TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Covanta Lake II, Inc.
3830 Rogers Industrial Park Road
Okahumpka, Florida 34762

Lake County Resource Recovery Facility
Facility ID No. 0690046

PROJECT

Draft Permit No. 0690046-015-AC/PSD-FL-113J
Application for Minor Source Air Construction (AC) Permit

Combustion of Biosolids in Municipal Waste Combustor Unit Nos. 1 & 2
and Waste (Fuel Slate) Revisions

COUNTY

Lake County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Permitting and Compliance
2600 Blair Stone Road, MS#5505
Tallahassee, Florida 32399-2400

September 5, 2014

1. GENERAL PROJECT INFORMATION

1.1. 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.

1.2. Facility Description and Location

This facility is an existing municipal waste combustor facility categorized under Standard Industrial Classification No. 4953. The existing Lake County RRF is located in Lake County at 3830 Rogers Industrial Park Road, Okahumpka, Florida.[1] The (UTM) Coordinates are: Zone 17; 413.12 km East; and, 3179.21 km North; Latitude: 28° 44’ 22” North; and, Longitude: 81° 53’ 23” West. This site is in an area that is in attainment (or designated as unclassifiable) for all air pollutants subject to state and federal Ambient Air Quality Standards (AAQS).

Figure 1 shows the location of Lake County in Florida. **Figure 2** shows the map location of the Lake County RRF. **Figure 3** shows a satellite view of the Lake County RRF.

Figure 1. Lake County in Florida.

Figure 2. Map Location of the Lake County RRF.

Figure 3. Satellite View of the Lake County RRF.

1.3. Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- This facility does not operate units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

1.4. Project Description

The applicant applied on April 28, 2014, to the Department for a minor source air construction permit. The minor source air construction permit is for the combustion of biosolids in Municipal Waste Combustor Unit Nos. 1 & 2 and waste (fuel slate) revisions at the existing municipal waste combustor facility.

The applicant requested the authorization to combust "biosolids" (treated sewage sludge) formerly known as "domestic wastewater residuals" in the Department's domestic wastewater treatment rule, Chapter 62-640, F.A.C. The applicant requested to combust biosolids (includes Class B, A, and AA biosolids) that are not liquid biosolids.

The MWC Unit Nos. 1 & 2 have a total charging rate (short-term) of 576 tons per day (TPD) of municipal solid waste (MSW). The applicant requested a maximum of up to 5% biosolids on an as received (i.e., wet) basis to be combusted in the MWC units. This is equivalent to a maximum mass of 29 TPD facility-wide.

1.5. Application Processing Schedule

- Minor Source Air Construction Permit Application received on April 28, 2014.
- Request for Additional Information (RAI) #1 sent via email on May 9, 2014.
- Additional Information Response received via mail on July 30, 2014 (complete).

{Documents specifically related to this project are posted and available on the Department's world wide website at http://appprod.dep.state.fl.us/air/emission/apds/default.asp by entering the project number shown above.}

1.6. Relevant Documents

- PSD-FL-113, Authorized the construction of Municipal Solid Waste Combustor Unit Nos. 1 & 2.
- Permit No. 0690046-003-AC/PSD-FL-113E, Added waste (fuel slate) specific conditions.
- Permit No. 0690046-008-AC/PSD-FL-113H, Added regulated garbage from international or interstate movements.
- Permit No. 0690046-014-AC/PSD-FL-113I, Allowed the combustion of higher quantities of "non-hazardous solid and liquid waste" (segregated loads).
- Permit No. 0690046-013-AV, Current Title V Air Operation Permit.
- HB 503, an amendment to Section 403.707(1), F.S. (2012).

2. PSD APPLICABILITY

2.1. General PSD Applicability

For areas currently in attainment with the state and federal AAQS or areas otherwise designated as unclassifiable, the Department regulates major stationary sources of air pollution in accordance with Florida's PSD preconstruction review program as defined in Rule 62-212.400, F.A.C. Under preconstruction review, the Department first must determine if a project is subject to the PSD requirements ("PSD applicability review") and, if so, must conduct a PSD preconstruction review. A PSD applicability review is required for projects at new and existing major stationary sources. In addition, proposed projects at existing minor sources are subject to a PSD applicability review to determine whether potential emissions *from the proposed project itself* will exceed the PSD major stationary source thresholds. A facility is considered a major stationary source with respect to PSD if it emits or has the potential to emit:

- 250 tons per year or more of any regulated air pollutant; or
- 100 tons per year or more of any regulated air pollutant and the facility belongs to one of the following 28 PSD-major facility categories: fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, coal cleaning plants (with thermal dryers), Kraft pulp mills, portland cement plants, primary zinc smelters, iron and steel mill plants, primary aluminum ore reduction plants, primary copper smelters, municipal incinerators capable of charging more than 250 tons of refuse per day, hydrofluoric, sulfuric, and nitric acid plants, petroleum refineries, lime plants, phosphate rock processing plants, coke oven batteries, sulfur recovery plants, carbon black plants (furnace process), primary lead smelters, fuel conversion plants, sintering plants, secondary metal production plants, chemical process plants, fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input, petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels, taconite ore processing plants, glass fiber processing plants and charcoal production plants.

Once it is determined that a project is subject to PSD preconstruction review, the project emissions are compared to the "significant emission rates" (SERs) defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NOx); sulfur dioxide (SO_2); particulate matter (PM); particulate matter with a mean particle diameter of 10 microns or less (PM_{10}); volatile organic compounds (VOC); lead (Pb); fluorides (F); sulfuric acid mist (SAM); hydrogen sulfide (H_2S); total reduced sulfur (TRS), including H_2S; reduced sulfur compounds, including H_2S; municipal waste combustor organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans; municipal waste combustor metals measured as PM; municipal waste combustor acid gases measured as SO_2 and hydrogen chloride (HCl); municipal solid waste landfills emissions measured as non-methane organic compounds (NMOC); and mercury (Hg). In addition, significant emissions rate also means any emissions rate or any net emissions increase associated with a major stationary source or major modification which

would construct within 10 kilometers of a Class I area and have an impact on such area equal to or greater than 1 $\mu g/m^3$, 24-hour average.

If the increase in emissions from the project exceeds the defined significant emissions rate of a PSD pollutant, the project is considered "significant" for the pollutant and the applicant must employ the Best Available Control Technology (BACT) to minimize the emissions and evaluate the air quality impacts. Although a facility or project may be *major* with respect to PSD for only one regulated pollutant, it may be required to install BACT controls for several "significant" regulated pollutants. **Table 1** lists the PSD SER applicable to the Wheelabrator North facility.

