

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF FINAL PERMIT

In the Matter of an  
Application for Permit by:

City of Tallahassee  
Arvah B. Hopkins Generating Station  
1125 Geddie Rd. (C.R. 1585)  
Tallahassee, Florida 32304

DEP File No. 0730003-005-AC  
Leon County

Enclosed is Final Permit Number 0730003-005-AC. This permit authorizes the City of Tallahassee to install two, General Electric LM6000 Turbine-Generator sets firing oil or natural gas, at the Arvah B. Hopkins Generating Station. This permit is issued pursuant to Chapter 403, Florida Statutes.

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 thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.



Trina Vielhauer, Chief  
Bureau of Air Regulation

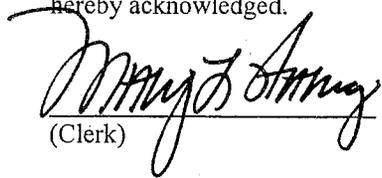
**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 10/26/04 to the person(s) listed:

Robert E. McGarrah, City of Tallahassee \*  
Jennette Curtis, C.P.M., City of Tallahassee  
Gregg Worley, EPA  
John Bunyak, NPS  
✓ Sandra Veazey, NWD  
Gerry Neubauer, NWD  
Ken Kosky, Golder  
Hamilton S. Oven, DEP-Siting

Clerk Stamp

**FILING AND ACKNOWLEDGMENT FILED**, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

  
(Clerk)

10/26/04  
(Date)



# Department of Environmental Protection

Jeb Bush  
Governor

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Colleen M. Castille  
Secretary

## PERMITTEE:

City of Tallahassee.  
Arvah B. Hopkins Generating Station  
1125 Geddie Road  
Tallahassee, FL 32310

### *Authorized Representative:*

Mr. Robert E. McGarrah  
Production Superintendent

ARMS Permit No.	0730003-005-AC
PSD Permit No.	PSD-FL-343
Facility ID No.	0730003
SIC No.	4911
Expires:	July 31, 2007
	[PA 74-03]

## PROJECT AND LOCATION

This permit is issued pursuant to the requirements for the Prevention of Significant Deterioration of Air Quality (PSD Permit). The proposed project authorizes the installation of two simple cycle, inlet-chilled combustion turbines, complete with electrical generator sets. The gas turbines are capable of producing a nominal 100 MW of electricity. This project additionally authorizes the installation of a 750 KW (or smaller) emergency generator set to be fired on distillate oil.

The project will be located at the Arvah B. Hopkins Generating Station, located approximately 7 miles west of downtown Tallahassee and about 24 miles north of the Bradwell Bay NWA and about 17.5 miles north of the St. Marks NWA, PSD Class I Areas. UTM coordinates for this facility are Zone 16; 749.53 km E; 3371.7 km N.

## STATEMENT OF BASIS

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.) and 40 CFR 52.21. The permittee is authorized to install the proposed equipment in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department.

## APPENDICES

The following Appendices are attached as part of this permit.

- Appendix BD - Technical Evaluation and BACT Determination
- Appendix GC - Construction Permit General Conditions

Michael G. Cooke, Director  
Division of Air Resource Management

Date:

## SECTION I. FACILITY INFORMATION

### FACILITY DESCRIPTION

Completion of this project will result in the installation of two new electric power generators capable of providing a nominal 100 MW of electrical power.

### NEW EMISSIONS UNITS

The proposed project will result in the following new emissions units.

Emissions Unit No.	Emissions Unit Description
031 - 032	General Electric LM 6000 Sprint Combustion Turbines capable of inlet chilling to 48°F
033	750KW Emergency Diesel Generator

### REGULATORY CLASSIFICATION

HAPs: This facility is a major source of hazardous air pollutants (Title III).

Acid Rain: This facility is subject to the acid rain provisions of the Clean Air Act (Title IV).

Title V Major Source: This facility is a Title V major source of air pollution.

PSD Major Source: Each pollutant with potential emissions greater than the Significant Emissions Rates specified in Table 62-212.400-2, F.A.C. requires a PSD review and Best Available Control Technology (BACT) determination. For this project, emissions of NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub>/SAM are significant and subject to the BACT standards specified in this permit. The emission of CO has been reduced below the PSD significance level (100 TPY) via the application of an oxidation catalyst and is therefore not subject to BACT.

