



**TECHNICAL EVALUATION  
&  
PRELIMINARY DETERMINATION**

**APPLICANT**

Miami-Dade County Department of Solid Waste Management  
6990 Northwest 97<sup>th</sup> Avenue  
Miami, Florida 33178

Miami-Dade County Resource Recovery Facility  
Facility ID No. 0250348

**PROJECT**

Project No. 0250348-011-AC (PSD-FL-006G)  
Application for Minor Source Air Construction Permit  
Updated Air Construction Permit

**COUNTY**

Miami-Dade County, Florida

**PERMITTING AUTHORITY**

Florida Department of Environmental Protection  
Division of Air Resource Management  
Office of Permitting and Compliance  
Chemicals and Combustion Key Industry Group  
2600 Blair Stone Road, MS#5505  
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## 1. GENERAL PROJECT INFORMATION

### 1.1. Facility Description and Location

Miami-Dade County Resource Recovery Facility is owned by Miami-Dade County and is operated by Covanta Energy operates. The facility is a municipal solid waste facility categorized under Standard Industrial Classification No. 4953. Refer to Figures 1 and 2 below for the location of the facility in Miami-Dade County and an aerial view of the facility. The facility is located at 6990 Northwest 97<sup>th</sup> Avenue, Miami, Florida. The UTM coordinates are Zone 17, 564.3 kilometers (km) East, and 2857.4 km North.

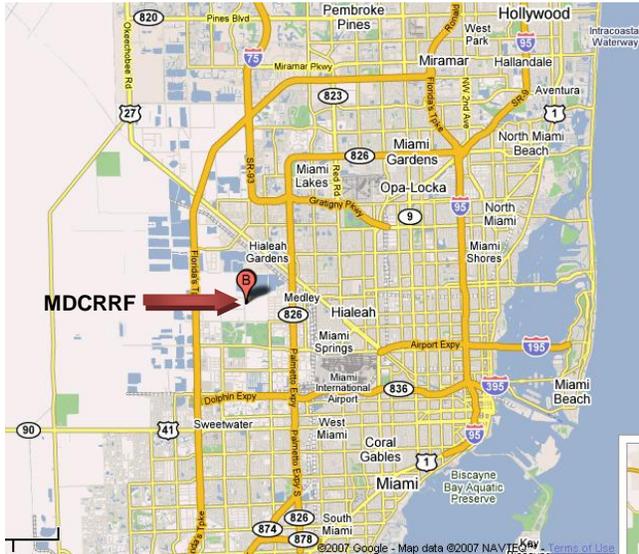


Figure 1. Location of the MDCRRF

Figure 2 – Aerial Photo of the MDCRRF

The Miami-Dade County Resource Recovery Facility includes:

- Four nominal 648 tons/day municipal waste combustors;
- Associated equipment for trash and garbage receiving, processing, shipping and feeding;
- Steam generation and electric power production equipment; and
- Engines for emergency power generators, firewater and well water pumps.

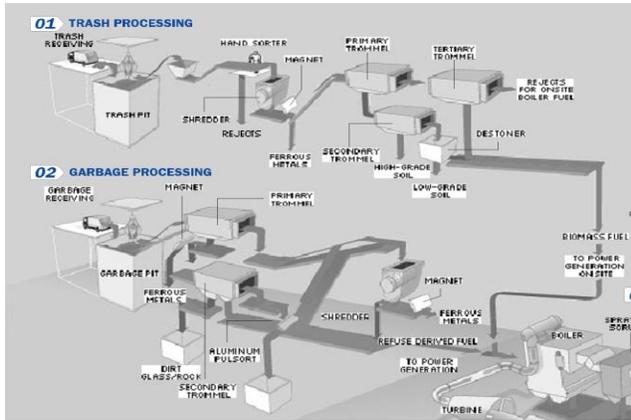
The facility also has an ash building and handling system, lime storage silos, and activated carbon storage silos. Units 1 and 2 share a common stack, each with its own flue. The same configuration is used for Units 3 and 4. Ash from the furnaces is disposed on-site in a monofill (landfill) that is operated by Miami-Dade County.

### 1.2. Process Description

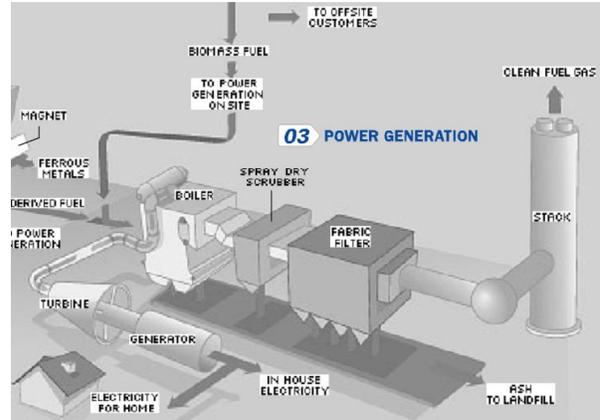
Garbage consisting of food, paper and plastic waste from residences is received at the site, as well as trash consisting primarily of commercial and wood waste and yard waste. The two streams are processed as shown in Figure 3. Magnets are used to remove ferrous metals from the garbage stream. An electromagnet is then used to remove aluminum cans. Then a combination of trammels and classifiers is used to remove glass, grit and batteries. The remaining material is shredded and used as refuse derived fuel (RDF) in the four municipal waste combustors (MWC).

Trash is sorted and shredded. A series of trammels separates out several grades of soil for recycling. Fuel is produced that is also used on-site as well as exported to other facilities such as the Okeelanta Cogeneration Facility in Palm Beach County. Refer to Figure 4. The RDF from garbage and some of the fuel produced from the trash stream is fed into the four furnaces to produce high temperature, high pressure steam used to drive two 38.5 megawatts (MW) steam turbine-electrical generators that export power to the grid.