TABLE 1 - LIST OF SIGNIFICANT EMISSION RATES BY PSD-(AIR) POLLUTANT RELEVANT TO THE FACILITY. [1]

PSD-(Air) Pollutant	SER tons/year	PSD-(Air) Pollutant	SER, tons/year
PM	25	CO	100
PM_{10}	15	NOx	40
$PM_{2.5}$	10	Ozone [NOx] [3]	40
$PM_{2.5}$ [NOx] [2]	40	Volatile Organic Compounds (VOC)	NA [4]
$PM_{2.5}$ [SO_2] [2]	40	Ozone [VOC] [3]	40
Lead (Pb)	0.60		
Mercury (Hg)	0.10	Reduced Sulfur Compounds (RSC) [H_2S]	10
MWC metals [measured as PM]	15	Total Reduced Sulfur (TRS) [H_2S]	10
		SO_2	40
Greenhouse Gases	0 [5]	Sulfuric Acid Mist (SAM)	7
		Fluorides (F)	3
		HCl	NA [4]
		MWC acid gases [SO_2 + HCl]	40
		MWC organics [dioxins/furans]	3.5×10^{-6}

1. There is a federal SER of 75,000 tons/year for Greenhouse Gases (GHG) as carbon dioxide equivalent (CO_2e) that has not been incorporated into Department rules.
2. $PM_{2.5}$ is also regulated through precursors [NOx and SO_2].
3. Ozone (O_3) is regulated through precursors [VOC and NOx].
4. NA means not applicable.
5. Pursuant to 40 CFR 52.21(b)(23)(ii), pollutants with no SER listed at 40 CFR 52.21(b)(23)(i) have a SER of zero tons/year. However, 75,000 TPY was proposed by EPA.

3. APPLICANT REVIEW

3.1. Background

The applicant applied on April 28, 2014, to the Department for a minor source air construction permit. The minor source air construction permit is for the combustion of biosolids in Municipal Waste Combustor Unit Nos. 1 & 2 and waste (fuel slate) revisions at the existing municipal waste combustor facility.

3.2. Combustion of Biosolids in Municipal Waste Combustor Unit Nos. 1 & 2 and Waste (Fuel Slate) Requested Changes

On page 2 of the application form in the Application Comment field and in the Introduction section of the supporting information (page 1) to the permit application received on April 28, 2014, the applicant requested that the combustion of biosolids be authorized in Municipal Waste Combustor Unit Nos. 1 & 2.

On page 2 of the application form in the Application Comment field and in the cover letter to the permit application, the applicant requested specific changes to the wastes (fuel slate) specific conditions in the current valid Title V air operation permit No. 0690046-013-AV. These specific conditions contain very specific types and descriptions of fuels/wastes allowed to be combusted in municipal solid waste combustor Unit Nos. 1 & 2.

In summary, the applicant requested:

1. Combustion of biosolids in Municipal Waste Combustor Unit Nos. 1 & 2; and,
2. Waste (fuel slate) revisions.

In support of the requests, the applicant cited the legislation effective in 2012, HB 503, an amendment to Section 403.707(1), F.S. which directs the Department to "*... allow waste-to-energy facilities to maximize acceptance and processing of nonhazardous solid and liquid waste*."

3.3. Combustion of Biosolids's Effect on Air Pollutant Emissions

The applicant indicated that "*… there will be no appreciable increase in emissions from the combustion of biosolids*" in the MWC Unit Nos. 1 & 2 {see the Conclusion section in the supporting information (page 6) to the permit application}.

The applicant also indicated that the combustion of biosolids in MWC Unit Nos. 1 & 2 is not expected to result in a significant increase of regulated air pollutants {see page 3 of the RAI Response received via mail on July 30, 2014}.

To demonstrate that there will be no significant increase in air pollutant emissions from the combustion of biosolids in MWC Unit Nos. 1 & 2, the applicant will be required to measure, track and report air pollutant emissions for up to 5 (five) years from completion of the project in accordance with Rule 62-212.300(1)(e), F.A.C.

4. DEPARTMENT REVIEW

This municipal solid waste combustor (MWC) plant was originally permitted in 1986 under Permit No. AC35-115379/PSD-FL-113. The Lake County RRF began commercial operation on August 22, 1990.

A typical mass burn, waste-to-energy facility process overview is posted and available Covanta's website.[2]

MWC Unit Nos. 1 & 2 are identical mass-burn municipal solid waste combustors. Air pollutant emissions are well controlled at the Lake County RRF. Air pollutant emission control techniques, measures and devices on each unit include:

- A selective non-catalytic reduction (SNCR) system for the control of NOx emissions;
- Good combustion practices to minimize NOx, CO and VOC emissions;
- A spray dryer absorber (SDA) system (scrubber) for the control of acid gas emissions (i.e., HCl, hydrogen fluorides (HF), SAM);
- An activated carbon injection (ACI) system for the control of Hg and dioxin/furan emissions; and,
- A baghouse filter system for the control of particulate matter (PM) and mercury (Hg) emissions.

Air pollutant emissions from each unit are monitored by certified continuous emissions monitoring systems (CEMS) for the following air pollutants: SO_2, NOx & CO. Stack testing is performed for the following air pollutants: PM, cadmium (Cd), Hg, Pb, HCl, dioxin/furan. Each unit is also equipped with a certified continuous opacity monitoring system (COMS) for visible emissions.

4.1. Combustion of Biosolids's Effect on Air Pollutant Emissions

The applicant, Covanta Lake II, Inc., requested to combust biosolids in Municipal Waste Combustor (MWC) Units 1 & 2.

The applicant requested the authorization to combust "biosolids" (treated sewage sludge) formerly known as "domestic wastewater residuals" in the Department's domestic wastewater treatment rule, Chapter 62-640, F.A.C. The applicant requested to combust biosolids (includes Class B, A, and AA biosolids) that are not liquid biosolids.

The MWC Unit Nos. 1 & 2 have a total charging rate of 576 TPD of municipal solid waste (MSW). The applicant requested a maximum of up to 5% biosolids on an as received (i.e., wet) basis to be combusted in the MWC units. This is equivalent to a maximum mass of 29 tons per day (TPD) facility-wide.

4.1.1. Biosolids Defined

Several definitions and uses of the term "biosolids" exist.

In 1991, the Water Environment Federation (also known as the "WEF"), which is an internationally recognized wastewater treatment organization, officially coined the term "biosolids."[3] Within the wastewater treatment industry, "biosolids" commonly refers to treated and tested sewage sludge.[4] The term "sewage sludge" has remained unchanged and is the residue generated during the treatment of domestic (human) wastewater in a domestic wastewater treatment facility.

In the state of Florida, by rule in the Florida Administrative Code (F.A.C.) the term "biosolids" and "liquid biosolids" are defined in a domestic wastewater treatment rule, specifically in Chapter 62-640, F.A.C. as follows:

> "**62-640.200 Definitions.**
>
> …
>
> (6) "Biosolids" means the solid, semisolid, or liquid ***residue generated during the treatment of domestic wastewater {emphasis added}*** in a domestic wastewater treatment facility, formerly known as "domestic wastewater residuals" or "residuals." Not included is the treated effluent or reclaimed water from a domestic wastewater treatment plant. Also not included are solids removed from pump stations and lift stations, screenings and grit removed from the preliminary treatment components of domestic wastewater treatment facilities, other solids as defined in subsection 62-640.200(31), F.A.C., and ash generated during the incineration of biosolids. Biosolids include products and treated material from biosolids treatment facilities and septage management facilities regulated by the Department.
>
> …
>
> (28) "Liquid biosolids" means any biosolids that are less than 12% solids by weight, or that are determined to contain free liquids as defined by Method 9095B (Paint Filter Liquids Test), November 2004, as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW-846), January 3, 2008, 73 FR 486, which is hereby adopted and incorporated by reference and is available from the Department of Environmental Protection, Domestic Wastewater Section, M.S. 3540, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 or any of the Department's District Offices.
>
> …"

The U.S. EPA on its Biosolids web site[5] refers to "biosolids" as follows:

> "Biosolids are the nutrient-rich organic materials resulting from the ***treatment of sewage sludge {emphasis added}*** (the name for the solid, semisolid or liquid untreated residue generated during the treatment of domestic sewage in a treatment facility). When treated and processed, sewage sludge becomes biosolids which can be safely recycled and applied as fertilizer to sustainably improve and maintain productive soils and stimulate plant growth."