NSPS Sources: The combustion turbines specified in this permit are also subject to regulation under the New Source Performance Standards for Stationary Gas Turbines, 40 CFR 60, Subpart GG.

NESHAP: The combustion turbines may also be subject to 40 CFR 63, Subpart YYYYY, compliance with which has currently been stayed.

### RELEVANT DOCUMENTS

- Permit application received on 08/13/04
- Intent to Issue Permit package mailed on 09/09/04
- Public Notice published in Tallahassee Democrat on 09/19/04
- Proof of publication received 09/24/04

## GENERAL AND ADMINISTRATIVE REQUIREMENTS

1. Permitting Authority: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (DEP), at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400 and phone number 850/488-0114.
2. Compliance Authority: All documents related compliance activities such as reports, tests, and notifications should be submitted to the Air Resources Section of the Northwest District Office, Florida Department of Environmental Protection, 160 Governmental Center, Pensacola, Florida 32502-5794. The phone number is 850/595-8300 and the fax number is 850/595-4417.
3. Terminology: The terms used in this permit have specific meanings as defined in the applicable chapters of the Florida Administrative Code.
4. General Conditions: The owner and operator are subject to, and shall operate under the attached General Conditions listed in *Appendix GC* of this permit. General Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]
5. Applicable Regulations, Forms and Application Procedures: Unless otherwise indicated 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 of the Florida Statutes (F.S.); Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.); and the Title 40, Parts 60, 72, 73, and 75 of the Code of Federal Regulations (CFR), adopted by reference in Rule 62-204.800, F.A.C. The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. Issuance of this permit does not relieve the facility permittee from compliance with any applicable federal, state, or local permitting or regulations. [Rules 62-204.800, 62-210.300 and 62-210.900, F.A.C.]
6. PSD Expiration: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified.
7. Permit Expiration: For good cause, the permittee may request that this PSD air construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation at least sixty (60) days prior to the expiration of this permit. [Rules 62-4.070(4), 62-4.080, and 62-210.300(1), F.A.C.]
8. BACT Determination: In conjunction with extension of the 18 month period to commence or continue construction, phasing of the project, or an extension of the permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of Best Available Control Technology (BACT) for the source. [Rule 62-212.400(6)(b), F.A.C.]
9. 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.]
10. Modifications: No emissions unit or facility subject to this permit shall be constructed or 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.]
11. Application for Title IV Permit: At least 24 months before the date on which the new unit begins serving an electrical generator greater than 25 MW, the permittee shall submit an application for a Title IV Acid Rain Permit to the Region 4 Office of the U.S. Environmental Protection Agency in Atlanta, Georgia and a copy to the Department's Bureau of Air Regulation in Tallahassee. [40 CFR 72]

12. Title V Permit: This permit authorizes construction of the permitted emissions unit and initial operation to determine compliance with Department rules. A Title V operation permit is required for regular operation of the permitted emission units. The permittee shall apply for and obtain a Title V operation permit in accordance with Rule 62-213.420, F.A.C. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the Department's Bureau of Air Regulation and a copy to the Compliance Authority. [Rules 62-4.030, 62-4.050, 62-4.220, and Chapter 62-213, F.A.C.]

13. Exemption for Emergency Generators: One or more emergency generators located within a single facility {are exempt from permitting} provided:
- a. None of the emergency generators is subject to the Federal Acid Rain Program; and
  - b. Total fuel consumption by all such emergency generators within the facility is limited to 32,000 gallons per year of diesel fuel, 4,000 gallons per year of gasoline, 4.4 million standard cubic feet per year of natural gas or propane, or an equivalent prorated amount if multiple fuels are used.

