TECHNICAL EVALUATION

AND

PRELIMINARY DETERMINATION

South Florida Water Management District
Pump Station S–5A

Air Permit File Number 0990349-003-AC

Palm Beach County, Florida

Palm Beach County Health Department
Environmental Health and Engineering
Air Pollution Control Section

February 21, 2006

1.0 APPLICATION INFORMATION

1.1 Applicant

South Florida Water Management District
3301 Gun Road Club
West Palm Beach, FL 33046

Authorized Representative:
Mr. Radu Alexander Damian, Director, Field Operations, Operations and Maintenance Resources

1.2 Application Review

01/25/06: Permittee requested to extend waiver of 90-day time clock to clarify additional NSR Reform provisions.
11/22/05 Permittee requested waiver of 90-day time clock to incorporate the impending adoption of NSR Reform provisions.
09-22-05: Palm Beach County Health Department deemed application complete.
09-07-05: Palm Beach County Health Department received response to request for additional information
07-22-05: Palm Beach County Health Department issued a request for additional information.
06-24-05: Palm Beach County Health Department received application for construction permit.

2.0 FACILITY INFORMATION

2.1 Location

SFWMD Pump Station S-5A
Address: 20700 State Road 80,
Loxahatchee, FL 33470

Station is located along the West Palm Beach Canal, immediately east of Twenty Mile Bend, and midway between West Palm Beach and Belle Glade.

UTM Coordinates: Zone 17; 562.6 km E ; 2951.3 km N
Latitude: 26° 40’ 59” North / *Longitude:* 80° 21’ 54” West

Description: Flood Control Pumps Stations [SIC: 9511]

2.2 Standard Industrial Classification Code (SIC #9511)

Major Group Number	95	Administration of Environmental Quality and Housing Programs
Industry Group Number	951	Administration of Environmental Quality Programs
Industry Number	9511	Air and Water Resource and Solid Waste Management

2.3 Regulatory Classification

Title III: The facility is not a major source of hazardous air pollutants (HAPs)
Title IV: The facility will not operate units subject to the acid rain provisions of the Clean Air Act.
Title V: The facility is a Title V major source of air pollution in accordance with Chapter 62-213, F.A.C.

PSD: The permittee proposes a federally enforceable limit on heat input to cap nitrogen oxide emissions and establish synthetic PSD minor status in accordance with Rule 62-212.400 F.A.C.

RACT: The diesel engines in this facility are not subject to the Major Source NOx RACT requirements in accordance with guidance issued by the Florida Department of Environmental Protection.

NSPS: The facility is not subject to any requirements of 40 CFR 60.

NESHAP: The facility is subject to the requirements of 40 CFR 61, Subpart M, Asbestos.

3.0 PROJECT DESCRIPTION

The South Florida Water Management District (SFWMD) operates a flood control pump station located on the West Palm Beach Canal, immediately east of Twenty Mile Bend, and midway between West Palm Beach and Belle Glade. Pump station S-5A consists of six (6) 1600 horsepower (hp) Fairbanks-Morse diesel engine/pump combinations, two (2) 535 hp diesel engines powering two emergency electrical generators; one (1) 10 hp diesel engine powering one standby air compressor; four (4) 25,000 gallon distillate oil storage tanks; a 4,000 gallon gasoline storage tank and distribution system (dispensing pump with Stage I/II vapor controls), architectural surface coating and other insignificant /exempt activities. All six engines currently operate on low sulfur fuel oil (0.05% S by wt). During periods of low sulfur fuel curtailment these engines can be operated on regular distillate fuel (0.5% S by wt).

The engines at this station are used to power six flood control pumps. The pump station is part of the Everglades Construction Project authorized by the Everglades Forever Act, Section 373.4592, Florida Statutes and it discharges water along the northern edge of Water Conservation Area 1. In addition, this facility regulates Hurricane Gate No. 5 to allow water flow out of Lake Okeechobee for irrigation needs.

The facility is presently classified as an existing major source of air pollution that pre-dates both Federal and State pre-construction review programs (40 CFR 52.21 and Chapters 62-210.300, 62-212.300, and 62-212.400, F.A.C) and as a major source under the Title V operating permit program (40 CFR Part 70 and Chapter 62-210.200, F.A.C.) with respect to nitrogen oxides emissions (NOx). Based on the estimated potential emissions, this facility is not a major source of hazardous air pollutants (HAPs).

