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PERMITTEE

Broward County Water & Wastewater Services
2555 West Copans Road
Pompano Beach, Florida 33069

Authorized Representative:
Mr. William R. Wilson, Project Manager

Air Permit No. 0112357-015-AC
Permit Expires: (one year from issue date–1 day)
North Regional Wastewater Treatment Plant
Minor Source Air Construction Permit
Digester Gas Co-Generator Construction Project

This is the final air construction permit, which authorizes the permittee to install a digester gas fired electric generator with waste heat recovery/reuse. The proposed work will be conducted at the Broward County North Regional Wastewater Treatment Plant, which is a wastewater treatment plant (Standard Industrial Classification No. 4952,). The facility is located in Broward County at 2401 North Powerline Road in Pompano Beach, Florida. The UTM coordinates are Zone 583.49 km East, and 2905.01 km North. As noted in the Final Determination provided with this final permit, only minor changes and clarifications were made to the draft permit.

This final permit is organized by the following sections.

Section 1. General Information

Section 2. Administrative Requirements

Section 3. Emissions Unit Specific Conditions

Section 4. Appendices

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of Section 4 of this permit.

This air pollution construction permit is issued under the provisions of: Chapter 403 of the Florida Statutes (F.S.) and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The permittee is authorized to conduct the proposed work in accordance with the conditions of this permit. This project is subject to the general preconstruction review requirements in Rule 62-212.300, F.A.C. and is not subject to the preconstruction review requirements for major stationary sources in Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Upon issuance of this final permit, any party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel (Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000) and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within 30 days after this order is filed with the clerk of the Department.

Executed in West Palm Beach, Florida.

_____ _____

Jennifer K. Smith Date
Southeast District Assistant Director

JKS/dmp/lch/sdt

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Final Air Permit package (including the Final Determination and Final Permit) was sent by electronic mail (or a link to these documents made available electronically on a publicly accessible server) with received receipt requested before the close of business on _____ to the persons listed below.

Mr. William R. Wilson, Chevron Energy Solutions: wilsonw@chevron.com
Mr. John Paniccia, Broward County Water & Wastewater Operation Division: jpaniccia@broward.org
Mr. Mark Darmanin, Broward County Water & Wastewater Operation Division: mdarmanin@broward.org
Mr. Clive Haynes, Broward County Water & Wastewater Operation Division: chaynes@broward.org

Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.

_____ _____

(Clerk) (Date)

FACILITY AND PROJECT DESCRIPTION

Existing Facility

The existing Broward County North Regional Wastewater Treatment Facility consists of the following Emission Units.

EMISSIONS UNIT NO.	EMISSIONS UNIT DESCRIPTION	
001	Liquid Process Units and Solid Handling Process	Active/Unregulated
002	Eight (8) Iron Fireman boilers model No. 36-45-345 fired with digester gas from anaerobic digesters.	Active/Regulated
003	Six (6) Diesel-Fired Emergency Power Generators – Each generator set is rated for 2,000 kilowatts and provide emergency power to the facility during power interruptions including contractual load sharing events. Generators 1, 2, and 3 were replaced in June 2010 and are certified to comply with provisions of 40 CFR Part 63 Subpart ZZZZ. Generators 4, 5, and 6 were installed in June 2001 and are not certified to comply with provisions Subpart ZZZZ. Generator No. 4 is currently out of service and is scheduled to be replaced.	Active/Regulated
004	Two (2) Digester gas flares.	Active/Regulated

Proposed Project

The applicant seeks to construct/install a digester gas co-generator rated at 1,999 kW which will produce electricity for the site while waste heat will be utilized for the digesters. The digester gas is currently being burned in boilers to heat the digesters or flared when not burned in the boilers. The co-generator will utilize all of the available digester gas when running, approximately 87 percent of the time. When the digester gas co-generator is not in service (13 percent of the time) the boilers and flares will be utilized as they are currently. This project will add the following emissions units.

Facility ID No. 0112357	
ID No.	**Emission Unit Description**
005	Digester Gas Co-Generator (1,999 kW)

FACILITY REGULATORY CLASSIFICATION

- The facility is a synthetic minor source of hazardous air pollutants (HAP).
- The facility has no units subject to the acid rain provisions of the Clean Air Act (CAA).
- The facility is not 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(PSD), F.A.C.

SECTION 2. ADMINISTRATIVE REQUIREMENTS (DRAFT)

1. Permitting Authority: The permitting authority for this project is the Florida Department of Environmental Protection, Southeast District Office, street address is 400 North Congress Avenue, 3rd Floor, West Palm Beach, Florida, 33401-2913, (phone 561-681-6600 Fax 561/681-6755). All documents related to applications for permits to operate an emissions unit shall be submitted to the District/Local Office.