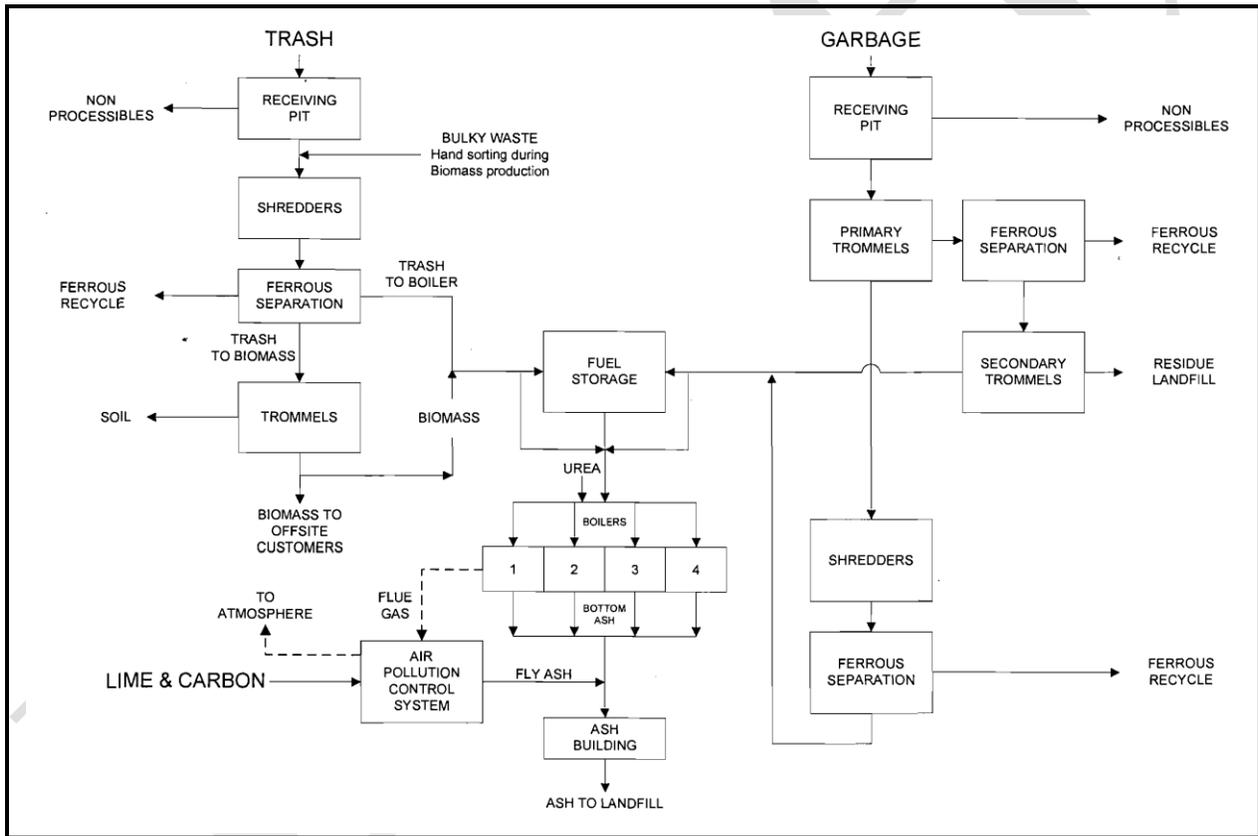
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**Figure 3 – Trash and Garbage Processing**



**Figure 4 - Power Production and Pollution Control**



**Figure 5 – Overall Process Flow Diagram at the Miami-Dade Resource Recovery Facility**

Each unit has a maximum sustained capacity (MSC) rating of 180,000 pounds of steam per hour and requires more or less feed than the nominal value of 648 tons/day of RDF depending upon the higher heating value (HHV) of the waste fuel, which is roughly between 4,500 and 5,600 British thermal units per pound (Btu/lb).

Each furnace is equipped with a urea injection system based on the principle of selective non-catalytic reduction (SNCR) for nitrogen oxides (NO<sub>x</sub>) control. After heat recovery for electrical energy production, the exhaust gas from each furnace is further cooled by injection of water and slaked lime slurry into a spray dryer absorber (scrubber) where acid gases react with lime and are converted to solid reaction products. Activated carbon is injected after the scrubber to bind with mercury and dioxin/furan.

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Fly ash, including reaction products from the scrubber and the spent activated carbon are removed in a fabric filter (baghouse). The exhaust is conveyed via an induced draft fan into a flue located within one of two facility stacks. The fly ash, stoker grate bottom ash and other wastes are combined and disposed in the on-site landfill. Figure 6 is a picture of the ducts from the four RDF MWC units to the respective scrubbers. Figure 7 is a picture of a baghouse with the scrubber visible to the right and the induced draft fan and lower stack to the left.



**Figure 6 – Ducting from furnaces to Scrubbers      Figure 7 – Stack, Fan, Baghouse, Scrubber (L to R)**

Odors are minimized by keeping the truck access doors closed during non-use and maintaining negative pressure on the garbage tipping floor and using the collected air to support combustion.

Table 1 indicates the emissions unit identification numbers (EU ID Nos.) presently assigned to the facility within the Department’s Air Resource Management System (ARMS).

**Table 1 – List of EU at the Miami-Dade County Resource Recovery Facility**

<b>EU No.</b>	<b>Emission Unit Description</b>
001	RDF Spreader Stoker Combustor & Auxiliary Burners - Unit No.1
002	RDF Spreader Stoker Combustor & Auxiliary Burners - Unit No. 2
003	RDF Spreader Stoker Combustor & Auxiliary Burners- Unit No. 3
004	RDF Spreader Stoker Combustor & Auxiliary Burners - Unit No. 4
006	Municipal Solid Waste to RDF Processing Facility with Baghouses - Unit No. 6
007	Bulky Waste to Biomass Processing Facility with Baghouses - Unit No. 7
008	Ash Building and Handling System/Ash Storage Silo with Baghouse - Unit No. 8
009	Two Lime Storage Silos each with a Baghouse - Unit No. 9
010	Activated Carbon or Comparable Reactant Storage Silos each with a Baghouse - Unit No. 10
011	Emergency Diesel Engine - Unit No. 11
012	Emergency Diesel Engine - Unit No. 12

The facility is equipped with continuous emission system (CEMS) for carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>) and NO<sub>x</sub>, and a continuous opacity monitoring systems (COMS) for visible emissions. Annual stack testing is required for particulate matter (PM), hydrogen chloride (HCl), mercury,

dioxin/furan, cadmium and lead.

### **1.3. Primary Regulatory Categories**

- The existing facility is a major source of hazardous air pollutants (HAP).
- The existing facility does not operate units subject to the Title IV, Acid Rain provisions of the Clean Air Act (CAA).
- The existing facility is a Title V major source as defined in Chapter 62-210, Florida Administrative Code (F.A.C.) and as regulated in Chapter 62-213, F.A.C.
- The existing facility is a PSD major stationary source as defined in Chapter 62-210, F.A.C. and as regulated in Rule 62-212.400, F.A.C. – Prevention of Significant Deterioration (PSD).
- The existing facility is subject to the Standards of Performance for New Stationary Sources (NSPS) pursuant to Section 111, CAA and the National Emissions Standards for Hazardous Air Pollutants (NESHAP) pursuant to Section 112, CAA.
- The existing facility is subject to Rule 62-204.800, Federal Regulations Adopted by Reference, including Rule 62-204.800(9), F.A.C., Title 40, Code of Federal Regulations, Part 60 (40 CFR 60), Emission Guidelines and Compliance Times.
- The existing facility is subject to the Florida Power Plant Siting Act at Sections 403.501-518, Florida Statutes (F.S.) and as implemented in Chapter 62-17, Part I, F.A.C.