On June 24, 2005, the South Florida Water Management District (SFWMD) submitted an application to modify the six engines to allow the combustion of a mixture of natural gas (approximately 80%) and low sulfur distillate oil (approximately 20%). The 80/20- fuel ratio is a manufacturer's estimate and, therefore, is subject to change in the field calibrations. The engines will remain capable of firing low-sulfur distillate oil (0.05% S) during routine operations as well as standard No. 2 Distillate (0.5% S) during low-sulfur fuel curtailment episodes. The mechanical /physical modifications planned for S-5A include a configuration in which natural gas is introduced at a location downstream of the engine air cleaner and upstream of the engine blower. The gas is supplied at approximately atmospheric pressure using an air-fuel mixing device. The air-gas mixture is then compressed in the engine blower and distributed to each cylinder by the engine air-intake manifold. During the piston's compression stroke, the diesel injector is activated and the air-gas mixture is ignited.

As these engines were not originally capable of combusting natural gas, the proposed modifications will eliminate the "grandfathered" status of this a pre-PSD source. Unrestricted, pump station S-5A would remain classified as an existing major PSD source of air pollution based on the estimated potential emissions of various pollutants including NOx. In order to avoid Major PSD Source classification, the SFWMD is seeking a construction permit to establish a federally enforceable heat input cap of 155,880 million BTU per year for all the stationary emission sources at Pump Station S-5A. The nitrogen oxides emissions associated with the combustion of the various types of fuels under the proposed heat input cap are anticipated to be below the PSD major source threshold (250 tons per year). The proposed permit modification will re-classify the facility as a synthetic PSD minor source of air pollution.

4.0 RULE APPLICABILITY

The proposed project is subject to preconstruction review under the applicable provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-4, 62-210, and 62-212 of the Florida Administrative Code (F.A.C.). This facility is located in Palm Beach County, an area designated as "maintenance" for the pollutant ozone and attainment for all other criteria pollutants in accordance with Rule 62-204.340, F.A.C. The proposed project is exempt from review under Rule 62-212.400 F.A.C., Prevention of Significant Deterioration (PSD), because the net emission increases associated with this modification are below the Significant Emission Rates listed in Table 62-212.400-2, F.A.C. The proposed facility shall comply with all applicable provisions of the Florida Administrative Code and, specifically, the following chapters and rules:

- F.A.C. Chapter 62-4 - Permitting Requirements.
- F.A.C. Chapter 62-204 - Ambient Air Quality Requirements, PSD Increments, and Federal Regulations Adopted by Reference
- F.A.C. Chapter 62-210 - Required Permits, Public Notice, Reports, Stack Height Policy, Circumvention, Excess Emissions, and Forms
- F.A.C. Chapter 62-212 - General Preconstruction Review Requirements, PSD Requirements
- F.A.C. Chapter 62-213 - Operation Permits for Major Sources of Air Pollution
- F.A.C. Rule 62-296 - General Pollutant Emission Limiting Standards.
- F.A.C. Rule 62-297 - Test Methods
- F.A.C. Chapter 62-256 - Open Burning and Frost Protection Fires
- F.A.C. Rule 62-257 - Asbestos Program

And the following National Emission Standards for Hazardous Air Pollutants

- 40 CFR 61, Subpart M. - Asbestos

{Note: As the cost of the mechanical /physical modification to each the six engines only represents about 8 % of the replacement cost of each engine, the proposed additions and changes in equipment do not qualify as a reconstruction. However, since these engines were not originally capable of combusting natural gas and the proposed changes in method of operation will result in an increase in potential emissions of VOC and various HAPs, this change in the method of operation constitutes a modification to the emission source, as specified in 40 CFR 60.14.

This facility is not subject to the requirements of 40 CFR 63, Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines because it is not a major source of HAP emissions.

Internal combustion engines that are modified after the date the proposed Standard of Performance for Stationary Compression Ignition Internal Combustion Engines is published in the Federal Register (July 11, 2005) may be subject to this proposed NSPS. This issue will be revisited upon promulgation of this standard.}

5.0 SOURCE IMPACT ANALYSIS

5.1 Net Emission Increase and PSD Applicability

The Florida Department of Environmental Protection regulates major air pollution sources in accordance with Florida's Prevention of Significant Deterioration (PSD) program, as approved by EPA in Florida's State Implementation Plan and defined in Rule 62-212.400, F.A.C. A PSD review is required only in areas currently in attainment with the National Ambient Air Quality Standards (NAAQs) or areas designated as "unclassifiable" for a given pollutant. A facility is considered "major" with respect to PSD if it emits or has the potential to emit:

>250 tons per year of any regulated pollutant , or
>100 tons per year of any regulated pollutant and belonging to one of 28 PSD Major Facility Categories, or > 5 tons per year of lead

For new PSD-major facilities, each regulated pollutant is reviewed for PSD applicability based on the PSD Major emission thresholds listed above. For modifications to existing PSD-major facilities, each regulated pollutant is reviewed for PSD applicability based on emission thresholds known as Significant Emission Rates listed in Table 62-212.400-2, F.A.C. Net emission increases exceeding these rates are considered "significant" and the applicant must employ the Best Available Control Technology (BACT) to minimize emissions of each pollutant and evaluate the air quality impacts. Although a facility 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.