2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the Florida Department of Environmental Protection, Southeast District Office, street address 400 North Congress Avenue, 3rd Floor, West Palm Beach, Florida, 33401-2913, (phone 561-681-6600 Fax 561/681-6755). Email address is sed.air@dep.state.fl.us

3. Appendices: The following Appendices are attached as part of this permit:

   a. Appendix A. Citation Formats and Glossary of Common Terms;

   b. Appendix B. General Conditions;

   c. Appendix C. Common Conditions; and

   d. Appendix D. Common Testing Requirements.

   e. Appendix E. 40 CFR 60, Subpart JJJJ—Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

4. Applicable Regulations, Forms and Application Procedures: Unless otherwise specified in this permit, the construction and operation of the subject emissions units shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403, F.S.; and Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296 and 62-297, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations.

5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]

6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No new emissions unit shall be constructed and no existing emissions unit shall be modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]

7. Source Obligation:

   (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.

   [Rule 62-212.400(12), F.A.C.]

This section of the permit addresses the following emissions unit/units.

ID No.	Emission Unit Description
005	Digester Gas Co-Generator (1,999 kW)

The digester gas engine driving the generator is a stationary spark ignition Internal Combustion Engine (ICE) and is subject to 40 CFR 60 Subpart JJJJ, adopted by the state in 62-204.800(8)(b)81. F.A.C,

EQUIPMENT

1. Digester Gas Co-Generator: The permittee is authorized to install a 1,999 kW digester gas powered generator with waste heat reuse. The proposed new equipment is a GE/Jenbacher Spark Ignition Internal Combustion Engine (Model JMS 616 GX-B.L). The engine will be powering a 1.999 MW electrical generator. Waste heat from the engine will be utilized for heating the digester tanks. [Application No. 0112357-015-AC]

PERFORMANCE RESTRICTIONS

2. Permitted Capacity: The emissions unit is permitted to run on 29,955 scf/m producing approximately 2778 bhp and 1,999 kW [Rule 62-210.200(PTE), F.A.C.]
3. Authorized Fuel: The emissions unit will run on digester gas produced at the facility. [Application No. 0112357-015-AC and Rule 62-210.200(PTE), F.A.C.]
4. Restricted Operation: The hours of operation of are limited to 7621 hours per year. [Application No. 0112357-015-AC, Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

EMISSIONS STANDARDS

5. Sitewide Limitations:
   a. Nitrogen Oxides (NOx) Emissions: The NOx emissions from this emissions unit shall contribute to the overall site NOx emission limit of 90 tons per year. As such, the emissions unit shall not emit NOx in excess of 0.7 g/bhp-hr or 14.7 tons per year [Application No. 0112357-015-AC]
   b. Carbon Monoxide (CO) Emissions: The CO emissions from this emissions unit shall contribute to the overall site CO emission limit of 90 tons per year. As such, the emissions unit shall not emit CO in excess of 3.5 g/bhp-hr or 73.4 tons per year [Application No. 0112357-015-AC]

   {Note: The emission standards for NOX and CO will be significantly less than that required in Subpart JJJJ in order to comply with the allowable required to meet the 250 tons/year limitation in order to escape PSD.}
6. The permittee shall comply with the emission standards specified in Table 1 of Subpart JJJJ, shown below.

   Table 1 **(**Landfill /Digester Gas engines hp≥500) built after July 1, 2010

EMISSION STANDARD					
g/HP-hr			ppmvd at 15% O2		
NOX	CO	VOC	NOX	CO	VOC
2.0	5.0	1.0	150	610	80

{Note: The permittee may choose to comply with the emission standards in units of either g/HP-hr or ppmvd at 15 percent O2. When calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.}

[Application No 0112357-015-AC and 40 CFR 60.4233(e)]

7. The permittee shall operate and maintain the stationary SI ICE that achieves the emission standards as required in Table 1 of subpart JJJJ over the entire life of the engine.
[40 CFR 60.4234]

8. The permittee shall demonstrate compliance according to the following:
   a. Keep a maintenance plan and records of conducted maintenance and to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.

   [40 CFR 60.4243(b)(2)(ii)]

TESTING REQUIREMENTS

9. Initial Compliance Tests: The emissions unit shall be tested to demonstrate initial compliance with the emissions standards for the CO, NOx and VOC's specified in conditions 5 and 6 above. The test shall be conducted using the digester gas from the adjacent digesters. The initial tests shall be conducted within 60 days after achieving permitted capacity, but not later than 180 days after initial operation of the unit.
[Rules 62-4.070(3) and 62-297.310(7)(a)1, F.A.C.]

10. Annual Compliance Tests: During each federal fiscal year (October 1st to September 30th), the emissions unit shall be tested to demonstrate compliance with the emissions standards for the pollutants specified in conditions 5 and 6 above. [Rule 62-297.310(7)(a)4, F.A.C.]

