TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Dixie Waste Services, LLC
201 Corporate Drive East
Langhorne, PA 19047

Dixie Waste Gasification Plant
Facility ID No. 0290016

PROJECT

Project No. 0290016-002-AC
Application for Minor Source Air Construction Permit
Dixie Waste Gasification Plant

COUNTY

Dixie

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Air Resource Section
Northeast District Office
7825 Baymeadows Way, Suite 200B
Jacksonville, FL 32256

December 27, 2011

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

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

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

Glossary of Common Terms

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

Facility Description and Location

Dixie Waste Services, LLC proposes to construct a new municipal solid waste, tire, and medical waste gasification plant , which is categorized under Standard Industrial Classification Code No. 4953. The facility will be located in Dixie County at located at 322 NE 264th Street, Cross City, Dixie County, FL. The UTM coordinates of the new facility are Zone 17, 297.6 km East, and 3279.5 km North, Latitude/Longitude: 29° 37' 44" N; 83° 05' 25" W. 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).

Facility Regulatory Categories

- The facility is not a major source of hazardous air pollutants (HAP).
- The facility has no 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 not a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Project Description

Dixie Waste Services, LLC has proposed a batch municipal waste combustion plant that consists of three starved air modular combustors. Discharge from each primary combustor is routed to individual cyclonic separators for particulate matter reduction. Gaseous emissions from the cyclonic separators is discharged to a common thermal oxidizer for complete (secondary)

combustion of the remaining gases, followed by a heat recovery steam boiler (supplementary fired by natural gas or propane) and steam turbine for the generation of electricity. Low temperature flue gases are routed to the carbon/lime injector reactor (acidic gas control) prior to discharge through a baghouse (PM control device).

Processing Schedule

May 28, 2011 Received the application for a minor source air pollution construction permit.

June 14, 2011 Requested additional information.

October 5, 2011 Received additional information; application complete.

2. PSD APPLICABILITY

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" defined in Rule 62-210.200, F.A.C. for the following pollutants: carbon monoxide (CO); nitrogen oxides (NO_X); 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 (Fl); 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 particulate matter; 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 potential emission 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.

PSD Applicability for Project

As provided in the application, the following table summarizes potential emissions and PSD applicability for the project.

Table A. Potential Emissions (Tons/Year) and PSD Applicability

Pollutant	Project Potential Emissions (TPY)	Project (Equivalent) Allowable Emissions (TPY)	Major Source Rate (TPY)	Subject To PSD?
CO	13.61	14.95	250	No
NO_X	15.95	245.5	250	No
$PM/PM_{10}/PM_{2.5}$	1.92	6.16	250	No
SO_2	5.51	20.52	250	No
VOC	20.25	N/A	250	No
HCL	4.61	9.73	N/A	No
Dioxin/Furan	1.1×10^{-8}	3.33×10^{-3}	250	No
Hg	1.28×10^{-3}	20.54×10^{-3}	250	No
Cd	7.69×10^{-5}	5.3×10^{-3}	N/A	No
Pb	7.69×10^{-4}	5.11×10^{-2}	N/A	No

As shown in the above table, project emissions will not exceed the PSD major source threshold for this facility type; therefore, the project is not subject to PSD preconstruction review.

3. APPLICATION REVIEW

RULE APPLICABILITY

Regulatory Classification

The facility is classified as Title V major source. The facility also establishes an emissions cap on NOx emissions to 245.5 tons per 12-month rolling total to escape PSD review (see above).

New Source Performance Standards (NSPS)

Applicability: This emissions unit is subject to 40 CFR 60, NSPS, Subpart AAAA - Small Municipal Waste Combustion Units. This is a new municipal combustion unit with a capacity of 225 tons per day (TPD), which is more than 35 TPD but less than 250 TPD of municipal solid waste burned. Therefore, the unit is an affected source of 40 CFR 60, Subpart AAAA. [40 CFR 60.1010]

Subcategory: This unit is a Class II unit since it is located at a municipal waste combustion plant with an aggregate plant combustion capacity no more than 250 tons per day of municipal solid waste. [40 CFR 60.1045]

Exemption: The unit is limited to 8% by weight of biological/medical wastes combustion to avoid applicability of 40 CFR 60, Subpart Ec, for Hospital/Medical/Infectious Waste Incinerators. By establishing the limitation for biological/medical waste combustion rate, the unit meets the definition of "Co-Fired Combustor" in 40 CFR 60.51c and therefore obtains exemption from the requirements of 40 CFR 60, Subpart Ec according to 40 CFR 60.50c(c).