Additionally, an emissions unit or pollutant-emitting activity that is not entitled to a categorical exemption pursuant to paragraph 62-210.300(3)(a), F.A.C., shall be exempt from the permitting requirements of this chapter, Chapters 62-212 and 62-4, F.A.C., if it meets all of the following criteria:

- a. It would be subject to no unit-specific applicable requirement.
- b. It would neither emit nor have the potential to emit:
  - (i) 500 pounds per year or more of lead and lead compounds expressed as lead;
  - (ii) 1,000 pounds per year or more of any hazardous air pollutant;
  - (iii) 2,500 pounds per year or more of total hazardous air pollutants; or
  - (iv) 5.0 tons per year or more of any other regulated pollutant.
- c. Its emissions, in combination with the emissions of other units and activities at the facility, would not cause the facility to emit or have the potential to emit any pollutant in such amount as to make the facility a Title V source.
- d. In the case of a proposed new emissions unit at an existing facility, the emissions of such unit, in combination with the emissions of any other proposed new or modified units and activities at the facility, would not result in a modification subject to the preconstruction review requirements of subparagraph 62-204.800(10)(d)2., Rule 62-212.400 or 62-212.500, F.A.C.
- e. In the case of a proposed new pollutant-emitting activity, such activity would not constitute a modification of any existing non-exempt emissions unit at a non-Title V source or any existing non-insignificant emissions unit at a Title V source.

[Rule 62-210.300(3)(a)20 and Rule 62-210.300(3)(b)1, F.A.C.]

**SECTION EMISSIONS UNIT SPECIFIC CONDITIONS**

This section of the permit addresses the following new emissions units.

E.U. ID No.	COMMON EMISSION UNIT DESCRIPTION
031 - 032	General Electric LM 6000 Sprint Combustion Turbines capable of inlet chilling to 48°F

**APPLICABLE STANDARDS AND REGULATIONS**

1. **BACT Determinations:** The emission unit addressed in this section is subject to a Best Available Control Technology (BACT) determination for nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (SAM) and particulate matter (PM<sub>10</sub>). [Rule 62-212.400, F.A.C.]
2. **NSPS Requirements:** The combustion turbine shall comply with all applicable requirements of 40 CFR 60, adopted by reference in Rule 62-204.800(7)(b), F.A.C.
  - (a) **Subpart A, General Provisions, including:**
    - 40 CFR 60.7, Notification and Record Keeping
    - 40 CFR 60.8, Performance Tests
    - 40 CFR 60.11, Compliance with Standards and Maintenance Requirements
    - 40 CFR 60.12, Circumvention
    - 40 CFR 60.13, Monitoring Requirements
    - 40 CFR 60.19, General Notification and Reporting Requirements
  - (b) **Subpart GG, Standards of Performance for Stationary Gas Turbines:** These provisions include a requirement to correct test data to ISO conditions; however, such correction is not used for compliance determinations with the BACT standards.

**PERFORMANCE RESTRICTIONS**

3. **Combustion Turbines:** The permittee is authorized to install, tune, operate and maintain two new inlet chilled combustion turbines with electrical generator sets (General Electric Model LM6000PC SPRINT). Each unit is designed to produce approximately 50 MW of electrical power. [Applicant Request]
4. **Permitted Capacity:** The heat input to each combustion turbine from firing natural gas shall not exceed 445 MMBtu per hour based on the following: 100% base load, a lower heating value (LHV) for natural gas and a compressor inlet air temperature of 29° F. The heat input to each combustion turbine from firing No. 2 fuel oil shall not exceed 434 MMBtu per hour based on the following: 100% base load, LHV and a compressor inlet air temperature of 29° F. The permittee shall provide manufacturer's performance curves (or equations) that correct for site conditions to the Permitting and Compliance Authorities within 45 days of completing the initial compliance testing. Heat input rates will vary depending upon compressor conditions and the combustion turbine characteristics. Operating data may be adjusted for the appropriate site conditions in accordance with the performance curves on file with the Department. [Design, Rule 62-210.200, F.A.C. (Definition - PTE)]
5. **Simple Cycle, Intermittent Operation:** Each combustion turbine shall operate only in simple cycle mode not to exceed the permitted hours of operation allowed by this permit. This restriction is based on the permittee's request, which formed the basis of the PSD applicability and BACT determination and resulted in the emission standards specified in this permit. For any request to convert this unit to combined cycle operation by installing/connecting to heat recovery steam generators or increasing the allowable hours of operation, including changes to the fuel quality or quantity which may cause an increase in short or long-term emissions, the permittee may be required submit a full PSD permit application complete with a new proposal of the best available control technology as if the unit had never been built. [Rules 62-212.400(2)(g) and 62-212.400(6)(b), F.A.C.]
6. **Allowable Fuels:** Each combustion turbine shall only be fired with natural gas containing no more than 2 grains of sulfur per 100 dry standard cubic feet of gas (monthly average) and 0.05% sulfur distillate oil (or superior). The permittee shall demonstrate compliance with the fuel sulfur limit by keeping the records specified in this permit. [Applicant Request, Rule 62-210.200, F.A.C. (Definition - PTE)]