Since this facility pre-dates PSD legislation, no construction permit has ever been issued for this "grandfathered" facility. A Title V air operation permit was issued to this facility for inventory purposes. Consequently, neither Air Operating Permit 0990349-001-AO issued on May 1, 1998, nor the air operating permit renewal 0990349-002-AO issued on October 17, 2003, established federally enforceable limits on fuel use, heat input or hours of operation. The only requirement included in these permits is for the permittee to notify the permitting authority in case of changes in sulfur content of the fuel.

In accordance with PSD requirements, the net emission increases were calculated as follows:

Table 1- Summary of Past Actual to Future Potential Emissions. Pump Station S-5A.

Pollutant	Proposed Potential Emissions Operating on Nat. Gas / Diesel Blend (TPY)	Baseline Actual Emissions highest 24 month Avg. operating on Diesel (TPY)	Net Emission Increase (TPY)	Significant Emission Rates (TPY)	Subject to PSD?
Nitrogen Oxide	247.54	107.30	140.24	40	Yes
Carbon Monoxide	37.32	28.50	8.82	100	No
Particulate Matter	2.18	3.35	-1.17	25	No
PM 10	3.29	3.35	-0.06	15	No
Volatile Organic Compounds	8.76	3.02	5.74	40	No
Sulfur Dioxide (0.5% S)	7.92	16.93	-9.01	40	No
Sulfur Dioxide (0.05% S)	0.83	1.69	-0.86	40	No
Total HAPs	4.98	0.15	4.83	NA	No

Although the net emissions increase for NOx exceeds the significance level, a review of the operations at this facility since 1993 indicate that the actual NOx emissions from pump station S-5A have never reached the major PSD source level, in fact the highest actual emissions were about 50% of the major source threshold:

Table 2. Actual Emissions of NOx - Pump Station S-5A

Reporting Year	Actual Emissions TPY
1993	94.91
1994	110.85
1995	109.0
1996	53.96
1997	58.46
1998	61.71
1999	83.99
2000	58.8
2001	41.95
2002	124.90
2003	86.84
2004	108.33

The applicant is seeking a construction permit to more accurately reflect the reality of the operations at pump station S-5A. Please note that the NOx emission exhibit great variability, as expected due to their dependency on annual rainfall totals. For example, NOx emissions increased over 80 tons between 2001 and 2002 because 2002 was a "wetter year".

5.2 Potential Pollutant Emissions

The SFWMD has requested a federally enforceable heat input cap of 155,880 million BTU per year for all the stationary emission sources at Pump Station S-5A. The nitrogen oxides emissions associated with the combustion of the various types of fuels under the proposed heat input cap are anticipated to be below the PSD major source threshold (250 tons per year).

Other pollutants associated with the fuel combustion, including sulfur dioxide, carbon monoxide, particulate matter (TSP and PM10), and volatile organic compounds, will also be indirectly capped at levels of less than 50% of the PSD Major Source thresholds. Synthetically-limited potential emissions are as follows:

Table 3 - Summary of Potential-to-Emit (PTE) Pump Station S-5A.

Pollutant	**Proposed Potential Emissions (TPY)**			**PSD Major Source Threshold (TPY)**	**PSD Major Source?**	**Subject to PSD?**
	100% Nat. Gas*	**100% Dist. Oil**	**80% NG 20% DO**			
Nitrogen Oxide	247.07	249.41	247.54	250	No	No
Carbon Monoxide	30.08	66.26	37.32	250	No	No
Particulate Matter	0.77	7.79	2.18	250	No	No
PM 10	2.99	4.47	3.29	250	No	No
Volatile Organic Compounds	9.35	6.67	8.76	250	No	No
Sulfur Dioxide (0.5% S)	0.05	42.04	7.92	250	No	No
Sulfur Dioxide (0.05% S)	0.05	4.20	0.183	250	No	No
Benzene	0.15	0.06	0.3	NA	No	No
Toluene	0.08	0.02	0.06	NA	No	No