In the U.S. EPA federal regulation covering air pollutant emissions from municipal waste combustors (MWCs) (the NSPS 40 CFR 60, Subpart Eb for 'new' MWCs and the Emission Guidelines 40 CFR 60, Subpart Cb for 'existing' MWCs), U.S. EPA excludes "sewage sludge" from the definition of municipal solid waste (MSW) or municipal-type solid waste (see 40 CFR 60.51b Definitions, excerpt below).

> "**60.51b Definitions.**
>
> …
>
> *Municipal solid waste* or *municipal-type solid waste* or *MSW* means household, commercial/retail, and/or institutional waste. Household waste includes material discarded by single and multiple residential dwellings, hotels, motels, and other similar permanent or temporary housing establishments or facilities. Commercial/retail waste includes material discarded by stores, offices, restaurants, warehouses, nonmanufacturing activities at

industrial facilities, and other similar establishments or facilities. Institutional waste includes material discarded by schools, nonmedical waste discarded by hospitals, material discarded by nonmanufacturing activities at prisons and government facilities, and material discarded by other similar establishments or facilities. Household, commercial/retail, and institutional waste ***does not include {emphasis added}*** used oil; ***sewage sludge {emphasis added}***; wood pallets; construction, renovation, and demolition wastes (which includes but is not limited to railroad ties and telephone poles); clean wood; industrial process or manufacturing wastes; medical waste; or motor vehicles (including motor vehicle parts or vehicle fluff). Household, commercial/retail, and institutional wastes include:

(1) Yard waste;
(2) Refuse-derived fuel; and
(3) Motor vehicle maintenance materials limited to vehicle batteries and tires except as specified in §60.50b(g).

…"

It is widely known that sewage sludge is not part of the MSW stream. MSW's typical composition is shown by the following pie chart from Franklin Associates[6] given in **Figure 4**:

Figure 4. Typical Composition of MSW.

Therefore, EPA does not consider "biosolids" or "sewage sludge" to be included in the MSW definition, in other words as part of the typical MSW going to an MWC. Although biosolids (treated sewage sludge) is not considered to be part of the typical MSW, the federal regulations of 40 CFR 60, Subparts Cb/Eb do not prohibit it from being combusted in an MWC.[7]

Neither the U.S. EPA federal air regulations nor the state of Florida air pollution rules specifically define "biosolids." The U.S. EPA promulgated on March 21, 2011 the NSPS 40 CFR 60, Subpart LLLL for 'new' Sewage Sludge Incineration (SSI) Units. This NSPS 40 CFR 60, Subpart LLLL applies to 'new' SSI Units located at wastewater treatment plants. This federal regulation does specifically define "sewage sludge" as:

"**40 CFR 60.4930 Definitions.**

…

Sewage sludge means solid, semi-solid, or liquid ***residue generated during the treatment of domestic sewage {emphasis added}*** in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incineration unit or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works."

When comparing the definition of "sewage sludge" from the NSPS 40 CFR 60, Subpart LLLL it is somewhat similar to the one in the state of Florida's domestic wastewater treatment rule for "biosolids." This could cause confusion when trying to use the domestic wastewater treatment definition in the air pollutant emission regulatory context.

The term "biosolids" these days is being used interchangeably with the term "sewage sludge."

For purposes of this specific air construction permit request from the Lake County RRF to combust "biosolids" in the MWC Unit Nos. 1 & 2, "biosolids" are defined consistent with the state of Florida definition contained in the domestic wastewater treatment rule, Chapter 62-640, F.A.C. The Department considers biosolids to be an allowable non-MSW fuel received as a segregated material.

4.1.2. General - Sources of Biosolids

Biosolids, formerly known as "domestic wastewater residuals," come from the treatment of domestic (human) wastewater. Solids that accumulate during the wastewater treatment process must be wasted periodically at different stages of the process. These semi-solids are referred to as sewage sludge, also now known as "biosolids." Usually at one of the last stages of a wastewater treatment plant the high water content sewage sludge (about 97%) is dewatered using presses, screw conveyors or centrifuges. After this dewatering stage the sewage sludge's water content is reduced to approximately 80% water content. The biosolids still have a high water content. In general, with biosolids having a high water content and containing high levels of inert materials, the net fuel value is often low.

Of interest in the U.S., is that biosolids are classified based on their degree of pathogen reduction and their metals concentrations typically as either "Class AA," "Class A" or "Class B." "Class AA" biosolids have the least amount of pathogens and the lowest metals content. Class AA biosolids have the least amount of water content resulting in a higher fuel value. Class B biosolids has a higher amount of pathogen and metals concentrations. Class AA biosolids are marketed and distributed for fertilizer use. Industry can contribute to higher metals concentrations in the wastewater going to the treatment plant and ultimately result in biosolids with higher metal concentrations. **Table 2** summarized the metals in biosolid classifications.

TABLE 2 - BIOSOLIDS CLASSIFICATIONS.

Metal Constituent	"Class B" Biosolids Specification (limit), mg/kg [a]	"Class A" Biosolids Specification (limit), mg/kg [a]	"Class AA" Biosolids Specification (limit), mg/kg [b]
Arsenic (As)	75	75	41
Cadmium (Cd)	85	85	39
Copper (Cu)	4300	4300	1500
Lead (Pb)	840	840	300
Mercury (Hg)	57	57	17
Molybdenum (Mo)	75	75	N/A
Nickel (Ni)	420	420	420
Selenium (Se)	100	100	100
Zinc (Zn)	7500	7500	2800

[a] The specification is based on a single sample. The metal constituent specifications are the same for Class B and Class A biosolids. Class A biosolids must meet more stringent pathogen reduction requirements.
[b] The specification is based on a monthly average concentration.
These specifications for biosolids are from Chapter 640, F.A.C.

(see http://www.dep.state.fl.us/legal/rules/wastewater/62-640.pdf).

Sewage sludge from small wastewater treatment plants (WWTPs) like the local wastewater treatment plant in Tallahassee typically does not meet Class B standards for biosolids. The sewage sludge from a WWTP typically leaves screw conveyors (presses) or centrifuges then sometimes gets additional treatment prior to leaving the plant. At large WWTPs additional treatment processes (like anaerobic digestion, lime stabilization or composting) are typically used treating the sewage sludge to meet Class B biosolids standards. Biosolids can be further treated to Class A or Class AA standards.[8]

Figure 5 shows sewage sludge at a dissolved air thickener at a local WWTP in the City of Tallahassee (COT).[9] Sewage sludge exits the dissolved air thickener at about 97% moisture content. At this moisture content the sewage sludge meets the definition of a "liquid biosolid" in Rule 62-640.200, F.A.C. The applicant, Pasco County RRF, for the proposed project is not going to combust "liquid biosolids." More water is removed at the next step of the process at this plant with a screw conveyor. **Figure 6** shows the screw conveyor.[10] At other WWTPs screw conveyors are referred to as screw presses. The sewage sludge exits the screw conveyor at approximately 83% moisture content (17% solids content) now in a semi-solid form. At this stage of the treatment process the sewage sludge is no longer a "liquid biosolid" as defined in Rule 62-640.200, F.A.C., i.e., it has greater than or equal to 12% solids.