**SECTIC II. EMISSIONS UNIT SPECIFIC CONDITIONS**

7. Hours of Operation: Each combustion turbine shall operate no more than 5840 hours during any consecutive 12-month period, 4000 of which may be on distillate fuel oil. The permittee shall install, calibrate, operate and maintain a monitoring system to measure and accumulate the hours of operation. [Rule 62-212.400, F.A.C. (BACT); Rule 62-210.200, F.A.C. (PTE)]
8. Operating Procedures: The Best Available Control Technology (BACT) determinations established by this permit rely on "good operating practices" to minimize emissions. Therefore, all operators and supervisors shall be properly trained to operate and maintain the combustion turbine and pollution control systems in accordance with the guidelines and procedures established by the manufacturer. The training shall include good operating practices as well as methods of minimizing excess emissions. [Applicant Request; Rule 62-4.070(3); Rule 62-212.400, F.A.C. (BACT)]
9. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the permittee shall notify the Compliance Authority as soon as possible, but at least within one working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; steps being taken to correct the problem and prevent future recurrence; and, where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit or the regulations. [Rule 62-4.130, F.A.C.]

**EMISSIONS CONTROLS**

10. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering, confining, or applying water or chemicals to the affected areas, as necessary. [Rule 62-296.320(4)(c), F.A.C.]
11. Water Injection Technology: The permittee shall install, calibrate, tune, operate, and maintain a water injection system for the unit. The system shall be designed and operated so as to ensure that NO<sub>x</sub> emissions prior to the SCR are sufficient to achieve the NO<sub>x</sub> emission limits in Condition III. 12 [Applicant request; Rule 62-4.070(3); Rule 62-212.400, F.A.C. (BACT)]
12. SCR/Oxidation Catalyst: To control NO<sub>x</sub> and CO emissions, the combustion turbine shall include an SCR system and an oxidation catalyst. The catalyst systems shall be designed in order to achieve the following emissions, regardless of fuel being combusted: 5 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub> and 6 ppmvd CO @ 15% O<sub>2</sub>. [Design and Rule 62-212.400, F.A.C.]
13. Circumvention: The permittee shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rule 62-210.650, F.A.C.]

**EMISSIONS STANDARDS**

14. Summary: The following table summarizes the emissions standards for each pollutant and total emissions in lb/hr and TPY for informational and convenience purposes (PTE) only. This table does not supersede any of the terms or conditions of this permit.

Pollutant	Emission Standard	CT Emissions (lb/hr)		One CT (lb/year)	TPY for 2 CT's
		OIL	GAS		
NO <sub>x</sub>	5 ppmvd @ 15% O <sub>2</sub>	8.67	8.62	50,541	50.5
CO	6 ppmvd @ 15% O <sub>2</sub>	6.35	6.27	36,937	36.9
SO <sub>2</sub>	NG & 0.05% S oil	10.31	1.13	43,319	43.4
PM <sub>10</sub>	VE	14.94	2.45	64,268	64.2
PM	VE	14.94	2.45	64,268	64.2
VOC	3 ppmvd @ 15% O <sub>2</sub>	2.66	1.79	13,934	13.9
SAM	NG & 0.05% S oil	9.66	1.15	40,756	40.8

Note: Annual emissions, for the purposes of this table only, are based on 4000 hours of oil operation and 1840 hours of natural gas operation.