### **1.4. Previous Projects**

The Department issued air construction permits (SC 13-2690 and 2691) for the four original pulp fuel boilers on August 4, 1977 (revised September 20, 1977). Site Certification No. PA77-08 was issued by the Siting Board (Governor and Cabinet) on January 9, 1978, and authorized a 3,000 tons/day resource recovery facility. EPA issued a Permit No. PSD-FL-006 on February 27, 1978.

Original Permit No. PSD-FL-006 specified best available control technology (BACT) pursuant to the PSD rule. The emissions standards in the original permit are only as strict as the requirements of NSPS, 40 CFR 60, Subpart E - Standards of Performance for Incinerators promulgated in 1971. The permit specified minimal controls except for electrostatic precipitators (ESP) to control PM and a startup fuel sulfur limit of 0.8 percent (%) to control SO<sub>2</sub>.

The facility began commercial operation in 1982. There is an extensive record indicating that the original process of hydropulping, together with the method of burning and air pollution control, was a failure. The County embarked on a Capital Improvement Plan between 1987 and 1990 that effectively completed a change to RDF processing, rebuilt the four boilers and made improvements in the air pollution control equipment.

The Department issued Permit No. PSD-FL-006A on December 16, 1994 to modify the existing bulky waste (trash) processing system to provide biomass to other users. The permit also specified modern emission standards and improved air pollution control systems including spray dryer absorbers (scrubbers), fabric filters (baghouses), and activated carbon injection.

The emission standards were based on a draft regulation intended for existing MWC that was subsequently rescinded and replaced as described further below. This project did not actually trigger PSD. However, permanently applicable emission standards were established by this action. The permit also introduced one or more process rates not limited in the original Permit No. PSD-FL-006.

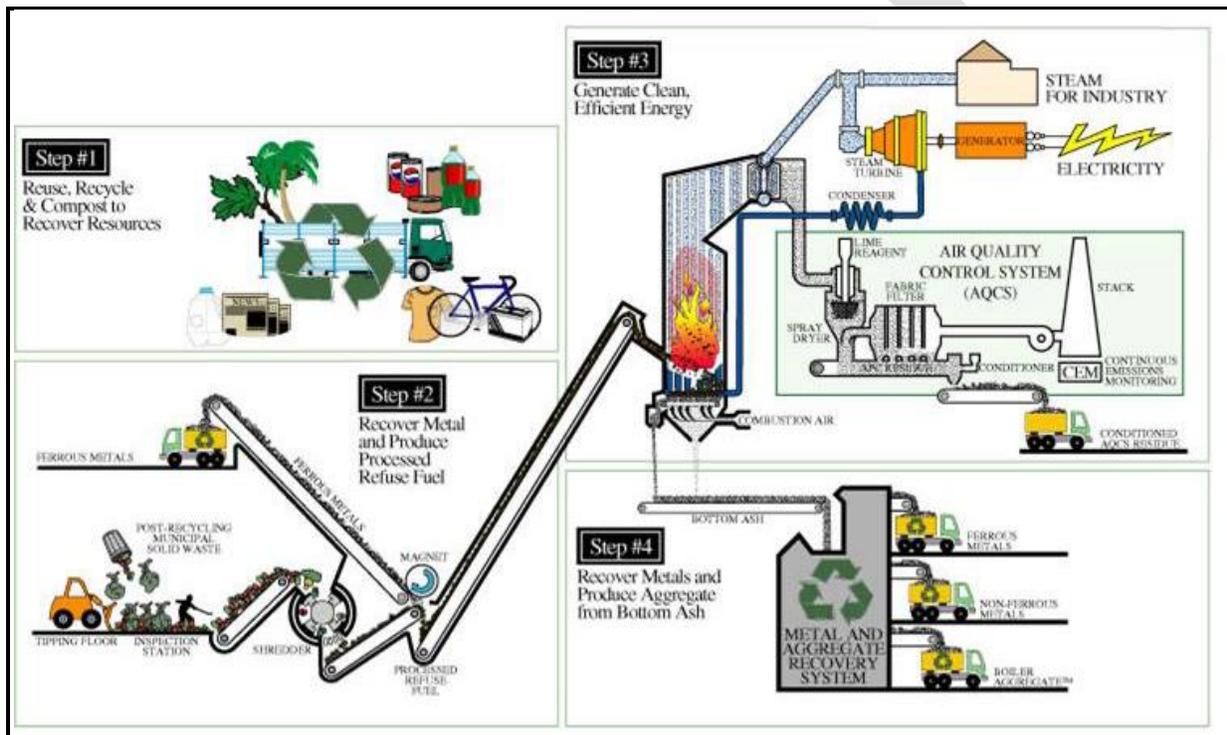
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The Department issued Permit No. PSD-FL-006D on July 21, 2000. The permit updated the facility requirements to comport with the final emission standards applicable to existing MWC. In addition to the updated requirements, the permit retained the most stringent of all previous emission standards applicable to the facility. The various process rate limits were also retained and an additional regulatory steam flow restriction related to flow achieved during the most recent dioxin/furan test was added.

The applicable process rate limits are:

- 648 tons RDF/day/unit;
- Process rate limits of 3,000 tons/day, 18,000 tons/week and 936,000 tons/year;
- 180,000 pounds steam/hour/unit on a 24-hour block basis; and
- Regulatory restriction to steam load of 110% of the highest 4-hour arithmetic average MWC unit load achieved during four consecutive hours during the most recent dioxin/furan performance test demonstrating compliance.

Refer to Figure 8 of a typical RDF based resource recovery facility. The waste entering the facility at Step 1 is accurately weighed, delivered onto a tipping floor, shredded and separated. The lighter fraction (i.e. the RDF) is then conveyed at Step 2 to the furnaces. The short term rate at which waste is received can vary greatly from the rate at which RDF is charged to the furnace.



**Figure 8 - Schematic of a Typical Refuse-Derived Fuel Combustion**

The heat content in terms of Btu/pound is highly variable making it even more difficult to estimate heat input on a short term basis. The steam production rate in pounds/hour (lb/hour) and the electric power generation rate in MW are directly measured at Step 3. The heat input rate can be inferred from the steam rate with knowledge of the steam enthalpy and boiler efficiency. The waste input can be also be inferred from determinations of HHV through calorimetric tests coupled with the inference for heat input.

Permit Nos. PSD-FL-006E and PSD-FL-006F (issued in 2007) revised Permit No. PSD-FL-006 to, respectively, clarify excess emissions definitions and increase the CO emission standard consistent with the MWC rule.

### **1.5. Proposed Project Description**

The proposed project involves no physical changes and no obvious operational changes to the facility. It does not involve any maintenance, repair or replacement tasks. The request for an air construction permit modification was submitted on December 1, 2011 in conjunction with the routine application to renew the five-year facility Title V operation permit.