Figure 5. Sewage Sludge at a Dissolved Air Thickener.

Figure 6. Screw Conveyor.

With dissolver air thickening and the use of screw conveyors at the COT WWTP, the sewage sludge's water content is greatly reduced from about 99% entering the plant to 83%, for a total of 16% water removal.

Figure 7 shows dried biosolids that are classified as Class AA biosolids from the COT WWTP.[11] These Class AA biosolids are about 99% solids (only 1% moisture content). These biosolids were produced by sending the sewage sludge (biosolids) exiting the screw conveyor pictured above through a rotary dryer.

Figure 8 shows some biosolids currently received at the Lee County's landfill and compost facility (the lighter material piles). The biosolids pictured here had been unloaded directly from a dump truck from the City of Ft. Myers WWTP. These biosolids have a 15% solids content (85% moisture content). As shown by this picture these biosolids are in a semi-solid form. {Note: The darker material in the back to the right is biosolids mixed with mulch.}

A close up of typical Class B biosolids are shown in **Figure 9**.[12] These can be land applied under certain constraints. This picture shows their semi-solid form close up.

Figure 7. Class AA Biosolids.

Figure 8. Biosolids Currently received at the Lee County's Landfill and Compost Facility.

Figure 9. Typical Class B Biosolids.

4.1.3. General - Biosolids Use and Disposal in Florida

In Florida, biosolids are disposed of by land application, land-filling, and roughly 1/3 is marketed & distributed (see **Figure 10**.[13] However, there are pressures to discontinue the land application of biosolids. In Florida, permits were required by the DEP from sites accepting biosolids by January 2013.

4.1.4. General - Combustion of Biosolids

Biosolids can be incinerated or co-fired with other combustible materials. Dedicated incinerators can burn exclusively biosolids. Incineration technologies include: hearth furnaces, fluidized beds, rotary kilns and electric incinerators.[14]

Figure 10. Disposal of Biosolids in Florida.

4.1.5. Biosolids Heat Content Value

Of interest is that sewage sludge was identified by U.S. EPA as being considered to be a non-traditional alternative fuel (see page 15647 of Federal Register dated March 21, 2011).[15] It has been reported that dried biosolids can have a heat content of up to 10,300 Btu/lb.[16] Biosolids can provide a source of energy when combusted in a municipal waste combustor. However, the cost savings in disposal of biosolids for municipalities is expected to be greater than the benefit in electrical generation.

Dried biosolids typically have a low moisture content. The actual heat content value provided by the Lee County RRF for the City of Ft. Myer's sewage sludge (biosolids) was 850 Btu/lb with a moisture content of 86%. The actual heat content value provided by the Pasco County RRF for the Shady Hill's sewage sludge (biosolids) was 850 Btu/lb with a moisture content of 82%. The sewage sludge (biosolids) proposed to be combusted by the Lake County RRF from nearby WWTPs. The biosolids delivered to the Lake County RRF will have an estimated moisture content of no more than 88%. In comparison, the moisture content of municipal solid waste at an RRF plant is typically about 21%.

For information purposes, **Table 3** below compares the heat content value of biosolids to other solid wastes/fuels.

TABLE 3 - HEAT CONTENT VALUE OF BIOSOLIDS COMPARED TO OTHER SOLID WASTES/FUELS.

Shady Hill's Biosolids (a semi-solid)	Dried Biosolids (solid material)	Municipal Solid Waste (MSW)	Distillate oil (a liquid)	Tires (solid material)	Coal (bituminous) (a solid fuel)
850 Btu/lb	10,300 Btu/lb[17]	5,000 Btu/lb	19,910 Btu/lb	15,800 Btu/lb	12,500 Btu/lb

Five (5) of the MWC facilities in Florida are currently permitted to accept and combust sewage sludge or biosolids. The 5 facilities are:

1) the Lee County RRF (permitted 03/08/2012);
2) the Hillsborough County RRF (permitted 12/13/2012);
3) the Pasco County RRF (permitted 10/01/2013);
4) the North Broward Waste-to-Energy Facility (permitted 04/15/2014); and,
5) the South Broward Waste-to-Energy Facility (permitted 04/16/2014).

Most of the air permits in Florida specifically prohibit the combustion of sewage sludge or the use of sewage sludge as a fuel. Two plants in the U.S. had been identified previously as currently combusting sewage sludge in the U.S.: the Covanta Lancaster County Resource Recovery Facility in Lancaster, Pennsylvania and the Covanta Huntsville Waste-to-Energy Facility in Huntsville, Alabama. The exact type of sewage sludge (biosolids) was not described.

4.1.6. Biosolids Sources for the Lake County RRF

The biosolids that the Lake County RRF proposed to combust are from the domestic wastewater treatment plants in the Lake County municipal area. These wastewater treatment plants are located in an area which has very light industry.[18]

In the air permit application, the applicant provided the sludge analyses for the 2014 sludge sampling results from the City of Leesburg WWTP's sludge which had a moisture content of 98.4% {note that the City of Leesburg WWTP will be installing equipment to dewater the biosolids down to a 88% moisture content level}. These results which are provided in **Table 4** indicates the following maximum metal constituent values:

TABLE 4 - CITY OF LEESBURG WWTP'S SLUDGE SAMPLING RESULTS FROM 2014.

Metal Constituent	Maximum Result, mg/kg
Arsenic	3.77
Cadmium	1.60
Copper	1240
Lead	24.2
Mercury	0.614
Molybdenum	83.1
Nickel	14.2
Selenium	14.0
Zinc	939

The 2014 sludge sampling results for the City of Leesburg WWTP's sludge almost meets the Class B biosolids heavy metal specifications. The molybdenum content is just above the 75 mg/kg specification at 83.1 mg/kg.

4.1.7. Handling, Storage and Combustion of Biosolids in the Lake County RRF MWC Units

The applicant briefly described how the biosolids are to be well mixed with MSW prior to being combusted in the MSW units. These practices need to be included in the permit to provide reasonable assurances that best management practices in the handling, storing of biosolids and combustion at the Lake County RRF are followed.

4.1.8. Air Pollution Affects from the Combustion of Biosolids

Review of standard air pollution references like U.S. EPA's AP-42, *Compilation of Air Pollutant Emission Factors* and the A&WMA's *Air Pollution Engineering Manual* provide no air pollution information on the combustion of biosolids or sewage sludge in MWCs.

Chapter 2 of AP-42 covers solid waste disposal. Specifically, Chapter 2.1 addresses refuse combustion and Chapter 2.1 addresses sewage sludge incineration. Review of these two chapters indicates that no emission factor information has been published for the combustion of biosolids or sewage sludge in MWCs. No other chapters in AP-42 address or contain emission factor information on the co-firing of biosolids with municipal waste (refuse).