15. Carbon Monoxide (CO):

CO emissions from the combustion turbine shall not exceed 6.0 ppmvd corrected to 15% oxygen for each fuel. The permittee shall demonstrate compliance with this standard by conducting performance tests and emissions monitoring in accordance with EPA Method 10 and the requirements of this permit. [Rule 62-212.400, F.A.C. (PSD Avoidance)]

16. Nitrogen Oxides (NO<sub>x</sub>):

NO<sub>x</sub> emissions from the combustion turbine shall not exceed 5.0 ppmvd corrected to 15% oxygen for each fuel. The permittee shall demonstrate compliance with this standard by conducting performance tests and emissions monitoring in accordance with 40 CFR Part 60 Subpart GG and based on a 24-hour block average for data collected from the continuous emissions monitor. The ammonia slip rate shall be limited to 10 ppmvd @ 15% O<sub>2</sub>. [Rule 62-212.400, F.A.C. (BACT)]

17. Particulate Matter (PM/PM<sub>10</sub>), Sulfuric Acid Mist (SAM) and Sulfur Dioxides (SO<sub>2</sub>)

(a) Fuel Specifications. Emissions of PM, PM<sub>10</sub>, SAM, and SO<sub>2</sub> shall be limited by the use of pipeline-quality natural gas containing no more than 2 grain per standard cubic feet, the use of 0.05% Sulfur oil and good combustion techniques as specified in this permit. The permittee shall demonstrate compliance with the fuel sulfur limit by maintaining the records specified by this permit. [Rule 62-212.400, F.A.C. (PSD Applicability)].

(b) VE Standard. Visible emissions from the combustion turbine shall not exceed 10% opacity, based on a 6-minute average. This work practice standard is established as a means of ensuring the non-applicability of BACT. The permittee shall demonstrate compliance with this standard by conducting tests in accordance with EPA Method 9 and the performance testing requirements of this permit. [Rule 62-212.400, F.A.C. (PSD Applicability)]

18. Volatile Organic Compounds (VOC):

VOC emissions from the combustion turbine shall not exceed 3.0 ppmvd corrected to 15% oxygen for each fuel. The VOC emissions shall be measured and reported in terms of methane. The permittee shall demonstrate compliance with these standards by conducting initial tests in accordance with EPA Methods 25 and/or 25A and the performance testing requirements of this permit. Optional testing in accordance with EPA Method 18 may be conducted to account for the actual methane fraction of the measured VOC emissions. [Application, Design, Rule 62-4.070(3), F.A.C.]

**EXCESS EMISSIONS**

19. Excess Emissions Prohibited: Excess emissions caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction, shall be prohibited. These emissions shall be included in the calculation of the 24-hour averages to demonstrate compliance with the continuous NO<sub>x</sub> emissions standard. [Rule 62-210.700(4), F.A.C.]

20. Excess Emissions Allowed: Providing the permittee adheres to best operational practices to minimize the amount and duration of excess emissions, the following conditions shall apply:

(a) During startup and shutdown, visible emissions excluding water vapor shall not exceed 20% opacity for more than 2 hours in any 24-hour period. [Design; Rule 62-210.700(1) and (5), F.A.C.]

(b) During all startups, shutdowns, and malfunctions, the continuous emissions monitor (CEM) shall monitor and record emissions. However, up to 2 hours of monitoring data during any 24-hour period may be excluded from continuous compliance demonstrations as a result of startups, shutdowns, and documented malfunctions. A documented malfunction means a malfunction that is documented within one working day of detection by contacting the Compliance Authority by telephone, facsimile, or electronic mail. In case of malfunctions, the permittee shall notify the Compliance Authorities within one working day. A full written

report on the malfunctions shall be submitted in a quarterly report, if requested by the Department. [Design; Rules 62-210.700(1), (5), and 62-4.130, F.A.C.]

**EMISSIONS PERFORMANCE TESTING**

21. **Sampling Facilities:** The permittee shall design the combustion turbine stack to accommodate adequate testing and sampling locations in order to determine compliance with the applicable emission limits specified by this permit. Permanent stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C. [Rules 62-4.070 and 62-204.800, F.A.C., and 40 CFR 60.40a(b)]
22. **Performance Test Methods:** Compliance tests shall be performed in accordance with the following reference methods as described in 40 CFR 60, Appendix A, and adopted by reference in Chapter 62-204.800, F.A.C.
  - (a) EPA Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources;
  - (b) EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources;
  - (c) EPA Method 7e - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure); or EPA Method 20 - Determination of Oxides of Nitrogen Oxide, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines; or ASTM D6522-00 Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers and Process Heaters Using Portable Analyzers, as specified in 40 CFR 60.335;
  - (d) EPA Method 25 or 25A - Determination of Volatile Organic Concentrations. (EPA Method 18 may be conducted to account for the non-regulated methane portion of the VOC emissions); and
  - (e) Conditional Test Method 027 – Measurement of Ammonia Slip

No other test methods may be used for compliance testing unless prior DEP approval is received, in writing, from the DEP Emissions Monitoring Section Administrator in accordance with an alternate sampling procedure specified in Rule 62-297.620, F.A.C.