The purpose of the air construction permit application is to revise the original, permanent PSD permit requirements and to harmonize them with subsequent and generally more stringent emissions and monitoring requirements of Department Rule 62-204.800(9)(b), F.A.C., applicable to existing facilities with a MWC unit capacity greater than 250 tons/day of municipal solid waste, and for which construction, reconstruction, or modification was commenced on or before September 20, 1994 (the Department's MWC rule). The applicant requests the following changes to Permit No. PSD-FL-006D:

- Replace permit emission standards that were set in 1994 and 2000 based on earlier MWC rules with those contained in the latest MWC rule;
- Delete from the PSD permit the emission standards and testing requirements for pollutants emitted at very low levels and that are now classified as HAP and not regulated by the PSD rules;
- Delete emission standards and testing requirements for each PSD pollutant demonstrated to have been emitted at rates much less than the respective applicable significant emission rate and emission standard established in the earlier permits;
- Update test methods, reporting and monitoring requirements with those of the MWC rule;
- Remove the description of routine and non-routine warm-up events limiting the use of propane to 5-hours and 11-hours respectively; and
- Replace the waste and heat input operational limitations with a 4-hour block steam production limit determined each year equal to 110% of the maximum demonstrated load achieved during the most recent dioxin/furan test.

### **1.6. Processing Schedule**

October 14, 2011	The Department received an application for a renewed Title V operation permit.
December 2, 2011	The applicant revised the Title V application, provided additional information and applied for a concurrent air construction permit.
January 1, 2012	Both applications determined complete (as of December 1, 2011).

## **2. 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, F.S. The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code which includes the applicable chapters listed in Table 2.

The U.S. Environmental Protection Agency (EPA) establishes air quality regulations in 40 CFR 60 that identify the NSPS for a variety of industrial activities. EPA also establishes the minimum emission guidelines and compliance schedules for existing facilities of certain industries in 40 CFR 60. 40 CFR 61 generally specifies NESHAP for certain individual HAP and 40 CFR 63 generally specifies NESHAP based on the Maximum Achievable Control Technology (MACT) by industrial source categories.

Federal regulations adopted by reference are given in Department Rule 62-204.800, F.A.C. Most state regulations approved by EPA are listed in 40 CFR 52, Subpart K – Florida, also known as the State Implementation Plan (SIP) for Florida. [Link to 40 CFR 52, Subpart K](#)

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**Table 2 - Applicable Rules from the F.A.C.**

Chapter	Description
<a href="#">62-4</a>	Permits
<a href="#">62-204</a>	Air Pollution Control – General Provisions
<a href="#">62-210</a>	Stationary Sources of Air Pollution – General Requirements
<a href="#">62-212</a>	Stationary Sources – Preconstruction Review
<a href="#">62-213</a>	Operation Permits for Major Sources (Title V) of Air Pollution
<a href="#">62-214</a>	Requirements for Sources Subject to the Federal (Title IV) Acid Rain Program
<a href="#">62-296</a>	Stationary Sources – Emission Standards
<a href="#">62-297</a>	Stationary Sources – Emissions Monitoring

Department Rule 62-204.800(9)(b), F.A.C. is based on 40 CFR 60, Subpart Cb - Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors That are Constructed on or Before September 20, 1994. 40 CFR 60, Subpart Cb was promulgated by EPA in accordance with section 111(d) and section 129 of the CAA and 40 CFR 60, Subpart B.

The Department's MWC rule (effective May 31, 2007) was prepared pursuant to 40 CFR 60, Subpart Cb and was approved by EPA. It is listed in 40 CFR 62, Subpart K-Approval and Promulgation of State Plans for Designated Facilities and Pollutants – Florida; specifically Section 40 CFR 62.2355 (adopted by EPA December 30, 2010, amended February 9, 2012), available at the following link: [Link to the MWC Rule](#)

### 3. PSD APPLICABILITY REVIEW

#### 3.1. General PSD Applicability

The Department regulates major stationary sources in accordance with Florida's PSD program pursuant to Rule 62-212.400, F.A.C. PSD preconstruction review is required in areas that are currently in attainment with the state and federal ambient air quality standards (AAQS) or areas designated as "unclassifiable" for these regulated pollutants.

Commonly addressed PSD pollutants in the power industry include: CO, NO<sub>x</sub>, PM, PM with a mean particle diameter of 10 microns or less (PM<sub>10</sub>), SO<sub>2</sub>, volatile organic compounds (VOC), lead, fluorides, sulfuric acid mist (SAM), and mercury (Hg).

Additional PSD pollutants that are more common to certain other industries include: hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) including H<sub>2</sub>S, reduced sulfur compounds (RSC) including H<sub>2</sub>S, MWC organics measured as total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (dioxin/furan), MWC metals measured as PM; MWC acid gases measured as SO<sub>2</sub> and HCl, and municipal solid waste landfill emissions as non-methane organic compounds (NMOC).

As defined in Rule 62-210.200(189)(a)1, F.A.C., a stationary source is a "major stationary source" (major PSD source) if it emits or has the potential to emit:

- 250 tons/year or more of any PSD pollutant; or
- 100 tons/year or more of any PSD pollutant and the facility belongs to one of the 28 listed PSD major facility categories. [Link to Rule 62-210, F.A.C.](#)

The list given in the citation includes the category of "municipal incinerators capable of charging more than 250 tons/day of refuse". The Miami-Dade County Resource Recovery Facility is a major stationary source based on actual emissions of and potential to emit 100 tons/year or more of several PSD pollutants.

For major stationary sources such as the Miami-Dade County Resource Recovery Facility, PSD applicability for modification projects is based on thresholds known as the significant emission rates (SER) as defined in Rule 62-210.200(275), F.A.C. Any "net emissions increase" as defined in

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Rule 62-210.200(204), F.A.C. of a PSD pollutant from the project that equals or exceeds the respective SER is considered “significant”. SER also means any emissions rate or any net emissions increase of a PSD pollutant associated with a major stationary source or major modification which would construct within 10 km of a Class I area and have an impact on such area equal to or greater than 1 gram per cubic meter, 24-hour average.

Although a facility may be “major” (i.e. emits or has the potential to emit 100 or 250 TPY as applicable) for only one PSD pollutant, a project must include BACT controls for any PSD pollutant that exceeds the corresponding SER given in Table 3.

PM with a mean particle diameter of 2.5 microns or less (PM<sub>2.5</sub>) is not included in the list, but is a federal PSD pollutant. The Department is in the process of adopting a SER of 10 tons/year. Refer to [Link to PM<sub>2.5</sub> Rulemaking Project](#). Until the rule is finalized in early 2012, projects in Florida are not subject to a SER for PM<sub>2.5</sub>.