No specific air emission information on the co-firing of biosolids or sewage sludge with municipal waste was also found in the A&WMA's Air Pollution Engineering Manual. Also, no technical papers on air emissions from the combustion of biosolids or sewage sludge in MWCs were found in A&WMA's web site resources.

The Lee County RRF biosolids project (Permit No. 0710119-009-AC) was the first MWC facility permitted to combust biosolids in the state of Florida and was permitted on March 8, 2012. Prior to the Lee County RRF biosolids

project, test data from an MWC facility in Florida while combusting biosolids was not available. The test report performed under the Lee County RRF biosolids project is useful information for this project {note: the test report can be found at the following website Link [see page 95; the test report is dated May 31, 2012]}.

Biosolids Emission Test Results

The Lee County RRF biosolids project (Permit No. 0710119-009-AC) required an evaluation/confirmation of air pollutant emissions along with initial compliance demonstrations. Initial compliance with the applicable air pollutant standards and limits was demonstrated by the Lee County RRF while combusting biosolids. As part of the Lee County RRF biosolids project an evaluation was required, comparing air pollutant emissions while combusting biosolids to when they were not combusted. A summary of the results is inserted here in **Table 5**.

TABLE 5 - LEE COUNTY RRF BIOSOLIDS COMBUSTION COMPARED TO ANNUAL STACK TESTING W/O BIOSOLIDS.

Air Pollutant/ Parameter	Units [1]	January 2012 Annual Stack Tests	March 2012 Test with 5% Biosolids	Comparison increase (+)/ decrease (-)
Mercury (Hg)	µg/dscm @ 7% O_2	0.722	0.258	-0.464
Cadmium (Cd)	µg/dscm @ 7% O_2	<0.117	<0.130	+0.013
Lead (Pb)	µg/dscm @ 7% O_2	1.33	1.33	0
Opacity	%	0	0	0
Particulate Matter (PM)	gr/dscf @ 7% O_2	0.000195	<0.0000442	-0.0001508
CO	ppm @ 7% O_2	12	11	-1
SOx	ppm @ 7% O_2	8	11	+3
NOx	ppm @ 7% O_2	145	151	+6

1. µg/dscm @ 7% O_2 means micrograms per cubic meter corrected to 7 percent oxygen.
ppm @ 7% O_2 means parts per million by volume, dry, corrected to 7% O_2.
gr/dscf @ 7% O_2 means grains per dry standard cubic foot corrected to 7% O_2.

The test results indicate that the co-firing of about 5% biosolids at the Lee County RRF does not have much effect on key exhaust gas stack concentrations of air pollutant emission rates. As shown in **Table 5** above, SO_2 and/or NOx emissions could increase in minor quantities.

The second biosolids project in Florida was permitted at the Hillsborough County RRF on 12/13/2012 (Permit No. 0570261-016-AC). As cited in the Technical Evaluation & Preliminary Determination document for the Hillsborough County RRF biosolids project (Permit No. 0570261-016-AC) NOx could be a PSD air pollutant of concern based on the Lee County test results. An increase of about 4% in NOx concentration equated to almost 40 TPY of NOx emissions for the 1800 TPD Hillsborough County RRF {see page 12 of the Technical Evaluation & Preliminary Determination}.[19]

The Hillsborough County RRF project (Permit No. 0570261-016-AC) also required an evaluation/confirmation of air pollutant emissions along with initial compliance demonstrations. As part of the Hillsborough County RRF biosolids project an evaluation was also required, comparing air pollutant emissions while combusting biosolids to when they were not combusted. As part of this application, the applicant provided a previously submitted copy of the Hillsborough County RRF Biosolids Test Report dated August 23, 2013.[20] A summary of the results is inserted here in **Table 6** and **Table 7**.

TABLE 6 - HILLSBOROUGH COUNTY RRF UNIT NOS. 1, 2 & 3 [1] BIOSOLIDS COMBUSTION COMPARED TO TESTING W/O BIOSOLIDS.

Air Pollutant/ Parameter	Units [2]	Test Data w/o Biosolids [3]	May-June 2013 Test Data with ~1% Biosolids [4]	Comparison increase (+)/ decrease (-)
CO	ppm @ 7% O_2	16	17	+1
SOx	ppm @ 7% O_2	3	5	+2
NOx	ppm @ 7% O_2	176	176	0

1. The highest value from all three unit test results is displayed here for worst-case emissions. Unit Nos. 1, 2 & 3 are identical units. Unit 4 is a new unit.
2. ppm @ 7% O_2 means parts per million by volume, dry, corrected to 7% O_2.
3. CEMS data from 5/7/2012 - 5/6/2013.
4. CEMS data from 5/7/2013 - 6/5/2013.

TABLE 7 - HILLSBOROUGH COUNTY RRF UNIT NO. 4 BIOSOLIDS COMBUSTION COMPARED TO TESTING W/O BIOSOLIDS.

Air Pollutant/ Parameter	Units [1]	Test Data w/o Biosolids [2]	May-June 2013 Test Data with ~1% Biosolids [3]	Comparison increase (+)/ decrease (-)
CO	ppm @ 7% O_2	32	31	-1
SOx	ppm @ 7% O_2	2	9	+7
NOx	ppm @ 7% O_2	85	86	+1
Mercury (Hg)	µg/dscm @ 7% O_2	1.37[4]	0.37	-1.0

1. µg/dscm @ 7% O_2 means micrograms per cubic meter corrected to 7 percent oxygen.
   ppm @ 7% O_2 means parts per million by volume, dry, corrected to 7% O_2.
2. CEMS data from 5/7/2012 - 5/6/2013.
3. CEMS data from 5/7/2013 - 6/5/2013.
4. CEMS data from 7/1/2012 - 5/6/2013.

The test results indicate that the co-firing of about 5-10 TPD (~1%) biosolids at the Hillsborough County RRF does not have much effect on key exhaust gas stack concentrations of air pollutant emission rates. As shown in **Table 6** and **Table 7** above, CO, SO_2 and/or NOx emissions could increase in minor quantities.

The third biosolids project in Florida was permitted at the Pasco County RRF on 10/01/2013 (Permit No. 1010056-009-AC). The Pasco County RRF first fired biosolids around January 2014, test data is not yet available.

In another biosolids permit application, an applicant provided a test report from the Wheelabrator Westchester Facility located in Peekskill, New York. A summary of some of the key results is inserted here in **Table 8**.

TABLE 8 - WESTCHESTER BIOSOLIDS COMBUSTION COMPARED TO TESTING W/O BIOSOLIDS.

Air Pollutant/ Parameter	Units [1]	Test w/o Biosolids	Test with 10% Biosolids	Comparison increase (+)/ decrease (-)
Opacity	%	1.2	0.8	-0.4
CO	ppm @ 7% O_2	15.3	15.7	+0.4
SO_2	ppm @ 7% O_2	21.3	23.1	+1.8

Air Pollutant/ Parameter	Units [1]	Test w/o Biosolids	Test with 10% Biosolids	Comparison increase (+)/ decrease (-)
NOx	ppm @ 7% O_2	156.3	174.6	+18.3
1. ppm @ 7% O_2 means parts per million by volume, dry, corrected to 7% O_2.				

