Laboratory Manager

Issued under the authority of
Alison Hadowanetz
Laboratory Manager

Opinions and Interpretations herein are outside the scope of UKAS accreditation

ATTACHMENT 8

REVISED TABLES 2-1 AND 2-6

TABLE 2-1
POTENTIAL EMISSIONS FROM PROPOSED CATERPILLAR 3520 ENGINES
RENEWABLE ENERGY PROJECT AT THE MEDLEY LANDFILL

Pollutants	Emission Factor	Ref.	Activity Factor[a] (per engine)						Potential Emissions (per engine)	
			Engine Power (bhp)	Fuel Consumption (Btu/bhp-hr)	Fuel Consumption (scfm)	LFG Methane Content (%)	Maximum Heat Input (MMBtu/hr)	Operating Hours	(lb/hr)	(TPY)
Carbon Monoxide (CO)	3.50 g/bhp-hr	b	2,233	6,509	588	50	17.64	8,760	17.2	75.5
Nitrogen Oxides (NOx)	0.60 g/bhp-hr	b	2,233	6,509	588	50	17.64	8,760	2.95	12.9
Particulate Matter (PM)	0.24 g/bhp-hr	c	2,233	6,509	588	50	17.64	8,760	1.18	5.17
Particulate Matter (PM_{10})	0.24 g/bhp-hr	c	2,233	6,509	588	50	17.64	8,760	1.18	5.17
Particulate Matter ($PM_{2.5}$)	0.24 g/bhp-hr	c	2,233	6,509	588	50	17.64	8,760	1.18	5.17
Sulfur Dioxide (SO_2)	4.86 lb/hr	e	2,233	6,509	588	50	17.64	8,760	4.86	21.3
Volatile Organic Compounds (VOC)	0.80 lb/hr	d	2,233	6,509	588	50	17.64	8,760	0.80	3.52
Non-Methane Organic Compounds (NMOC)	0.80 lb/hr	d	2,233	6,509	588	50	17.64	8,760	0.80	3.52

[a] Activity factors are based on manufacturer provided power output of 2,233 brake horsepower (bhp) and fuel consumption of 6,509 Btu/bhp-hr, Caterpillar, 2010.

[b] Based on Waste Management data, 2010.

[c] BACT limit proposed by Waste Management.

[d] NMOC emission rate is based on compliance with NSPS Subpart WWW, which requires NMOC outlet concentration to be less than 20 ppmvd as hexane, at 3% oxygen. Assuming exhaust gas moisture content is 7%. NMOC emissions calculated as following:

Exhaust flow rate =	12,476	acfm, based on Caterpillar data.
Exhaust temperature =	898	°F, based on Caterpillar data.
Oxygen content of dry air (O_2, dry) =	9	%, dry, based on Caterpillar data.
NMOC, ppm actual =	13.30	[20 ppmvd x (20.9-O_2, dry)/(20.9-3)]
Molecular weight of NMOC as hexane =	86.18	lb/lb-mol (AP-42 table 2.4-1)
NMOC emissions =	0.80	lb/hr: NMOC (ppmv actual) x Volume flow (acfm) x 86.18 (MW of NMOC) x 2116.2 lb/ft^2 (pressure) / [1545.4 (gas constant, R) x Actual Temp. (°R)] x 60 min/hr

[e] SO_2 emission rate is based on H_2S concentration in LFG and design LFG flow rate to the engine.