Summary of Federal NSPS Provisions

- **NSPS, Subpart AAAA - Small Municipal Waste Combustion Units**
- **NSPS, Subpart A – General Provision for 40 CFR 60**

National Emission Standards for Hazardous Air Pollutants (NESHAP)

Applicability: This emissions unit is not subject to any requirements of 40 CFR 63, NESHAP.

Florida Administrative Code (F.A.C.)

The State of Florida Rule 62-296.416, F.A.C. (Waste to Energy) limits mercury emissions to a rate approximately 12.5% lower than the NSPS limit referenced above and therefore is the limiting rule for mercury emissions.

The State of Florida Rule 62-296.401(4), F.A.C. (Biological Waste Incineration Facility) limits emissions of PM, hydrogen chloride, and carbon monoxide. These limits exceed the standards listed in 40 CFR 60, Subpart AAAA, Small Municipal Waste Combustion Units and are therefore not emission limiting pollutant standards.

Summary of State Requirements

- **Chapter 62-4, F.A.C. - Permits**
- Rule 62-4.160, F.A.C.- General Permit Conditions
- Rule 62-4.130, F.A.C. – Plant Operation - Problems
- **Chapter 62-210, F.A.C. – Stationary Sources – General Requirements**
- Rule 62-210. 300, F.A.C. – Permits Required
- Rule 62-210. 350, F.A.C. – Public Notice and Comment
- Rule 62-210.650, F.A.C. – Circumvention
- Rule 62-210.700, F.A.C. – Excess Emissions
- **Chapter 62-296, F.A.C. – Stationary Sources – Emissions Standards**
- Rule 62-296.320, F.A.C.- General Pollutant Emissions Limiting Standards

- Rule 62-296.401(4), F.A.C. – Biological Waste Incineration Facility
- Rule 62-296.416, F.A.C. - Waste-to-Energy Facilities
- **Chapter 62-297, F.A.C. – Stationary Sources – Emissions Monitoring**
- Rule 62-297.310, F.A.C. – General Test Requirements

TECHNICAL EVALUATION

Capacity: The maximum incineration rate for all three primary combustion cells combined is permitted for 150 tons per day. Each primary cell can load up to 50 tons per batch. It typically takes 15 – 30 minutes for startup, then the wastes will allowed to burn for 8 – 12 hours, and 2-4 hours to cool down after combustion. The applicant is assuming that each complete process takes 16 hours per batch. Therefore, the maximum design capacity of the unit is 225 tons per day (24/16 x 150 tons per batch). This is considered reasonable estimations taking into consideration of time needed for cells to load up for combustion and the ashes removal after the cells completely cooled down.

{Definition: Capacity of a batch municipal waste combustion unit. Calculate the capacity of a batch municipal waste combustion unit as the maximum design amount of municipal solid waste they can charge per batch multiplied by the maximum number of batches they can process in 24 hours. Calculate this maximum number of batches by dividing 24 by the number of hours needed to process one batch. Retain fractional batches in the calculation. For example, if one batch requires 16 hours, the municipal waste combustion unit can combust 24/16, or 1.5 batches, in 24 hours. [40 CFR 60.1460(e)]}

Emissions Limitations: Eleven pollutants are being regulated by NSPS, Subpart AAAA:

(1)Dioxins/furans.
(2) Cadmium.
(3) Lead.
(4) Mercury.
(5) Opacity.
(6) Particulate matter.
(7) Hydrogen chloride.
(8) Nitrogen oxides.
(9) Sulfur dioxide.
(10) Carbon monoxide.
(11) Fugitive ash.

Three pollutants are being regulated by Florida Administrative Code, Rule 62-296.401(4), Biological Waste Incinerator:

(1) Particulate Matter
(2) Hydrogen Chloride
(3) Carbon Monoxide

The above three emission limiting standards are not a stringent as the NSPS requirements, therefore compliance with the NSPS requirements indicates compliance with these requirements.

One pollutant is regulated by Florida Administrative Code, Rule 62-296.416, F.A.C., Waste to Energy Facilities:

Mercury

The emission limiting standard for mercury emissions under this rule is more stringent than the NSPS requirements and therefore is the emission limiting standard for mercury. See comment under **Florida Administrative Code (F.A.C.)** section above.

Work Practice Standards: The unit is subject to several work practice standards.

