TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Manatee County Utilities Department
4410 66th St. West
Bradenton, FL 34210

Manatee County Lena Road Landfill

Facility ID No. 0810055

PROJECT

Project No. 0810055-009-AC
Application for Minor Air Construction Permit
New LFG Fired Engine Generator Set

COUNTY

Manatee County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Air Resource Management
Southwest District Office
Temple Terrace, Florida 33637-7600

August 2, 2012 *(revised August 28, September 4, and September 10, 2012)*

Prepared by David Zell

GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

I. Facility Description:

This facility is engaged in landfilling of municipal solid waste (MSW). This Class I disposal facility (landfill) consists of three areas: Stage I (approximately 132 acres) which is a closed area; Stage III (approximately 66 acres) which is the active area (became active in January of 2004); and Stage II (approximately 118 acres), which is an undeveloped expansion area which will be the last area to be used. Stage I and Stage III have an active landfill gas (LFG) collection system with an open candlestick LFG flare control device. A thermal sludge dryer also utilizes LFG from the landfill as a supplemental fuel. This facility does not include a bioreactor.

II. Project Description:

A. Applicant:

Dan Gray, Director
Manatee County Utilities Department
4410 66th St. West
Bradenton, FL 34210

B. Professional Engineer:

Daniel Cooper, P.E.
SCS Engineers
4041 Parks Oaks Blvd.
Tampa, FL 33610

C. Project Location:

This project will be at the Manatee County Lena Road Landfill located at 3333 Lena Road in Bradenton, Florida.

D. Project Summary:

This project is for the construction of an engine generator set for the generation of electricity. The engine generator set will be a CAT generator rated at 1.6 MW, powered by a Caterpillar Model G 3520C Engine (DM 5860) 4-stroke lean burn (4SLB) spark ignition (SI) reciprocating internal combustion engine (RICE) rated at 2,233 bhp that will be fired exclusively with landfill gas (LFG) from the Lena Road Landfill.

Caterpillar Gas Generator Set

The maximum design heat input rating of the engine is 16.38 MMBtu/hour, based on an expected average heating value of the LFG of 456 Btu/scf (LHV). The LFG will be delivered to the engine using the existing LFG collection system blower system (currently being used to collect and deliver LFG to an open candlestick flare emissions control device). The LFG will be processed through a LFG treatment system (LFG Gas Treatment System) *(see description below)* prior to introduction into the engine as fuel. The maximum delivery volume of LFG from the LFG gas treatment system to the engine will be approximately 546 scfm.

Emissions from the generator engine will be limited by lean burn combustor design and use of air-to-fuel ratio controls.

The LFG Gas Treatment System will consist of the following gas treatment equipment and processes:

1. LFG will be drawn into the gas treatment skid at approximately 30 inches water column (w.c.) vacuum.
2. A gas compressor will increase gas pressure to approximately 5 psig.
3. An air-to-gas heat exchanger will reduce (cool) the temperature of the compressed gas.
4. A separator will remove all condensed moisture and other particulates having a diameter of 5-micron and larger.

The components of the LFG Gas Treatment System will not be equipped with atmospheric vents (therefore it is not itself an emissions source). Therefore, all of the LFG received by the unit will be directed to the generator set RICE engine for use as fuel.

The NSPS 40 CFR 60 Subpart WWW LFG control system requirements do not apply to the LFG fired engine generator set engine because the LFG is first sent to a gas treatment system (the LFG Gas Treatment System) prior to piping to the engine for use as a fuel. This satisfies one of the Subpart WWW LFG control system options (40 CFR 60.752(b)(2)(iii)C. - "Route the gas to a treatment system that processes the collected gas for subsequent sale or use."). There are no additional Subpart WWW requirements for the subsequent use of the treated gas that would apply to the LFG fired engine.

E. Application Information:

Application Received and Complete* on: 06/28/12

(Application Review Note – An email requesting clarification and confirmation of issues raised by the permit application was sent to the applicant on 07/10/12. A response was received on 07/17/12.)*

III. Rule Applicability

This project is subject to the preconstruction review requirements of Chapter 403, Florida Statutes and Chapters 62-204 through 62-297, Florida Administrative Code (F.A.C.), as indicated below.

Subject to:	Y/N	Comments
Rule 62-210.300, F.A.C. – Permits Required	Y	project is subject to general permitting requirements
Rule 62-212.400, F.A.C. - Prevention of Significant Deterioration	N	existing facility is not a PSD major source nor is this project PSD major
Rule 62-296.320(4), F.A.C. - General Particulate Emission Limiting Standards	Y	engine is subject to the facility-wide VE limitation
Rules 62-296.320(1) and (2), F.A.C. - General Pollutant Emission Limiting Standards (VOCs and Odor)	Y	combustion of landfill gas is a source of VOC and odors
Rule 62-296.401-470, F.A.C. - Stationary Source Emission Standards	N	there is no applicable source category
Rule 62-296.500, F.A.C. - Reasonably Available Control Technology (VOC)	N	Manatee County is not an air quality maintenance area for ozone
Rule 62-296.700, F.A.C. - Reasonably Available Control Technology (PM)	N	this is a new source, therefore not subject to PM RACT rule