LFG H_2S concentration =	830	ppmv, based on OLI data.
LFG gas flow to engine =	588	scfm, design LFG flow for CAT 3520, based on WM data.
Standard Temperature =	68	°F
Molecular weight of H_2S =	34	lb/lb-mol (AP-42, Table 2.4-1)
SO_2 emissions =	4.86	lb/hr: H_2S (ppmv actual) x Volume flow (scfm) x 34 (MW of H_2S) x 2116.2 lb/ft^2 (pressure)

TABLE 2-6
POTENTIAL ANNUAL EMISSIONS FOR DESIGN LFG FLOW (7,317 scfm)
MEDLEY LANDFILL, INC., MEDLEY, FLORIDA

Source	No. of Units	LFG Flow per Unit (scfm)	Total LFG Flow (scfm)	Units	Pollutant								
					CO	NO_x	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	NMOC	HAP
Emission Factors													
CAT 3520 Engine	--	--	--	TPY/unit	75.5	12.9	5.17	5.17	5.17	21.3	3.52	3.52	0.088
6,000 scfm Enclosed Flare	--	--	--	lb/scf	1.00E-04	3.00E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	2.33E-05	2.33E-05	5.68E-07
3,000 scfm Open Flare	--	--	--	lb/scf	1.85E-04	3.40E-05	8.50E-06	8.50E-06	8.50E-06	1.38E-04	2.66E-06	2.66E-06	5.68E-07
Potential Emissions of Annual Operating Scenarios (TPY)													
Scenario 1: Six CAT 3520 engines + 3,789 scfm LFG combusted in the enclosed flare													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	31.0	31.0	31.0	127.7	21.1	21.1	0.53
6,000 scfm Enclosed Flare	1	3,789	3,789	TPY	99.6	29.9	8.5	8.5	8.5	137.2	23.2	23.2	0.6
3,000 scfm Open Flare	1	0	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
			7,317		552.4	107.5	39.5	39.5	39.5	264.9	44.3	44.3	1.09
Scenario 2: Six CAT 3520 engines + 3,789 scfm LFG combusted in the flares													
CAT 3520 Engine	6	588	3,528	TPY	452.8	77.6	31.0	31.0	31.0	127.7	21.1	21.1	0.5
6,000 scfm Enclosed Flare	1	789	789	TPY	20.7	6.2	1.8	1.8	1.8	28.6	4.8	4.8	0.1
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		619.4	110.6	39.5	39.5	39.5	264.9	28.1	28.1	1.09
Scenario 3: 6,000 scfm LFG in enclosed flare + 1,317 scfm LFG in open flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	6,000	6,000	TPY	157.7	47.3	13.4	13.4	13.4	217.2	36.7	36.7	0.9
3,000 scfm Open Flare	1	1,317	1,317	TPY	64.0	11.8	2.9	2.9	2.9	47.7	0.9	0.9	0.2
			7,317		221.7	59.1	16.3	16.3	16.3	264.9	37.6	37.6	1.09
Scenario 4: 3,000 scfm LFG in open flare + 4,317 scfm LFG in enclosed flare													
CAT 3520 Engine	0	588	0	TPY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6,000 scfm Enclosed Flare	1	4,317	4,317	TPY	113.5	34.0	9.6	9.6	9.6	156.3	26.4	26.4	0.6
3,000 scfm Open Flare	1	3,000	3,000	TPY	145.9	26.8	6.7	6.7	6.7	108.6	2.1	2.1	0.4
			7,317		259.3	60.8	16.3	16.3	16.3	264.9	28.5	28.5	1.09
Worst-Case Scenario Annual Emissions (TPY)					**619.4**	**110.6**	**39.5**	**39.5**	**39.5**	**264.9**	**44.3**	**44.3**	**1.1**
Worst-Case Scenario CAT Engine Emissions (TPY)					**452.8**	**77.6**	**31.0**	**31.0**	**31.0**	**127.7**	**21.1**	**21.1**	**0.5**
Worst-Case Scenario Flare Emissions (TPY)					**166.6**	**33.0**	**8.5**	**8.5**	**8.5**	**137.2**	**23.2**	**23.2**	**0.6**

Golder Associates

Gibson, Victoria

From: Gibson, Victoria
Sent: Wednesday, August 18, 2010 3:05 PM
To: Hoefert, Lee; 'Garcia, Rick (Dade County)'; 'forney.kathleen@epa.gov'; 'abrams.heather@epa.gov'; 'dee_morse@nps.gov'
Cc: McWade, Tammy; Koerner, Jeff; Walker, Elizabeth (AIR)
Subject: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

A new **PSD Permit Application** has been received at FL Department of Environmental Protection Div. of Air Resource Management and is currently under review.