11. Test Requirements: The permittee shall notify the Compliance Authority in writing at least 15 days prior to any required tests. Tests shall be conducted in accordance with the applicable requirements specified in Appendix D (Common Testing Requirements) of this permit. [Rule 62-297.310(7)(a)9, F.A.C.]

12. Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis, and Moisture Content
7E	Determination of Nitrogen Oxide Emissions from Stationary Sources
9	Visual Determination of the Opacity of Emissions from Stationary Sources
10	Determination of Carbon Monoxide Emissions from Stationary Sources (The method shall be based on a continuous sampling train.)
18	Measurement Of Gaseous Organic Compound Emissions By Gas Chromatography
320	Vapor Phase Organic & Inorganic Emissions by Extractive FTIR

The above methods are described in Appendix A of 40 CFR 60 or Appendix A of 40 CFR part 63, and are adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used unless prior written approval is received from the Department.
[Rules 62-204.800 and 62-297.100, F.A.C.; and Appendix A of 40 CFR 60]

13. The performance tests shall follow the procedures in paragraphs (a) through (g) of this Specific Condition.

    a. Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in §60.8 and under the specific conditions that are specified by Table 2 to subpart JJJJ (Appendix E)
    b. You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine.
    c. You must conduct three separate test runs for each performance test required in this section, as specified in §60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.
    d. To determine compliance with the NOX mass per unit output emission limitation, convert the concentration of NOX in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 1)}$$

Where:

ER = Emission rate of NOX in g/HP-hr.

Cd = Measured NOX concentration in parts per million by volume (ppmv).

1.912×10−3 = Conversion constant for ppm NOX to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

    e. To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 2)}$$

Where:

ER = Emission rate of CO in g/HP-hr.

Cd = Measured CO concentration in ppmv.

1.164×10−3 = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

f. When calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 3)}$$

Where:

ER = Emission rate of VOC in g/HP-hr.

Cd= VOC concentration measured as propane in ppmv.

1.833×10−3 = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.

Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.

T = Time of test run, in hours.

HP-hr = Brake work of the engine, in HP-hr.

g. If the owner/operator chooses to measure VOC emissions using either Method 18 of 40 CFR part 60, appendix A, or Method 320 of 40 CFR part 63, appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{Mi}}{C_{Ai}} \qquad \text{(Eq. 4)}$$

Where:

RFi = Response factor of compound i when measured with EPA Method 25A.

CMi = Measured concentration of compound i in ppmv as carbon.

CAi = True concentration of compound i in ppmv as carbon.

$$C_{icorr} = RF_i \times C_{imeas} \qquad \text{(Eq. 5)}$$

Where:

Cicorr = Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.

Cimeas = Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{Peq} = 0.6098 \times C_{i,corr} \qquad \text{(Eq. 6)}$$

Where:

CPeq = Concentration of compound i in mg of propane equivalent per DSCM.

[40 CFR 60.4244 (a)(b)(c)(d)(e)(f)(g)]

MONITORING REQUIREMENTS

14. Hours of Operation: The owner or operator shall monitor the hours of operation of the emissions units with an hour meter. Each emissions unit shall be equipped with a timing device to record the actual time of operation.
[Rule 62-4.070(3), F.A.C.]

RECORDS AND REPORTS

15. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Appendix D (Common Testing Requirements) of this permit.
[Rule 62-297.310(8), F.A.C.]

16. AOR Supplemental Information: Annual operating reports shall include the following supplemental information that was recorded in the previous calendar year:

    a. The highest 12-month total hours of operation for the unit
    b. The highest 12-month total NOx emission for the unit
    c. The highest 12-month total CO emission for the unit

    [Rule 62-4.070(3), F.A.C.]

17. Hours of Operation: The records on hours of operation and CO and NOx emissions shall be prepared no later than 15 days after the end of each month and shall be maintained at the facility's physical location and available for inspection.
[Rule 62-4.070(3), F.A.C.]

18. The permittee shall keep records of all the information as follows in paragraph a) through d):

    a. All notifications submitted to comply with this permit and all documentation supporting any notification.
    b. Maintenance conducted on the engine.
    c. (not applicable)
    d. If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

    [40 CFR 60.4245(a)]

19. The permittee shall submit an initial notification as required; the notification shall include the information in paragraphs a) through e).

    a. Name and address of the owner or operator;
    b. The address of the affected source;
    c. Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;
    d. Emission control equipment; and
    e. Fuel used.

[40 CFR 60.4245(c)]

20. The permittee shall submit a copy of each performance test that was conducted in accordance of Specific Condition A.8, within 60 days after the test has been completed.
[40 CFR 60.4245(d)]

21. The parts of the General Provisions of 40 CFR 60.1 through 60.19 that apply to this facility are listed in Table 3 of subpart JJJJ (Appendix E).
[40 CFR 60.4246]

22. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Appendix D (Common Testing Requirements) of this permit.
[Rule 62-297.310(8), F.A.C.]