Subject to:	Y/N	Comments
Rule 62-204.800, F.A.C. - Standards of Performance for New Stationary Sources (NSPS - 40 CFR 60)	Y	the LFG Gas treatment system is subject to Subpart WWW [1] the new Engine Generator Set stationary RICE engine is subject to Subpart JJJJ [2]
Rule 62-204.800, F.A.C. National Emission Standard for Hazardous Air Pollutants (NESHAPS – 40 CFR 61)	N	there is no applicable source category
Rule 62-204.800, F.A.C. National Emission Standard for Hazardous Air Pollutants for Source Categories a.k.a. MACT (NESHAPS –40 CFR 63)	Y	the LFG Gas treatment system is subject to Subpart AAAA [3, 4]
Chapter 62-213, F.A.C. - Operation Permits for Major Sources of Air Pollution	Y	facility is a Title V source
Rule 62-297.310, F.A.C. - General Compliance Test Requirements, F.A.C.	N	testing is required on the LFG fired engine for NOx, CO and VOC emissions

Federal Rule Applicability Notes -

1 The Lena Road municipal solid waste (MSW) landfill is subject to the Emission Guidelines contained in Rule 62-204.800(9)(c), F.A.C. (which adopts by reference and implements the requirements of 40 CFR 60 Subpart Cc – Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills) since it has a design capacity greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m^3). This emission guidelines rule requires that this MSW landfill meet specific requirements of NSPS 40 CFR 60 Subpart WWW - New Source Performance Standards (NSPS) for Solid Waste Landfills. This landfill is subject to the collection and control system requirements of Subpart WWW, since current emissions of NMOC (Non-methane Organic Compounds) are greater than 50 Mg/year. This facility is also subject to NESHAP 40 CFR 63 Subpart AAAA - National Emission Standards for Hazardous Air Pollutants (NESHAP) from Municipal Solid Waste Landfills.

The NSPS 40 CFR 60 Subpart WWW LFG control system requirements do not apply to the LFG fired engine generator set engine because the LFG is first sent to a gas treatment system (the LFG Gas Treatment System) prior to piping to the engine for use as a fuel. This satisfies one of the Subpart WWW LFG control system options (40 CFR 60.752(b)(2)(iii)C. - "Route the gas to a treatment system that processes the collected gas for subsequent sale or use."). There are no additional Subpart WWW requirements for the subsequent use of the treated gas that would apply to the LFG fired engine.

2 The new stationary spark ignition (SI) reciprocating internal combustion engine (RICE) which is a part of the new LFG Fired Engine Generator Set (new EU No. 011), is subject to NSPS 40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines).

[3] This facility, and therefore the LFG gas treatment system which will be the LFG control device for the LFG Engine Generator Set, is subject to NESHAP 40 CFR 63 Subpart AAAA - National Emission Standards for Hazardous Air Pollutants (NESHAP) from Municipal Solid Waste Landfills (which primarily references NSPS Subpart WWW requirements).

[4] The Engine Generator Set engine is also potentially subject to Federal NESHAP 40 CFR 63 Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines). However, in accordance with Subpart ZZZZ 40 CFR 63.6590(c), this new stationary RICE "must meet the requirements of Subpart ZZZZ by meeting the requirements of NSPS 40 CFR 60 Subpart JJJJ for spark ignition engines", and "no further requirements apply under Subpart ZZZZ".)

IV. A. Summary of Allowable Emissions for the Engine Generator Set LFG Fired Engine

This new stationary SI RICE engine is subject to the requirements of NSPS 40 CFR 60 Subpart JJJJ as a non-certified engine (i.e., the manufacturer does not certify compliance with Subpart JJJJ). This means that the owner/operator is responsible for demonstrating compliance with the applicable Subpart JJJJ emissions standards (i.e., allowable emission rates) show below.

Pollutant	Subpart JJJJ Emission Standard [1]	Equivalent Potential TPY Emission Rate [2]
NOx	150 ppmvd@ 15% 0_2 (2.0g/HP-hr)	43.1 TPY
CO	610 ppmvd@ 15% 0_2 (5.0g/HP-hr)	107.7 TPY
VOC	80 ppmvd@ 15% 0_2 (1.0g/HP-hr)	21.6 TPY

Notes:

[1] from Subpart JJJJ 40 CFR 60.4233(e), and Table 1 to Subpart JJJJ

[2] based upon the Subpart JJJJ g/HP-hr standard, and operation at maximum design horsepower of 2233 HP for 8,760 hrs/yr.