**Table 3 - List of Significant Emission Rates (SER) by PSD-Pollutant <sup>3</sup>**

Pollutant	SER (TPY)	Pollutant	SER (TPY)
CO	100	NO <sub>x</sub>	40
PM	25	PM <sub>10</sub> <sup>1</sup>	15
Ozone (VOC) <sup>2</sup>	40	Ozone (NO <sub>x</sub> ) <sup>2</sup>	40
SO <sub>2</sub>	40	Sulfuric acid mist (SAM)	7
fluoride	3	lead	0.6
mercury	0.1	H <sub>2</sub> S	10
TRS including H <sub>2</sub> S	10	RSC including H <sub>2</sub> S	10
MWC organics as dioxin/furan	3.5 x 10 <sup>-6</sup>	MWC acid gases as HCl and SO <sub>2</sub>	40
MWC metals as PM	15	MSW Landfill Emissions as NMOC	50

1. PM<sub>2.5</sub> is also a PSD pollutant, but a SER has not yet been defined in the Department’s rules. It is regulated through its precursors and surrogates (e.g. PM/PM<sub>10</sub>, ammonia (NH<sub>3</sub>), SO<sub>2</sub> and NO<sub>x</sub>).
2. Ozone (O<sub>3</sub>) is regulated through its precursors (VOC and NO<sub>x</sub>).
3. The federal SER of 75,000 tons/year (TPY) for Greenhouse Gases (GHG) as carbon dioxide equivalent (CO<sub>2</sub>e) has not been incorporated into Department rules.

In addition to triggering the PSD rules by physical or operational changes, it is also possible to do so as a result of relaxation of enforceable conditions such as emissions, hours of operation and process rates or by exceeding projected actual emissions (designed to avoid PSD). These situations are addressed by the “Source Obligation” provisions in Rule 62-212.400(12), F.A.C. which states:

- (a) *At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by virtue of a relaxation in any enforceable limitation which was established after August 7, 1980, on the capacity of the source or modification otherwise to emit a pollutant, such as a restriction on hours of operation, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification.*
- (b) *At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by exceeding its projected actual emissions, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification.*

The reason paragraph (a) is relevant in the present analysis is because the County has requested a

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relaxation (removal) of certain federally enforceable waste (fuel) throughput limit, as well as the heat input limit. The requested steam limitation must be shown to be at least as strict and as stringent as the waste throughput and heat input limitations that will be replaced. This is not a trivial exercise or demonstration given the highly variable nature of waste and difficulty in directly measuring its throughput.

**3.2. PSD Applicability for the Project**

No emission increases would result due to the replacement of the emission standards in Permit No. PSD-FL-006D with those already required by the MWC rule. However, it is theoretically possible to exceed the respective SER for several pollutants depending upon whether the steam production limit is less strict or stringent than the present waste throughput and heat input limits. The exception would be if the units are already physically limited such that removal of the present limitations would make no difference in production. Alternatively, if one of the existing limitations is actually “controlling” then there could be a significant increase of one or more pollutants.

In the jargon used by the boiler manufacturer (Zurn), the term maximum continuous rating is the load at which the unit can operate without any problems. The maximum continuous rating was specified by Zurn in the Steam Generator General Data submitted to the previous facility operator (Montenay) in a proposal submitted in 1987 to rebuild the units. The value was given as 180,000 lb/hour of steam at an operating pressure of 625 pounds per square inch, gauge (psig) and 721 degrees Fahrenheit (°F). Usually a two to four hour peak rating is specified, which is typically 110% of maximum continuous rating, which would be 198,000 lb/hour of steam for a unit with a MSC of 180,000 lb/hour.

There is not a specified MSC for waste throughput or heat input. Instead there is a range of waste throughput rates for a corresponding range of RDF heating values to produce 180,000 lb/hour of steam as described above. The relationship is given in given in Table 4 taken from the Zurn proposal. It is clear that the key design parameter is steam flow and that heating value and waste flow can vary greatly.

**Table 4 – Estimates of Fuel Flow, Furnace Liberation with Varying RDF Heating Values, Steam Loads**

Heating Value (Btu/lb)	Steam Flow (lb/hour)	Estimated RDF Flow (tons/day)	Estimated Furnace Liberation (Btu/hour/cubic foot) <sup>1,2</sup>	Superheater Temp. (°F)
4,500	150,000	628	14,193	693
	180,000	782	17,674	721
5,000	150,000	542	13,617	693
	180,000	673	16,893	721
5,500	150,000	472	13,037	693
	180,000	584	16,141	721

1. 18,000 and 15,000 Btu/hour/cubic foot would be liberal and conservative design criteria, respectively.
2. Factors leading to operating at more liberal design criteria include: Grate heat release; overfire air systems; uniformity of fuel feed; and RDF characteristics such as heating value, sizing and homogeneity.

The applicant requested that all process limits with the exception of the annual throughput rate be removed and replaced with steam limits based on the MWC rule. This rule defines the following term:

*Maximum demonstrated MWC unit load means the highest 4-hour arithmetic average MWC unit load achieved during four consecutive hours during the most recent dioxin/furan performance test demonstrating compliance with the applicable limit for MWC organics specified under §60.52b(c).....No owner or operator of an affected facility shall cause such facility to operate at a load level greater than 110% of the maximum demonstrated MWC unit load as defined in §60.51b .....*

For the purposes of this discussion, 110% of the the maximum demonstrated MWC unit load will be referred to as the maximum allowable load.

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If this provision replaces all other process limits, then there will be no practicably (permanent) enforceable limitation on production. In theory, the units could be progressively operated at increasing steam rates and ultimately exceed the manufacturer MSC and peak rates. At some point, the capability of the equipment (for example the RDF feed system) would prevent further production increases, but the true mechanical limitations of the units are not known.

Table 5 is a summary of the maximum demonstrated and the maximum allowable loads determined for the four MWC based on the most recent dioxin/furan tests conducted in 2010 and 2011. The values are compared with the manufacturer maximum continuous rating (MCR) and the peak ratings (if such were provided) based on industry practice.

**Table 5 – Maximum Demonstrated, Allowable Steam Loads compared with MCR and Peak Ratings**

Parameter	Description	Boiler 1 (lb/hour)	Boiler 2 (lb/hour)	Boiler 3 (lb/hour)	Boiler 4 (lb/hour)
<b>Maximum Demonstrated Load<sup>1</sup></b>	Highest 4-hr arithmetic average load during 4 consecutive hours of D/F testing	170,300	174,000	175,100	172,200
<b>Maximum Allowable Load<sup>1</sup></b>	110% of the maximum demonstrated load <sup>1</sup>	187,000	191,000	193,000	189,000
<b>Maximum Capacity Rating<sup>2</sup></b>	Zurn Equipment Specification	180,000	180,000	180,000	180,000
<b>Peak Rating</b>	2 to 4 hour rating equal to 110% of MCR	198,000	198,000	198,000	198,000

1. Maximum demonstrated and allowable loads are detailed in Covanta Dade Renewable Energy Ltd. submittal dated January 18, 2012 and based on dioxin/furan (D/F) testing conducted in 2010 and 2011.  
2. Zurn Generator General Data, 1987.