The test results indicated that the co-firing of up to 15% biosolids at the Westchester Facility did not have much effect on opacity (visible emissions). As shown in **Table 8** above, CO, SO_2 and/or NOx emissions could increase. The NOx emissions were observed to change by up to approximately 12%. In the conclusion of the Westchester Facility test report {see page 22}, CO emission spikes were observed and excluded from the summary data. NOx is a PSD air pollutant of concern based on these actual test results, affirming what was cited above regarding NOx emissions from the Hillsborough County RRF biosolids project (Permit No. 0570261-016-AC). A 12% increase in NOx concentration may not seem like much but, when this increase is applied to mass emissions and longer time-based quantities like lbs/hour & TPY values it could easily result in exceeding the PSD SER for NOx of 40 TPY if not reduced by the injection of additional reagent (ammonia/urea) in the SNCR system to lower NOx emissions. Also, an increase in mass quantities of NOx emissions can be further magnified by MWC units that are larger when looking at the mass emitted in lbs and tons. The Lake County RRF is a 576 TPD facility vs. the 1800 TPD Hillsborough County RRF. Because the MWC units are equipped with CEMS for NOx emissions the applicant can monitor NOx emissions to ensure that they will be less than the PSD SER threshold quantity of 40 TPY.

In conclusion, the actual effects on air pollution from the combustion of biosolids or sewage sludge in MWCs are becoming more known and documented in Florida. Air pollution impacts (if any) at the Lake County RRF while combusting biosolids can be confirmed by actual emissions testing.

4.1.9. Potential and Control of Air Pollutant Emissions from the Combustion of Biosolids

Biosolids consist of primarily inert materials, solids. Heavy metal constituents in biosolids are analyzed in order to classify biosolids. Obvious air pollutants of concern from the combustion of biosolids in an MWC are heavy metals, particulate matter and objectionable odors.

Air pollutants specifically regulated under the federal regulations in 40 CFR 60 Subparts Cb/Eb for MWCs are: total particulate matter (PM); metals and metal compounds (cadmium (Cd), mercury (Hg) and lead (Pb)); all acid gases (including, but not limited to, sulfur dioxide (SO_2) and hydrogen chloride (HCl) gases); organic compounds (includes dioxins/furans (D/F)); nitrogen oxides (NOx); and, carbon monoxide (CO).

4.1.10. General - Metals

The Lake County MWC units use spray dry absorbers and baghouses for the control of acid gases and particulate matter, selective non-catalytic reduction (SNCR) systems for the NOx, and activated carbon injection (ACI) systems for the control of mercury (Hg) and certain organic emissions. Activated carbon is injected into the flue gases prior to the baghouses to control Hg emissions.

In general, heavy metals like arsenic (As), cadmium (Cd), lead (Pb), mercury (Hg) and nickel (Ni) will remain in the sewage sludge combusted material when combustion temperatures are less than 1650 degrees F.[21] Metal oxides of mercury and lead may be emitted. Heavy metal oxides of mercury and lead can also combine with particles and are collected with particulate matter. The precipitated heavy metals onto particles are collected in the baghouses or in the scrubbers. Heavy metals in the air stream are further precipitated with the activated carbon onto particles and collected in the baghouses or in the scrubbers.

4.1.11. Mercury (Hg)

Mercury emissions depend on the mercury containing wastes being combusted. Typical mercury containing wastes are light bulbs, switches, alkaline batteries, thermometers and thermostats. Assuming the combustible fraction of

sewage sludge is completely burned, mercury could be volatized during combustion. Mercury emissions from the MWCs could be impacted due to the mercury content in the sewage sludge.

Mercury controls primarily accomplished by activated carbon injection have been removing at least 85% of the mercury emissions in the MWC exhaust. This means that no more than 15% of the mercury emissions have been exiting the stack. It is assumed that the mercury controls will work the same with the co-firing of sewage sludge as with MSW.

In 1989, 709 short tons of Hg were disposed of in the U.S. [22] In 1990, 205 million tons total of MSW was generated in the U.S. [23] Nationally, it could be estimated that municipal solid waste contains only about 0.34 x 10^{-3} % by weight (ton/ton) of mercury laden waste in the 1990's. Although mercury in the MSW stream twenty years later has been reduced more current data could not be found. Based on the reported sludge values for the City of Leesburg WWTP, the mercury content of the sludge is 0.000614 x 10^{-3} % by weight (kg/kg).

The applicant and Department estimated mercury emissions from this project. A theoretical increase in Hg emissions when combusting up to 5% by weight of biosolids were estimated to be approximately 0.0044 mg/dscm {at a design flow rate of 43,200 dscm for both units (x 2) equivalent to 12.47 lbs/year}. The PSD SER for Hg is 200 lbs/year. The estimated increase in emissions (12.47 lbs/year) is less than the PSD SER.

In the Lee County RRF biosolids project a theoretical increase in Hg emissions was predicted (0.67 lb/year). Emissions testing at the Lee County RRF actually showed a decrease in Hg emissions (see **Table 5** above). The mercury content of the City of Ft. Myer's biosolids under the Lee County RRF project was 1.2 mg/kg.

When up to 5% by weight of biosolids is burned displacing 29 TPD of MSW, mercury emissions while burning biosolids may slightly increase. The impact on mercury emissions from the combustion of biosolids in the MWC units should therefore not result in a significant emission rate increase of mercury.

As previously indicated in **Table 5**, Hg test data was available from the Lee County RRF biosolids project. Actual testing at the Lake County RRF can confirm the effect on Hg emissions while combusting biosolids.

Hg emissions from MWC Unit Nos. 1 & 2 are regulated under the federal regulations for MWCs in 40 CFR 60 Subpart Cb. Previous BACT determinations may contain a Hg emission standard/limit more stringent than the federal regulation.

To confirm Hg emissions and to demonstrate compliance with the Hg emission standard/limit while burning biosolids a Hg test will be required.

4.1.12. Lead (Pb)

Like Hg, lead emissions are a function of the lead containing wastes being combusted.

Based on the reported sludge values for the City of Leesburg WWTP, the lead content of the sludge is 0.0242 x 10^{-3} % by weight (kg/kg).

The applicant and Department estimated lead emissions from this project. A theoretical increase in Pb emissions when combusting up to 5% by weight of biosolids were estimated to be approximately 0.0121 mg/dscm {at a design flow rate of 43,200 dscm for both units (x 2) equivalent to 34.3 lbs/year}. The PSD SER for Pb is 1,200 lbs/year (0.6 TPY). The estimated increase in emissions (34.3 lbs/year) is less than the PSD SER.

Emissions testing at the Lee County RRF actually showed no change in Pb emissions (see **Table 5** above). The lead content of the City of Ft. Myer's biosolids under the Lee County RRF project was 34.3 mg/kg. The lead content of the City of Leesburg's biosolids under this project is 24.2 mg/kg.

When up to 5% by weight of biosolids is burned displacing 29 TPD of MSW, lead emissions while burning biosolids may slightly increase. The impact on lead emissions from the combustion of biosolids in the MWC units should therefore not result in a significant emission rate increase of mercury.

As previously indicated in **Table 5**, Pb test data was available from the Lee County RRF biosolids project. Actual testing at the Lake County RRF can confirm the effect on Pb emissions while combusting biosolids.