Xylene	0.02	0.02	0.02	NA	No	No
Formaldehyde	4.30	0.01	3.44	NA	No	No
Acetaldehyde	0.60	0.00	0.60	NA	No	No
Acrolein	0.61	0.00	0.61	NA	No	No
Methanol	0.19	0.00	0.19	NA	No	No
PAH	0.01	0.02	0.01	NA	No	No
1,3- Butadiene	0.06	-	0.06	NA	No	No
2,2,4-Trimethylpentane	0.07	-	0.07	NA	No	No
Ethylbenzene	0.01	-	0.01	NA	No	No
Methylene Chloride	0.01	-	0.01	NA	No	No
n-Hexane	0.03	-	0.03	NA	No	No
Total HAPs	6.20	0.12	4.98	NA	No	No

Potential emissions are based on a combined heat input of 155,880 million BTU per rolling 12-month total for six (6) 1600 horsepower (hp) Fairbanks-Morse diesel engine/pump combinations. However, the proposed facility-wide NOx emission limit will also apply to the two Cummins emergency generators. The emission rates for natural gas and distillate oil are based on AP-42 emission factors. The emission rates for the natural gas/distillate oil fuel blend are based on a weighted average of AP-42 emission factors for each type of fuel. No correction coefficients for the various emission factor ratings have been applied to any of the emission estimates (baselie or potential emissions).

**Based on the information provided by the vendor, due to lubricity considerations, these engines are technically incapable of operating on 100% natural gas.*

The permit application included two (2) 535 hp diesel engines powering two emergency electrical generators in the list of insignificant activities. Potential emissions for both units were calculated based on the standard 500 hours/year operation that defines emergency generator and a combined heat input rate of 32.2 MMBTU/hr for both generators. The emergency generators will not be modified to combust the dual fuel mixture. All emission rates are based on AP-42 emission factors.

Table 4 - Summary of Potential-to-Emit (PTE) Two (2) - 535 hp Emergency Generators.

Pollutant	**Emission Factor (lb/MMBTU)**	**Potential Emissions (TPY)**
Nitrogen Oxide	3.2	25.76
Carbon Monoxide	0.85	6.84
Particulate Matter	0.10	0.85
PM 10	0.0573	0.46
Volatile Organic Compounds	6.42E-04 (lb/hp-hr)	0.17
Sulfur Dioxide (0.5% S)	4.05E-03 (lb/hp-hr)	1.08
Sulfur Dioxide (0.05% S)	4.05E-04 (lb/hp-hr)	0.11
Benzene	7.76E-4	6.25E-03
Toluene	2.81E-04	2.26E-03
Xylene	1.93E-04	1.55E-03
Formaldehyde	7.89E-05	6.35E-04
Acetaldehyde	2.52E-05	2.03E-04
Acrolein	7.88E-06	6.34E-05
PAH	2.12E-04	1.71E-03
Total HAPs		0.013

In accordance with Rule 62-213.430(6)(b)3 F.A. C., in order to be considered an insignificant emission unit or activity, the given unit shall not emit or have the potential to emit 5 tons a year or more of any criteria pollutant. As these generators have potential emissions of NOx and CO that exceed the 5 tons per year threshold they cannot be consider insignificant and, therefore, shall be included on the site-wide heat input cap for this facility. As the potential emissions from the 10 hp diesel engine powering one standby air compressor are expected to be below the 5 tpy threshold, this engine remains classified as an insignificant unit.

Pump Station S-5A is not be subject to PSD preconstruction review requirements because the net NOx emission increase resulting from this modification has been estimated to be below the Significant Emission Rates listed in Table 62-212.400-2, F.A.C. The heat input limits requested by the applicant will limit all potential emissions below the PSD major facility threshold. This facility will be classified as a synthetic minor source under the preconstruction review program.

This permit action will establish a facility-wide heat input cap. Compliance with the heat input cap shall be demonstrated on a rolling 12-month basis through fuel monitoring and heat input calculations.

The NOx emission factors used to establish the heat input cap (cap factors) shall be verified by stack testing of at least one of the six (6) 1600 horsepower pump engines. The emission factor verification tests will be conducted while the emission units operate on the natural gas/distillate fuel mixture. Within ninety (90) days of the effective day of this construction permit, the permittee shall submit a proposed testing protocol for approval by the Palm Beach County Health Department. The proposed testing protocol shall address the following items:

- proposed test date
- sampling locations
- the total number of tests per engine
- the duration of each test run
- operating parameters during testing (i.e. engine operating loads, heat input monitoring)
- testing methods
- quality assurance provisions
- data analysis procedures

The Palm Beach County Health Department will evaluate all the data collected from the emission factor verification tests in order to establish the minimum emission monitoring requirements (i.e. frequency, testing methodology, etc.) that will be incorporated into the Title V operating permit. The minimum emission monitoring requirements shall provide reasonable assurance that the potential emissions of nitrogen oxides from this facility do not exceed the PSD synthetic minor threshold of 250 tpy under any operating conditions (i.e. operating load, fuel type, etc.).