The maximum demonstrated loads (MDL) for the four units were all less than the maximum continuous rating and the permitted 24-hour steam flow limit of 180,000 lb/hour. Notably, the applicant did not or possibly could not achieve that level. Regardless, the units may, subsequent to the tests, operate at steam loads near 190,000 lb/hour.

Presently, there is no fixed peak 4-hour limitation in the permit. It is doubtful that replacement of the 24-hour steam flow limit of 180,000 lb/hour with a peak 4-hour steam flow limit of 198,000 lb/hour (to harmonize with the MWC rule) would actually cause or result in significantly increased operations or emission increases. The reason is that simply switching to a 4-hour peak limit in lieu of the present 24-hour limit (equal to the maximum continuous rating) does not meaningfully change the manner by which a prudent operator or owner will allow MWC units to be operated. According to the operator *“to run significantly greater than 180,000 lb/hour on a continuous basis would most likely require permitted boiler modifications.”*

The Department reviewed 5 years of annual operating report (AOR) data submitted by the operator. The averages of total annual emissions from the four MWC combined values are listed in Table 5. Assuming that the new peak flow limitation would actually encourage the operator to test at higher levels in order to continuously operate at even higher levels up to 198,000 lb/hour would represent a few percent and theoretically no more than 10% annual increase in steam production.

**Table 5 – Combined Annual Emissions for the Four MWC at MDCRRF (Average of 2005-2010)**

Pollutant <sup>1</sup>	CO	NO <sub>x</sub> <sup>2</sup>	SO <sub>2</sub>	HCl	PM	F	VOC	Pb	Be	SAM	As	D/F	Hg
<b>Average (tons/year)</b>	608	1,184	83.4	75.9	17.4	0.3	18	0.16	0.0005	6.8	0.02	29E <sup>-06</sup>	0.01
<b>10% of average</b>	61	118	8	8	1.7	0.03	0.2	0.02	0.00005	0.7	0.002	2.9E <sup>-06</sup>	0.001
<b>SER</b>	100	40	40	none	25	3	40	0.6	No SER	7.0	No SER	3.5E <sup>-06</sup>	0.1
			SO <sub>2</sub> +HCl=40										

1. SER – Significant Emission Rate, F – fluoride, Be beryllium, As - arsenic, Pb - lead, D/F – dioxin/furan, Hg - mercury  
2. The allowable NO<sub>x</sub> emissions are 2,460 tons/year and averaged 1,257 ton/year in 2009-2010 (baseline actual emissions)

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NO<sub>x</sub> is the only pollutant for which emissions could increase in a meaningful manner. The increase could theoretically exceed the respective SER provided in Table 5. The four MWC are equipped with functional SNCR systems. These systems are rarely used due to the relatively high NO<sub>x</sub> emission rates allowed by the MWC rule for RDF fueled units and the inherently low NO<sub>x</sub> emissions actually exhibited by RDF fueled units. Thus, any NO<sub>x</sub> increase is readily controllable by actually using the installed SNCR systems (e.g. on the higher emitting Unit 4). The Department concludes that daily and weekly waste throughput limits and the 24-hour steam flow limit can be replaced with a peak steam production limit of 198,000 lb/hour on a 4-hour basis without triggering PSD.

### 4. UPDATES OF AIR CONSTRUCTION PERMIT-BASED LIMITS

Besides process rate limits, the County requests modifications to Permit No. PSD-FL-006D to move certain obsolete or unnecessary emission standards and replace others with the current ones from the Department's MWC rule. Except for a PM limit and a back-up startup fuel sulfur limit specified in Permit No. PSD-FL-006 issued in 1978, no limits were ever set in accordance with the PSD/BACT procedures. A VOC limit of 100 tons/year was included to avoid triggering non-attainment area new source review and the requirement of lowest achievable emission rate (LAER). All other limits in Permit Nos. PSD-FL-006A, PSD-FL-006D or modifications thereto were due to projects to comply with draft or final MWC rules and were included as updates of the original PSD permit.

In order to fully consider the request, the Department reviewed the test results from the most recent tests conducted on the four MWC covering the period 2007-2011.

**Table 6 – Test Results for Cadmium, Lead and VOC versus Emission Standards (2007-2011)**

Pollutant	Years	UNIT 1	UNIT 2	UNIT 3	UNIT 4
<b>Cadmium</b> (µg/dscm at 7% O <sub>2</sub> )	2007	0.44	0.33	1.19	0.9
	2008	0.20	0.20	0.10	0.10
	2009	0.22	0.09	0.24	0.75
	2010	1.48	0.91	1.0	1.0
	2011	0.131	0.126	0.134	0.124
	<b>Average</b>	<b>0.49</b>	<b>0.33</b>	<b>0.53</b>	<b>0.57</b>
	<b>PSD-FL-006D</b>	<b>15 µg/dscm at 7% O<sub>2</sub></b>			
	<b>MWC Rule</b>	<b>35 µg/dscm at 7% O<sub>2</sub></b>			
<b>Lead</b> (µg/dscm at 7% O <sub>2</sub> )	2007	5.44	6.27	40.10	17.62
	2008	6.10	1.90	2.0	1.20
	2009	4.69	1.93	5.88	4.74
	2010	8.59	5.26	4.20	4.20
	2011	1.81	2.47	5.78	4.73
	<b>Average</b>	<b>5.33</b>	<b>3.57</b>	<b>11.60</b>	<b>6.50</b>
	<b>PSD-FL-006D</b>	<b>380 µg/dscm at 7% O<sub>2</sub></b>			
	<b>MWC Rule</b>	<b>400 µg/dscm at 7% O<sub>2</sub></b>			
<b>VOC</b> (ppmvd at 7% O <sub>2</sub> )	2007	4.23	2.98	3.26	0.85
	2008	0.50	1.80	0.90	1.30
	2009	7.02	1.96	1.75	1.24
	2010	5.07	7.58	5.64	2.64
	2011	4.99	4.46	4.65	1.12
	<b>Average</b>	<b>4.36</b>	<b>3.76</b>	<b>3.24</b>	<b>1.43</b>
	<b>PSD-FL-006D</b>	<b>25 ppmvd at 7% O<sub>2</sub></b>			
1. µg/dscm at 7% O <sub>2</sub> means micrograms per dry standard cubic meter corrected to 7 percent oxygen.					
2. ppmvd means parts per million by volume, dry.					

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Table 7 is a comparison of the various limits applicable to the four municipal waste combustors and a stringency/applicability analysis for each emission standard.