Pb emissions from MWC Unit Nos. 1 & 2 are regulated under the federal regulations for MWCs in 40 CFR 60 Subpart Cb. Previous BACT determinations may contain a Pb emission standard/limit more stringent than the federal regulation.

To confirm Pb emissions and to demonstrate compliance with the Pb emission standard/limit while burning biosolids a Pb test will be required.

4.1.13. Particulate Matter (PM)

As previously mentioned for the heavy metals, particulate matter can be formed when they precipitate onto particles in the flue gas. The MWC units have baghouses primarily to remove particulate matter. To a minor extent PM will also be removed in the scrubbers. The baghouses have an estimated control efficiency of 99%.

No PM test data was available from Lee County RRF biosolids project. An actual PM test at the Lake County RRF can be performed to evaluate PM emissions while combusting biosolids.

Other metals in the sludge like arsenic, cadmium, copper, molybdenum, nickel, selenium and zinc presumably would behave similar to Hg and Pb. A total metals test can be performed to evaluate the total metal emissions while combusting biosolids. To evaluate total metal emissions while burning biosolids a total metals test will be required.

Total PM emissions from MWC Unit Nos. 1 & 2 are regulated under the federal regulations for MWCs in 40 CFR 60 Subparts Cb/Eb. Previous BACT determinations may contain a PM emission standard/limit more stringent than the federal regulations.

To evaluate PM emissions and to demonstrate compliance with the PM emission standard/limit while burning biosolids a PM test will be required.

4.1.14. SO_2, NOx and CO

The effects on emissions of SO_2, NOx and CO while burning biosolids are becoming more known and well documented in Florida. Biosolids are high in nitrogen content, so NOx emissions could be affected.

For information purposes, **Table 9** below compares the nitrogen content value of biosolids to other solid wastes/fuels.

TABLE 9 - NITROGEN CONTENT VALUE OF BIOSOLIDS COMPARED TO OTHER SOLID WASTES/FUELS.

City of Leesburg WWTP's Biosolids (currently a liquid)	Natural Gas (a gas)	Municipal Solid Waste (MSW)	Coal (bituminous) (a solid fuel)
5.72%	0.6%[24]	0.17%	1.3%

As previously indicated in **Table 5**, SO_2, NOx and CO emissions data were available from Lee County RRF biosolids project. **Table 8** portrayed SO_2, NOx and CO emissions data from the Westchester Facility biosolids project in New York. Actual SO_2, NOx and CO CEMS data could be easily used to evaluate SO_2, NOx and CO emissions while combusting biosolids at the Lake County RRF.

SO_2, NOx and CO emissions from MWC Unit Nos. 1 & 2 are regulated under the federal regulation for MWCs in 40 CFR 60 Subpart Cb. Previous BACT determinations may contain SO_2, NOx and CO emission standards/limits more stringent than the federal regulation.

To evaluate SO_2, NOx and CO emissions and to demonstrate compliance with the SO_2, NOx and CO emission standards/limits while burning biosolids a SO_2, NOx and CO test will be required. The test is fulfilled by submitting CEMS data for SO_2, NOx and CO emissions.

4.1.15. Odors

Odors from the MWC facility are controlled by drawing combustion air from the refuse tipping floor area. The applicant proposes to unload and store biosolids within the building enclosing the tipping floor. Odors from the unloaded and stored biosolids within the building should be drawn into the combustion air.

4.1.16. Pathogenic Emissions

The Department does not have a specific air rule regulating pathogenic air emissions from MWCs. Pathogens present in stack gas exhaust could affect public health.

A certain amount of pathogen removal occurs at wastewater treatment plants during the sludge thickening process at what are known as digesters.

Pathogenic destruction also occurs in a combustion process. Combustion of the biosolids co-fired with MSW material takes place in the furnaces. Gases containing potentially pathogens pass through the SNCR with temperatures around 1600-2100 degrees F with a residence time of 1-2 seconds.[25]

In comparison, medical waste incinerator temperatures within a dual chamber unit have secondary chambers (afterburners) which operate between 1,600-1,800 degrees F. Residence times in secondary chambers (afterburners) are typically 1.0 seconds. The Department's medical waste incinerator rule contains temperature and residence time requirements.

In comparison, rotary sludge dryers run with temperatures at around 700 degrees F with a residence time. Rotary dryers effectively further reduce pathogens, resulting in biosolids easily being classified from "Class B" to "Class A."

Obviously, biosolids is different from medical waste. However, the temperature and residence time in an MWC's combustion zone in the furnaces and in the SNCR should be more than adequate to provide complete pathogen destruction resulting in exhaust gases free of pathogens.

The spread of pathogens could occur when improperly storing, handling and mixing of biosolids. Specific best management practices for the storage, handling and mixing of biosolids can be added to the permit.

4.2. Permitted Quantity of Biosolids

As previously indicated in this evaluation, at certain quantities of biosolids being combusted, the PSD SER for NOx emissions could be approached or exceeded without additional measures being taken by the owner or operator like injecting additional reagent into the SNCR to further reduce NOx emissions. The Department has been provided reasonable assurances by applicants to combust biosolids at levels of 5% {Lee, Hillsborough and Pasco County RRFs}.

4.3. Emission Increases from the Combustion of Biosolids Alone

Based on the previous discussions to this point, the Department expects no significant increase in air pollutant emissions from the combustion of biosolids alone in MWC Unit Nos. 1 & 2.

4.3.1. Regulation Applicability

In U.S. EPA's Non-Hazardous Secondary Materials (NHSM) rule [originally promulgated on March 21, 2011 and subsequently amended in the federal register on February 7, 2013], sewage sludge was identified as a non-hazardous secondary material (NHSM) and was considered to be a solid waste therefore subject to Section 129, Solid Waste Combustion of the Clean Air Act (CAA). [26] Section 129, Solid Waste Combustion of the CAA includes 40 CFR 60 Subparts Cb/Eb.

The combustion of biosolids (treated sewage sludge) in MWC units is therefore regulated under 40 CFR 60, Subparts Cb/Eb. 40 CFR 60, Subparts Cb/Eb does not contain any new or additional applicable requirements for when the MWCs are combusting biosolids.

A few federal regulations under 40 CFR Part 60 identified as being potentially applicable to these MWCs when combusting biosolids (treated sewage sludge) were:

1. 40 CFR 60, Subpart MMMM, Emission Guidelines (EG) for Sewage Sludge Incinerators (SSI); and,
2. 40 CFR 60; Subpart LLLL, NSPS for SSIs;

40 CFR 60.5065 of 40 CFR 60, Subpart MMMM specifically exempts combustion units that are not located at a wastewater treatment plant designed to treat domestic sewage sludge. The combustion of biosolids (treated sewage sludge) in the MWCs is therefore exempt from 40 CFR 60, Subpart MMMM, EG for SSIs.

40 CFR 60.4780 of 40 CFR 60, Subpart LLLL specifically exempts combustion units that are not located at a wastewater treatment plant designed to treat domestic sewage sludge. The combustion of biosolids (treated sewage sludge) in the MWCs is therefore exempt from the NSPS 40 CFR 60, Subpart LLLL for SSIs.