Link to Permit Application Documents:

http://arm-permit2k.dep.state.fl.us/psd/0250615/00005028.pdf

ARMS PA Project ID:	**0250615-012-AC**
PSD-FL-	**414**
Facility Name:	**Waste Management Inc. of Florida - Medley Landfill**
Florida County:	**Miami-Dade**
Project Description:	**Air Construction Permit**
Permit Application Processor:	**Tammy McWade**
Processor Phone:	**850-488-1906**
Processor Email Address:	**Tammy.McWade@dep.state.fl.us**
Received in-house:	**8/16/10**

Please direct any questions regarding this permit application to the permit application processor. If you have any problems accessing these documents please let me know.

Thanks,

Vickie

Victoria Gibson, Administrative Secretary for
Trina Vielhauer, Chief, Bureau of Air Regulation
Division of Air Resource Management
victoria.gibson@dep.state.fl.us
850-921-9504 fax 850-921-9533

Gibson, Victoria

From: Hoefert, Lee
To: Gibson, Victoria
Sent: Wednesday, August 18, 2010 3:10 PM
Subject: Read: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Your message was read on Wednesday, August 18, 2010 3:10:21 PM (GMT-05:00) Eastern Time (US & Canada).

Gibson, Victoria

From: Garcia, Manuel (DERM) [GarciMa@miamidade.gov]
Sent: Wednesday, August 18, 2010 3:05 PM
To: Gibson, Victoria
Subject: Out of Office AutoReply: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

I will be out of the office between August 16, 2010 and August 20, 2010. Permit related questions may be addressed by calling 305-372-6925.

Gibson, Victoria

From: Mail Delivery System [MAILER-DAEMON@in10.sjc.mx.trendmicro.com]
To: garcima@miamidade.gov
Sent: Wednesday, August 18, 2010 3:05 PM
Subject: Relayed: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Delivery to these recipients or distribution lists is complete, but delivery notification was not sent by the destination:

garcima@miamidade.gov

Subject: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Gibson, Victoria

From: Mail Delivery System [MAILER-DAEMON@mseive01.rtp.epa.gov]
To: abrams.heather@epa.gov; forney.kathleen@epa.gov
Sent: Wednesday, August 18, 2010 3:05 PM
Subject: Relayed: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Delivery to these recipients or distribution lists is complete, but delivery notification was not sent by the destination:

abrams.heather@epa.gov

forney.kathleen@epa.gov

Subject: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Gibson, Victoria

From: Dee_Morse@nps.gov
Sent: Wednesday, August 18, 2010 4:22 PM
To: Gibson, Victoria
Subject: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Return Receipt

Your document: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

was received by: Dee Morse/DENVER/NPS

at: 08/18/2010 02:21:59 PM MDT

Gibson, Victoria

From: Microsoft Exchange
To: McWade, Tammy; Walker, Elizabeth (AIR); Koerner, Jeff
Sent: Wednesday, August 18, 2010 3:05 PM
Subject: Delivered: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Your message has been delivered to the following recipients:

McWade, Tammy

Walker, Elizabeth (AIR)

Koerner, Jeff

Subject: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Sent by Microsoft Exchange Server 2007

Gibson, Victoria

From: McWade, Tammy
To: Gibson, Victoria
Sent: Monday, August 23, 2010 9:41 AM
Subject: Read: Waste Management Inc. of Florida - Medley Landfill 0250615-012-AC PSD-FL-414

Your message was read on Monday, August 23, 2010 9:41:22 AM (GMT-05:00) Eastern Time (US & Canada).