**Table 7 – Comparison of Air Construction Permit Limits with the MWC Rule Limits for MDCRRF**

Parameter	PSD-FL-006D, E or F	MWC Rule	Summary of Analysis
<b>NO<sub>x</sub></b>	250 ppmvd at 7% O <sub>2</sub> (24-hour basis) <u>and</u> 615 tons/year/unit	250 ppmvd at 7% O <sub>2</sub> (24-hour basis)	No change is required on concentration limit. The annual limit will be removed as the units typically emit about half of the indicated value.
<b>SO<sub>2</sub></b>	29 ppmvd at 7% O <sub>2</sub> (24-hour geometric mean) <u>or</u> 75% removal efficiency	29 ppmvd at 7% O <sub>2</sub> (24-hour geometric mean) <u>or</u> 75% removal efficiency	No change is required as the permit limit is equal to the MWC rule emission standard.
<b>CO</b>	250 ppmvd at 7% O <sub>2</sub> (24-hour arithmetic mean) <u>and</u> 267.7 tons/year/unit	250 ppmvd at 7% O <sub>2</sub> (24-hour geometric mean)	Permit PSD-FL-006D was modified as Permit PSD-FL-006F in 2007 to reflect the requirements of the MWC rule. The limit in PSD-FL-006F will be included in the updated permit.
<b>HCl</b>	25 ppmvd at 7% O <sub>2</sub> <u>or</u> 95% removal efficiency (annual test) <u>and</u> 57.1 tons/year/unit	29 ppmvd at 7% O <sub>2</sub> <u>or</u> 95% removal efficiency (annual test)	No change required. Present emissions of HCl and of HCl+SO <sub>2</sub> exceed SER for MWC-acid gases. Present emission concentration standard is more stringent than MWC rule requirement. Annual emission limit is not required as the facility consistently emits less than half of the allowable emissions.
<b>PM<sup>1,2</sup></b>	0.011 grains/dscf at 7% O <sub>2</sub>	25 mg/dscm at 7% O <sub>2</sub>	The MWC rule limit is equal to and will replace the Permit PSD-FL-006D limit. (The previous MWC rule limit of 27 mg/dscm was equal to 0.0118 grains/dscf at 7% O <sub>2</sub> and less stringent than the permit limit)
<b>Opacity</b>	10% Opacity Compliance by COMS	10% Opacity Compliance by Annual Test Requirement to operate COMS	No change required. The limit will be retained in updated air construction permit to support the PM BACT limit. The observer-based visible emissions stack test compliance requirement of the MWC rule will be retained. The latter method is used by the Department's inspectors and is available to the operator during COMS downtime.
<b>SAM</b>	2.1 ppmvd at 7% O <sub>2</sub> <u>and</u> 9.8 tons/year/unit	No standard	The facility reports approximately 1.7 tons/year/unit. The concentration limit was not set pursuant to PSD/BACT. The MWC rule limits for SO <sub>2</sub> and HCl are adequate surrogates for all acid gases from this facility. The SAM limits will be removed.
<p>1. grains/dscf – grains per dry standard cubic foot.                  2. mg/dscm - milligrams per dry standard cubic meter.</p>			

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Parameter	PSD-FL-006D, E or F	MWC Rule	Summary of Analysis
<b>Pb</b>	380 µg/dscm at 7% O <sub>2</sub>	400 µg/dscm at 7% O <sub>2</sub>	The lead (Pb) standard will be removed from Permit PSD-FL-006D as the four MWC units emit much less Pb than the SER for this pollutant. The slightly less stringent Pb limit from the present MWC rule will be included in the Title V operation permit.
<b>Hg</b>	70 µg/dscm at 7% O <sub>2</sub> <u>or</u> 80% reduction <u>and</u> 160 lb/year/unit	50 µg/dscm at 7% O <sub>2</sub> <u>or</u> 85% reduction	The MWC rule concentration limit is stricter than and will replace the Permit PSD-FL-006D limit. The mass limit will be removed as the facility consistently reports ~ 5 lb Hg/year/unit.
<b>D/F<sup>3</sup></b>	30 ng/dscm at 7% O <sub>2</sub> (total) <u>and</u> 3.8x10 <sup>-5</sup> tons/year/unit	30 ng/dscm at 7% O <sub>2</sub> (total)	The concentration limit will be retained, but annual mass limit will be removed as the facility consistently reports 10 to 25% of the annual limits.
<b>VOC</b>	25 ppmvd at 7% O <sub>2</sub> <u>and</u> 100 tons/year (facility)	No Standard	This standard will be removed as the four MWC emit much less than the SER for this pollutant. The CO limit is a sufficient surrogate for VOC for this facility. The facility has been consistently demonstrated to emit less than 100 tons/year of VOC. The area is no longer non-attainment.
<b>Fluoride</b>	840 µg/dscm at 7% O <sub>2</sub> <u>and</u> 0.97 tons/year/unit	No Standard	This standard will be removed as the facility reports 0.3 tons/year of fluoride compared with SER of 3 tons/year and ~ 0.1 tons/year/unit. PM and acid gas control are sufficient to control fluoride.
<b>Beryllium</b>	0.46 µg/dscm at 7% O <sub>2</sub> <u>and</u> 0.0005 tons/year/unit	PM = 25 mg/dscm	Per 1990 CAA Amendments, beryllium is no longer a PSD pollutant and is regulated by programs for HAP. The MWC rule regulates beryllium through the regulation of MWC metals as PM. Thus, beryllium will be removed.
<b>Arsenic</b>	9.3 µg/dscm at 7% O <sub>2</sub> <u>and</u> 0.011 tons/year/unit	PM = 25 mg/dscm	Per 1990 CAA Amendments, arsenic is no longer a PSD pollutant and is regulated by programs for HAP. The MWC rule regulates arsenic through the regulation of MWC metals as PM. Thus arsenic will be removed.

3. grains/dscf – grains per dry standard cubic foot.
4. mg/dscm - milligrams per dry standard cubic meter.
5. ng/dscm – nanograms per dscm, “total” refers to total mass of dioxin/furan instead of “toxic equivalent”.

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### 5. CHANGES TO REQUIREMENTS OF PERMIT NOS. PSD-FL-006D AND PSD-FL-006E

Restrictions to the use of propane or natural gas for the purposes of start-ups and stabilization will be minimized. Accordingly, the changes indicated immediately below will be made in the provisions originating in Permit No. 0250348-006-AC (PSD-FL-006E) when they are incorporated into the updated construction permit. The changes to the condition originating in the mentioned permit are shown in ~~strikeout~~ and underlined format.