B. Summary of Potential Emissions (PTE = Potential To Emit)

Pollutant	**Allowable PTE from New LFG Engine [1] (TPY)**	**Estimated PTE from New LFG Engine (TPY)**	PTE from Sludge Dryer[5] (TPY)	PTE from Landfill LFG Flare [6] (TPY)	PTE from New Engine & Sludge Dryer (TPY) [7]	*PTE from Engine, Sludge Dryer & Flare [7,8] (TPY)*
NOx	**43.1** [1]	**12.9** [3]	4.6	24.7	47.7 (17.5)	*72.4 (42.2)*
CO	**107.7** [1]	**64.7** [3]	17.8	134.2	125.5 (82.5)	*259.7 (216.7)*
VOC/ NMOC	**21.6** [1]	**21.6** [3]	2.7	3.2	23.3 (23.3)	*26.5 (26.5)*
SO_2 [2]	*NA*	**12.1**	16.7	66.5	28.8	*95.3*

PM/PM_{10}	*NA*	**3.4** [3]	21.9	6.7	25.3	*32.0*
HAPs	*NA*	***negligible*** [4]	1.3	0.4	1.3	*1.7*
Mercury (Hg)	*NA*	***negligible*** [4]	1.3	*negligible* [6]	1.3	*1.3*

Notes:

1 LFG fired engine PTE estimate based on NSPS Subpart JJJJ emission standards equivalent TPY emission rates for NOx, CO, and VOC (see Summary of Allowable Emissions table above).

2 In order to account for possible worst case increases in LFG H_2S concentration due to a change in the character of the waste collected (i.e., more wallboard from overseas and increased moisture content), sulfur dioxide (SO_2) emissions are conservatively based upon a LFG H_2S concentration of 500 ppm instead of the current actual concentration of 140 ppm. This was first used in the current construction permit application for the LFG fired engine generator set and has also been retroactively applied to the emissions estimates for the sludge dryer and landfill flare.

3 LFG fired engine NOx, CO, NMOC, and PM PTE estimate based upon manufacturer's guarantee and operation for 8,760 hours/year at capacity (546 cfm LFG firing rate).

4 Based on previous LFG fired engine emissions information. Negligible HAPS = < 0.01 TPY; negligible Hg = < 0.0002 TPY.

5 Sludge dryer PTE estimate from Technical Evaluation (TEV) for construction permit 0810055-005-AC. The sludge dryer can also be fired with natural gas, but because they must purchase natural gas and the LFG fuel is "free", there is a strong built-in incentive to operate as much as possible using LFG as the fuel (rather than flare the LFG off to no purpose). (Sludge dryer maximum design LFG firing rate is 754 cfm (includes RTO).)

6 Landfill LFG flare PTE is from Feb. 2004 TV Renewal Application (EPSAP) (Permit 0810055-004-AV) based on operation at maximum flare design capacity (3,000 scfm) for 8,760 hrs/yr.

7 Facility PTE Note – The first number represent the total TPY PTE based on the allowable engine PTE for NOx, CO and VOC/NMOC; the second number in parentheses ( ) represents the total TPY PTE based on the manufacturer estimated engine PTE for NOx, CO and VOC/NMOC (i.e., the more representative actual PTE). All of the above PTE estimates are based upon combustion or flaring of LFG. Each assumes that the equipment is operated at capacity for 8,760 hrs/yr. The facility PTE at any given time will be based upon the quantity of LFG generated and collected, and how it is used/combusted. The Landfill Flare PTE assumes that the flare is operating at design capacity. However any

LFG combusted in the engine or the sludge dryer will not need to be combusted by the flare. The flare will be a backup control device to combust any LFG not sent to and combusted by the engine and or sludge dryer. Based upon the current LFG generation rate (approximately 1,500 acfm), the quantity of LFG available is enough to fuel both the LFG fired engine and the sludge dryer exclusively on LFG with a small amount of extra unused LFG to be combusted by the flare (flare would also combust the additional excess LFG whenever the engine or sludge dryer is not operating, or operating at reduced capacity). The quantity of LFG available will be variable/ever-changing (increasing and then eventually decreasing) based upon the quantity and age of the solid waste in place (this is an active landfill) and its moisture content.

[8] This "worst case" scenario represents operation of all LFG combustion equipment at capacity for 8,760 hrs/yr. This scenario could not actually occur as it represents a LFG firing rate far above the actual LFG generation rate from the landfill (it is estimated that current LFG generation rate is only 35% of the total LFG usage capacity).

V. Conclusions

The emission limits proposed by the applicant will meet all of the requirements of Chapters 62-204 through 297, F.A.C.

The General and Specific Conditions listed in the proposed permit (attached) will assure compliance with all the applicable requirements of Chapters 62-204 through 297, F.A.C.

VI. Preliminary Determination

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. Additional details of this analysis may be obtained by contacting the project engineer at the Florida Department of Environmental Protection Air Resource Management, Southwest District 13051 North Telecom Parkway, Temple Terrace, Florida 33637-7600.

Pursuant to Section 403.087, Florida Statutes and Section 62-4.070, Florida Administrative Code, the Department hereby gives notice of its intent to issue a permit to construct the aforementioned air pollution source in accordance with the draft permit and its conditions as stipulated (see attached).