(1) The facility shall have a plant specific operating manual. Facility operators shall receive proper training and obtain certification.
(2) The owner or operator shall not operate the municipal waste combustion unit at loads greater than 110 percent of the maximum demonstrated unit load of the municipal waste combustion unit (4-hour block average).
(3) The owner or operator shall not operate the municipal waste combustion unit so that the temperature at the inlet of the particulate matter control device exceeds 17 deg. C above the maximum demonstrated temperature of the particulate matter control device (4-hour block average)

For biological/medical waste incineration,

(4) The owner or operator shall operate with a combustion zone design temperature of no less than 1800 degrees Fahrenheit for at least 1.0 second gas residence time in the secondary (or last) combustion chamber.
(5) The volume of the loading system shall be designed to prevent overcharging thereby assuring complete combustion of the waste.

Incineration or ignition of waste shall not begin until the secondary (or last) combustion chamber temperature requirement is attained. All air pollution control and continuous emissions monitoring equipment shall be operational and functioning properly prior to the incineration or ignition of the waste and until all the wastes are incinerated. The secondary (or last) combustion chamber temperature requirement shall be maintained until the wastes are completely combusted.

COMPLIANCE

The owner or operator shall use the data from the continuous emissions monitoring systems (CEMS) to determine compliance with the emissions limiting standards for sulfur dioxide, nitrogen oxides (short-term limit) and carbon monoxide.

The owner or operator shall conduct testing to determine compliance with Dioxins/Furans, Cadmium, Lead, Mercury, Particulate, Hydrogen Chloride, and Opacity.

NOx Emissions Cap: The owner or operator shall determine the monthly NO_X emissions using the data collected from the continuous emission monitoring system and the flow meter. The monthly NOx emissions shall be based on 30 - operating day block averages that shall be computed as the arithmetic average of all the valid hourly average occurring with each 30 operating day block. An operating day is any day that the permitted unit incinerates wastes. The rolling 12-month NOx emissions shall be determined from the monthly emissions record for the current month and the preceding eleven months and shall be expressed in tons per 12-month rolling period. The owner or

operator shall install a computer system to illustrate 24-hour average flow rate, 24 – NOx concentration average, 30-day NOx emissions and 12-month rolling NOx emissions in quantifiable terms that provide specific data directly in relation to and support of data requirements that will relate to the NOx emissions cap in tons.

Moisture Content: The facility also needs to measure or estimate the moisture content of the flue gas using F-factor, wet/dry bulb, thermal couple or moisture analyzer if the facility installed a hot/wet CEMS system.

Temperature: The owner or operator shall continuously monitor the temperature of flue gases at the exit of the secondary combustion chamber. The purpose of this requirement is to demonstrate that the unit is operating with a combustion zone design temperature of no less than 1800 degrees Fahrenheit in the secondary (or last) combustion chamber.

Amount and Type of Wastes Burned: The facility will burn MSW, tires and biological/medical wastes. The facility shall not burn any hazardous wastes, industrial sludge, and other materials that not meeting the definition of MSW and Biological/Medical wastes. The facility shall keep records of the amount and types of wastes burned. The amount of biological/medical waste burned shall be measured on a calendar quarter basis.

Other Draft Permit Requirements

The facility shall process up to a maximum of 225 tons per day of municipal solid waste (MSW), tire derived fuel (TDF), and medical/infectious hospital waste (MIHW). MIHW shall be limited to eight per cent by weight of the total charge weight on a calendar quarter basis. Auxiliary fuels may include propane and natural gas. The hours of operation shall not be limited.

The permittee shall install, calibrate, maintain, and operate continuous emission monitoring systems for oxygen (or carbon dioxide), sulfur dioxide, carbon monoxide, and nitrogen oxides, and opacity. Install the continuous emission monitoring systems for sulfur dioxide, nitrogen oxides, and oxygen (or carbon dioxide) at the outlet of the air pollution control device. The nitrogen oxides continuous emission monitor is also used to demonstrate compliance with the emission limiting nitrogen oxide cap of 245.5 tons per year (12 month rolling total).

Secondary combustion chamber and inlet to the PM control device continuous temperature monitors and recorders are required. Initial, semi-annual, and annual reports are required to provide operational data, testing data, and monitored parameter results to the Department.

4. 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.

MengChiu Lim was the permit processor for permit No. 0290016-001-AC issued in 2006. Jerry Woosley is the project engineer responsible for reviewing this application and associated changes to the project. The gasification plant authorized by permit No. 0290016-001-AC was not constructed. This permit (No. 0290016-002-AC) supersedes the previous permit. Additional details of this analysis may be obtained by contacting the project engineer at the Department of

Environmental Protection, Northeast District Office, Air Resources Section 7825 Baymeadows Way, Suite 200-B, Jacksonville, FL 32256.