#### Section 3, Condition 5, Allowed Excess Emissions from Warm-up, Startup, Shutdown, or Malfunction:

- (1) Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided best operational practices to minimize emissions are adhered to and the duration of excess emissions shall be minimized but in no case exceed two hours in a 24-hour period unless specifically authorized by the Department for longer duration. As referenced below, the Department specifically authorizes a longer duration.
  - a. The emission limitations for this unit shall apply at all times, except during periods of warm-up, startup, shutdown, or malfunctions, provided that the duration of excess emissions during startup, shutdown, or malfunction does not exceed three hours in a 24-hour period.
  - b. The startup and warm-up periods are defined to be consistent with the applicable federal new source performance standards.
  - c. The shutdown period shall be defined as to commence with the cessation of charging municipal waste to the boiler and ending when steam flow decreases to 70,000 lb/hour and 13.5% flue gas oxygen, as programmed into the Data Acquisition System (DAS). (That is, when the unit's steam flow is less than 70,000 lb/hour and the flue gas oxygen is greater than 13.5%, the DAS receives the 'unit off line' signal.)
  - d. The exclusion of CEMS data for purposes of allowed excess emissions and demonstrating compliance with an emissions standard shall be based on a one-hour block average period.
- (2) A warm-up period is defined to be consistent with the applicable federal new source performance standards. The emission limitations for this unit shall apply at all times, except during periods of warm-up (but only when firing natural gas or propane exclusively), startup, shutdown, or malfunctions, during which the duration of excess emissions shall not exceed three hours in a 24-hour period. During all warm-ups, startups, shutdowns, and malfunctions, the owner/operator shall use best operational practices to minimize air pollutant emissions.
- (3) The commencement of startup is programmed into the DAS as a steam flow of 70,000 lb/hour and 13.5% flue gas oxygen. (That is, when the unit's steam flow is greater than or equal to 70,000 lb/hour and the flue gas oxygen is less than or equal to 13.5%, the DAS receives the 'unit on line' signal, and the unit is considered no longer in warm-up.)
- (4) The shutdown commences with the cessation of charging municipal waste to the boiler and ends when steam flow decreases to 70,000 lb/hour and 13.5% flue gas oxygen, as programmed into the DAS. (That is, when the unit's steam flow is less than 70,000 lb/hour and the flue gas oxygen is greater than 13.5%, the DAS receives the 'unit off line' signal.)
- (5) During warm-up, to provide thermal protection to the grate, the refuse derived fuel (RDF) shall be fired in the unit for a period of no longer than 2 hours.
- ~~(6) During a routine warm up event, propane shall not be used for more than 5 hours. During non-routine warm up events, propane shall not be used for more than 11 hours. Descriptions of these two types of events follow:~~

#### Routine Warm up Event:

- ~~• Routine Cold Startup: A cold startup occurs after a long period (more than 12 hours) of the boiler being offline. Propane is fired during the warm up to allow the metal to be heated at a safe rate of approximately 100 degrees F per hour. Following warm up, the startup begins when the steam flow rate reaches 70,000 lb/hr.~~

#### Non-routine Warm up Event:

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- ~~Extended Cold Start up: Approximately once per year, each unit has an extended cold start up. This is done to condition the boiler internal surfaces after extensive boiler tube or metal surface work such as resurfacing. The surface conditioning procedure involves the burning of propane gas for a maximum of 10 hours before RDF is used. Once RDF is introduced, the timing of events is similar to the routine cold start up as described above.~~

~~For the purposes of this specific condition, a malfunction means any unavoidable mechanical and/or electrical failure of air pollution control equipment or process equipment or of a process resulting in operation in an abnormal or unusual manner.~~

[Rule 62-210.700(1), F.A.C.; PSD-FL-006(E); Rule 62-210.200(Definitions+94), F.A.C., Definitions; and Applicant request dated March 30, 2005.]

The only limits identified as BACT in the original Permit No. PSD-FL-006 are for PM and SO<sub>2</sub>. The most recent Department MWC rule will be used as the basis to modify the original BACT determinations. Therefore, the MWC rule limits of 25 and 29 mg/dscm at 7% O<sub>2</sub> shall constitute the updated BACT determinations, respectively. A 10% opacity BACT limit will apply consistent with the PM BACT limit.

Certain non-BACT enforceable limits will be retained in the construction permit if they are more stringent than the respective values in the MWC rule or emitted at values greater than the respective SER.

The Department will issue a single enforceable air construction Permit No. 0250348-011-AC (PSD-FL-006G) that will replace the Permit No. PSD-FL-006D and modifications thereto. Table 8 is a listing of the applicable emission standards and details which emission standards will be retained in the air construction permit and will be in both permits.

**Table 8 – Summary of Emission Standards Applicable to the MWC and Future Permit Reference**

Pollutant	Emission Standard <sup>1</sup>	Compliance Method	Permits
PM	25 mg/dscm at 7% O <sub>2</sub>	Annual Stack Test	AC (BACT), Title V
SO <sub>2</sub>	29 ppmvd at 7% O <sub>2</sub> or 75% removal efficiency	24 hour daily geometric mean, CEMS	AC (BACT), Title V
Opacity	10%	COMS (AC-BACT) Annual Stack Test (MWC Rule)	AC (BACT), Title V
NO <sub>x</sub>	250 ppmvd at 7% O <sub>2</sub>	24-hr daily arithmetic block, CEMS	AC, Title V
HCl	25 ppmvd at 7% O <sub>2</sub> or 95% removal efficiency	Annual Stack Test	AC, Title V
D/F	30 ng/dscm at 7% O <sub>2</sub>	Annual Stack Test	AC, Title V
Hg	50 µg/dscm at 7% O <sub>2</sub> or 85% reduction	Annual Stack Test	AC, Title V
CO	250 ppmvd at 7% O <sub>2</sub>	24-hour block geometric mean, CEMS	AC, Title V
Pb	400 µg/dscm at 7% O <sub>2</sub>	Annual Stack Test	Title V
Cd	35 µg/dscm at 7% O <sub>2</sub>	Annual Stack Test	Title V
<sup>1</sup> The emission standards pursuant to the Department's Rule 62-204.800(9)(b), F.A.C., (Subpart Cb) also apply. <sup>2</sup> CEMS means continuous emission monitoring system; COMS means continuous opacity monitoring system.			

Compliance testing methods will be updated to insure consistency with the MWC rule. By and large operational requirements will be minimized in the air construction permit and referred to the Title V operation permit. Department will include an annual reporting requirement for NO<sub>x</sub> to insure that such emissions do not increase as a result of the replacement of daily/weekly waste throughput and 24-hour steam flow with a four-hour steam flow limit on each MWC.

**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. No air quality modeling analysis is required because the project does not result in a significant increase in emissions.

Yousry (Joe) Attalla is the project engineer responsible for reviewing the application and drafting the permit. A.A. Linero, P.E. is responsible for the review of the technical documents. Additional details of this analysis may be obtained by contacting Mr. Attalla at [yousry.attalla@dep.state.fl.us](mailto:yousry.attalla@dep.state.fl.us) or 850-717-9078 or at the Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.