None of the emission factor verification requirements shall apply to the emergency generators.

If the NOx emission factor measured during the emissions factor verification tests (see Specific Condition 4.2) exceeds 3.2 lb/MMBTU, the permittee shall calculate and immediately implement a new heat input cap which adequately maintains the facility's potential emissions below the PSD Major Source threshold. If needed, within 90 days of completion of emission factor verification testing, the permittee shall submit a construction permit application to PBCHD to make the new heat cap federally enforceable.

Because the estimated potential emissions of nitrogen oxides are very close to the PSD threshold, PBCHD is establishing a rolling 365–day total averaging period whenever a rolling 12-month NOx emissions total exceeds 200 tons. Monthly monitoring may be resumed after 30 consecutive days of daily monitoring demonstrate NOx emissions below the 200 tons per rolling 365-day total threshold. In order to provide reasonable assurance of accuracy of the heat input calculations the applicant has agreed to update the fuel heating value data from both natural gas and distillate oil fuel suppliers as frequent as possible. The applicant shall use the most recent vendor supplied information to calculate the daily heat input (if

needed), the monthly heat input, the rolling 12-month heat input, and rolling 365-day heat input (if needed) to the facility.

Based on the proposed potential emissions of nitrogen oxides, this facility will be classified as a major source of air pollution under the Title V Operating Permit Program. Because the proposed potential emission of each single HAP would be less than 10 tons per year and the combination of all HAP would be less than 25 tons per year, this facility is classified as a natural minor source under the Title III Hazardous Air Pollutant Program.

5.3 Air Quality Analysis

During the renewal of the Title V air operation permit, SFWMD proposed to combust No. 2 distillate fuel (0.5% S by weight) in place of low sulfur diesel (0.05% by weight). As part of the 2002 Title V permit review for this facility, PBCHD requested that ambient air modeling be conducted to demonstrate the use of higher sulfur fuel will not cause a violation of the National Ambient Air Quality Standards (NAAQS). The sulfur dioxide impacts from the use of distillate fuel on all six engines were determined using ISCTS3 model. However, as originally modeled, an incorrect stack height of 60.37 ft was assumed. The original model indicated compliance with all the NAAQS. At the request of PBCHD, the applicant re-ran this model using the correct stack height of 37.5 ft. The results of the model are as follows:

Table 6-Summary of Air Dispersion Modeling for SO_2 .

Fuel = distillate oil (0.5% S wt.)	**3-hr Avg. Period ($\mu g/m^3$)**	**24-hr Avg. Period ($\mu g/m^3$)**	**Annual Avg. Period ($\mu g/m^3$)**
Stack Height = 11.5 meters	**NAAQS (2nd Highest)**	**NAAQS (2nd Highest)**	**NAAQS (2nd Highest)**
Year = 1991	701.1	303.6	25.7
Year = 1990	674.4	356.5	34.3
Year = 1989	539.7	267	26.9
Year = 1988	646.1	276.4	23.1
Year = 1987	853.7	365.8	28.3
Standard	**1300**	**260**	**60**

The annual impacts are based on full load operation for 8760 hrs per year.

As indicated by the result of this modeling, the facility, as originally proposed, does not meet the 24-hr NAAQS for SO_2 while operating on higher sulfur distillate fuel. Closer inspection indicates that these high concentrations occur at about 50 to 125 meters west-southwest of the stacks which is within the property boundary of the facility. The 24-hr SO_2 concentration outside the property boundary meets the NAAQS standards. (See attached AERMOD output).

Since this facility combusts regular No. 2 distillate oil (0.5% S) only during very short-lived emergency situations, such as low-sulfur fuel curtailment, no violations of the NAAQS are anticipated. The addition of a third type of fuel (natural gas) will further decrease the dependency on distillate fuel oil, regardless of its sulfur content.

CONCLUSION

Based on the information provided by the applicant, the Health Department has a reasonable assurance that the proposed project, as described in this evaluation, and subject to the conditions in the proposed draft permit, will not cause or significantly contribute to a violation of any applicable air quality standard, PSD increment, or any other technical provision of Chapter 62-209 through 62-297 of the Florida Administrative Code.

Permit Engineer: Jose M. Garcia, P.E.
Filename: 0349003.TE2