Per the U.S. EPA's promulgated NHSM rule, if sewage sludge had not been deemed to be a solid waste under the NHSM rule it would have been subject to the new MACTs under 40 CFR 63. The combustion of biosolids (treated sewage sludge) in MWC units is therefore not subject to any of U.S. EPA's new MACTs under 40 CFR 63. [27]

The older (circa 1975) National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR 61, Subpart E, NESHAP for Mercury had been identified as being potentially applicable to these MWCs when combusting biosolids (treated sewage sludge). This NESHAP applies to stationary sources that dry or incinerate wastewater treatment plant sludge, therefore, it does apply to the MWC units when combusting biosolids. Subpart E contains a mercury emission limitation of 3.2 kg (7.1 lb) of mercury per 24-hour period from the combined sludge drying/incineration plants. The equivalent mercury emissions limit from MWC Unit Nos. 1 & 2 combined is 1.44 lb/day (24-hours). Compliance with the current mercury limits for MWC Unit Nos. 1 & 2 therefore assures compliance with the less stringent limit under the old NESHAP.

Another federal regulation identified as being potentially applicable to these MWCs when combusting biosolids (treated sewage sludge) was 40 CFR 503, Standards for the Use or Disposal of Sewage Sludge (also commonly referred to as the U.S. EPA's "Part 503 Biosolids Rule").

40 CFR 503.6(c) of 40 CFR 503, Standards for the Use or Disposal of Sewage Sludge, specifically exempts incinerators that co-fire sewage sludge with other wastes. Biosolids (treated sewage sludge) will be co-fired with MSW at the Pasco County RRF. The combustion of biosolids with MSW in the MWC units is therefore exempt from the 40 CFR 503, Standards for the Use or Disposal of Sewage Sludge.

4.4. Permit Requirements for Biosolids

Only five (5) of the ten (10) municipal waste combustor facilities in the State of Florida are permitted to combust biosolids. Each authorization was done through a minor source AC permit. The AC permits for the combustion of biosolids by these 5 MWC plants contain similar permit requirements for statewide consistency. For consistency among the MWC plants, the Lake County RRF permit requirements are structured similarly.

For PSD avoidance requirements, from the previous discussions because NOx and CO emissions could increase when combusting biosolids the Department requires monitoring, reporting and recordkeeping for these pollutants.

Specific best management practices for the storage, handling and mixing of biosolids are added to the permit.

Initial compliance demonstration (testing) when combusting biosolids is specified in the permit to provide the Department reasonable assurances that the existing emission standards & limits are complied with by the Lake County RRF MWC Unit Nos. 1 & 2. Submission of the analysis of the biosolids combusted during testing is also required in the permit.

4.5. Waste (Fuel Slate) Requested Changes

The applicant specifically requested that the prohibition against sewage sludge being burned in the MWC units cited in Specific Condition **A.4.** of the current Title V air operation permit No. 0690046-013-AV to be deleted.

The Department's review indicates that Specific Condition **A.4.** of the current Title V air operation permit No. 0690046-013-AV originates from Specific Conditions **1.e.** of an AC/PSD permit, 0690046-003-AC/PSD-FL-113E which has been revised since.

Because the waste (fuel slate) permit specific condition originates from an underlying AC/PSD permit, this permit specific condition cannot be revised in the Title V air operation permit; the underlying AC/PSD permit must be revised.

4.6. PSD Applicability for Project

Rule 210.200(252), *Projected Actual Emissions*, F.A.C. (Effective 03/28/2012) requires an emissions comparison for modifications to existing emission units. Basically, baseline actual emissions (BAEs) are compared to future emissions or referred to as projected actual emissions (PAEs).

This project is the first regulatory application of the emissions comparison of BAEs to PAEs for the combustion of biosolids in MWC units.

As allowed by Rule 210.200(252), F.A.C. the Department accepts the applicant's BAE and PAE estimates.

The air construction permit application for the project to avoid PSD BACT was based in whole or in part on projected actual emissions. The baseline actual emissions and the projected actual emissions for the *existing* MWC Unit Nos. 1 & 2 were provided by the applicant and are provided in **Table 10**.

TABLE 10 - BASELINE ACTUAL EMISSIONS VS. PROJECTED ACTUAL EMISSIONS USED UNDER THIS PROJECT.

PSD-(Air) Pollutant	Baseline Actual Emissions, TPY (tons/year)	Projected Actual Emissions, TPY	Increase (+)/Decrease (-) in Emissions, TPY	PSD SER, TPY	PSD SER exceeded?
PM	5.82	6.36	+0.54	25	No
PM_{10}	5.82	6.36	+0.54	15	No
$PM_{2.5}$	5.82	6.36	+0.54	10	No
Pb	0.021	0.023	+0.002	0.60	No
Hg	0.009	0.010	+0.001	0.10	No
F	-	-	-	3	-
NOx	496	515	+18.92	40	No
CO	35.4	38.6	+3.12	100	No
VOC	1.70	1.80	+0.10	40	No
SO_2	6.15	8.01	+1.86	40	No
SAM	-	-	-	7	-
MWC acid gases [SO_2 + HCl]	30.1	33.38	+3.31	40	No
MWC organics [dioxins/furans]	6.76E-06	6.34E-06	-4.17E-07	3.5E-06	No
Total GHGs (CO_2e)	-	-	-	75,000	No

Since the units are already equipped with CEMS for SO_2, NOx & CO, changes to these individual air pollutant emissions when burning biosolids can be easily evaluated for initial compliance demonstration and that PSD is avoided.

Since the units routinely perform stack tests for the following air pollutants: PM, Cd, Hg, Pb, HCl, dioxin/furan, changes to these individual air pollutant emissions when burning biosolids can also be easily evaluated for initial compliance demonstration and that PSD is avoided.

The individual MWC units at the Lake County RRF are large. The Lake County RRF has two 288 TPD units.

Air pollutant emissions can be measured and tracked to determine whether or not there were in fact any net emission increases resulting from this project. Specific requirements to measure, track and report air pollutant emissions of concern associated with this project are placed in the AC permit.

Based on what the applicant has provided and based on the permit processor's review of other similar air permitted projects namely the Lee, Hillsborough and Pasco County RRF ones, there are no expected significant emission rate increases from the proposed project. The project therefore is not subject to PSD preconstruction review.

5. PRELIMINARY DETERMINATION

The Lake County RRF will be the sixth MWC facility in the state of Florida permitted to burn biosolids.

The Lake County RRF's MWC Unit Nos. 1 & 2 which commenced operations in 1990 have advanced air pollution control technology and monitor air pollutant emissions on a frequent basis using CEMS, COMS and stack testing. The MWC Unit Nos. 1 & 2 are identical. Testing from one of the MWC units is therefore adequate and representative of air pollutant emissions when burning biosolids.

The effects on air pollutant emissions while burning biosolids are not known for these units. Actual air emissions testing while burning biosolids can demonstrate initial compliance with the existing air emission standards and limits. Actual air emission rates from testing will also be able to confirm that emissions are below the PSD SERs applicable to the project.

The Department makes a preliminary determination that the proposed project will comply with all applicable state rules 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. No air quality modeling analysis is required because the project does not result in a significant increase in emissions.

Mr. Scott M. Sheplak, P.E. is the permit processor responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting him by telephone at 850/717-9074 or by e-mail at scott.sheplak@dep.state.fl.us in the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

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