23. **Test Notification:** The permittee shall notify the Compliance Authority in writing at least 30 days prior to initial NSPS performance tests and at least 15 days prior to any other required tests. [40 CFR 60.7, 40 CFR 60.8 and Rule 62-297.310(7)(a)9., F.A.C.]
24. **Initial Tests Required:** Initial performance tests to demonstrate compliance with the emission standards specified in this permit shall be conducted within 60 days after achieving at least 90% of permitted capacity, but not later than 180 days after initial operation of the emissions unit. Initial performance tests shall be conducted for CO, NO<sub>x</sub>, VOC, ammonia slip and visible emissions while combusting each fuel. Initial NO<sub>x</sub> performance tests shall be conducted in accordance with the requirements of NSPS Subpart GG and shall also be converted into units of the NSPS emissions standard. [Rule 62-297.310(7)(a)1., F.A.C.]
25. **Annual Performance Tests:** To demonstrate compliance with the emission standards specified in this permit, the permittee shall conduct annual performance tests for NO<sub>x</sub>, CO, and visible emissions from the combustion turbine for each fuel. Testing for ammonia slip is required during the first scheduled annual performance tests after the cumulative hours of operation on each combustion turbine exceed 1,500 hours of oil firing or 5,000 hours of gas firing starting from the initial installation of the SCR catalysts. Thereafter, ammonia testing is required during the first scheduled annual performance tests after subsequent cumulative 1,500 hours of oil firing and 5,000 hours of gas firing in each combustion turbine or after regeneration, replacement or addition to the SCR catalyst system. If conducted at permitted capacity, NO<sub>x</sub> emissions data collected during the annual NO<sub>x</sub> continuous monitor RATA required pursuant to 40 CFR 75 may be substituted for the required annual performance test. Tests required on an annual basis shall be conducted at least once during each federal fiscal year (October 1<sup>st</sup> to September 30<sup>th</sup>). In the event that the operation of the CT is less than 400 hours per year on natural gas or distillate oil, annual testing is not required for that year and that fuel. [Rule 62-297.310(7)(a), F.A.C.]

26. Tests Prior to Permit Renewal: Prior to renewing the air operation permit, the permittee shall conduct performance tests for CO, NO<sub>x</sub>, and visible emissions from the combustion turbine. VOC emission tests are not required prior to permit renewal provided the CO emission standards are met. Testing for ammonia slip meeting the requirements of Condition 25, Annual Performance Tests will meet the requirements of this condition. These tests shall be conducted within the 12-month period prior to renewing the air operation permit. For pollutants required to be tested annually, the permittee may submit the most recent annual compliance test to satisfy the requirements of this provision. [Rule 62-297.310(7)(a)3., F.A.C.]
27. Tests After Major Repairs or Replacements: The Department may require that additional compliance testing be conducted within 90 days after major repairs or replacements are performed. [Rule 62-297.310(7)(a)4., F.A.C.]
28. Combustion Turbine Testing Capacity: Initial performance tests shall be conducted in accordance with 40 CFR 60.8 and 40 CFR 60.335 for pollutants subject to a New Source Performance Standard (NSPS) in Subpart GG for stationary gas turbines. Other required performance tests for compliance with standards specified in this permit shall be conducted with the combustion turbine operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input vs. ambient temperature). If it is impracticable to test at permitted capacity, the source may be tested at less than permitted capacity. However, subsequent operation is limited by adjusting the entire heat input vs. ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for inlet temperature) and 110 percent of the value reached during the test until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity. Emissions performance tests shall meet all applicable requirements of Chapters 62-204 and 62-297, F.A.C. [Rule 62-297.310(2), F.A.C.]
29. Calculation of Emission Rate: For each emissions performance test, the indicated emission rate or concentration shall be the arithmetic average of the emission rate or concentration determined by each of the three separate test runs unless otherwise specified in a particular test method or applicable rule. [Rule 62-297.310(3), F.A.C.]
30. Applicable Test Procedures
- (a) Required Sampling Time.
    - 1. Unless otherwise specified in the applicable rule, the required sampling time for each test run shall be no less than one hour and no greater than four hours, and the sampling time at each sampling point shall be of equal intervals of at least two minutes. [Rule 62-297.310(4)(a)1., F.A.C.]
    - 2. The minimum observation period for a visible emissions compliance test shall be sixty (60) minutes. The observation period shall include the period during which the highest opacity can reasonably be expected to occur. [Rule 62-297.310(4)(a)2., F.A.C.]
  - (b) Minimum Sample Volume. Unless otherwise specified in the applicable rule or test method, the minimum sample volume per run shall be 25 dry standard cubic feet. [Rule 62-297.310(4)(b), F.A.C.]
  - (c) Calibration of Sampling Equipment. Calibration of the sampling train equipment shall be conducted in accordance with the schedule shown in Table 297.310-1, F.A.C. [Rule 62-297.310(4)(d), F.A.C.]
31. Determination of Process Variables
- (a) Required Equipment. The owner or operator of an emissions unit for which compliance tests are required shall install, operate, and maintain equipment or instruments necessary to determine process variables, such as process weight input or heat input, when such data are needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards. [Rule 62-297.310(5)(a), F.A.C.]
  - (b) Accuracy of Equipment. Equipment or instruments used to directly or indirectly determine process variables, including devices such as belt scales, weight hoppers, flow meters, and tank scales, shall be calibrated and

adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value. [Rule 62-297.310(5)(b), F.A.C.]

32. Special Compliance Tests: When the Department, after investigation, has good reason (such as complaints, increased visible emissions or questionable maintenance of control equipment) to believe that any applicable emission standard contained in a Department rule or in a permit issued pursuant to those rules is being violated, it shall require the owner or operator of the emissions unit to conduct compliance tests which identify the nature and quantity of pollutant emissions from the emissions unit and to provide a report on the results of said tests to the Department. [Rule 62-297.310(7)(b), F.A.C.]

**CONTINUOUS MONITORING REQUIREMENTS**

33. NO<sub>x</sub> CEMS: The permittee shall install, calibrate, operate, and maintain a CEMS to measure and record NO<sub>x</sub> and oxygen concentrations in the combustion turbine exhaust stack. A monitor for carbon dioxide may be used in place of the oxygen monitor, but the system shall be capable of correcting the emissions to 15% oxygen. The NO<sub>x</sub> monitoring devices shall comply with the requirements of 40 CFR 60.334(b) for 40 CFR Part 75 monitoring systems. A monitoring plan shall be provided to the Department's Emissions Monitoring Section Administrator, EPA Region 4, and the Compliance Authority for review no later than 45 days prior to the first scheduled certification test pursuant to 40 CFR 75.62. The plan shall consist of data on CEM equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location. [Rule 62-212.400, F.A.C. (BACT) and 40 CFR 75]

34. NO<sub>x</sub> CEMS Data Requirements:

- (a) Installation. The CEMS shall be installed, calibrated, and properly functioning prior to the initial performance tests. Each device shall comply with the applicable monitoring system requirements of 40 CFR 60.7(a)(5), 40 CFR 60.13, and 40 CFR 60.334(b).
- (b) Data Collection. Emissions shall be monitored and recorded at all times including startup, operation, shutdown, and malfunction except for continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments. Each valid 1-hour average shall be calculated using at least two valid data points at least 15 minutes apart.
- (c) Data Reporting: Data collected by the CEMS shall be used to demonstrate compliance with the emissions standards specified for each 24-hour block average. Emissions shall be reported in units of ppmvd corrected to 15% oxygen for each hour of operation. The compliance averages shall be determined by calculating the arithmetic average of a 24-hour block of valid hourly emission rates. When a monitoring system reports emissions in excess of the standards allowed by this permit, the permittee shall notify the Compliance Authority within one (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. The Department may request a written report summarizing the excess emissions incident. The permittee shall also report excess emissions in a quarterly report as required in specific condition 42 of this permit.
- (d) Data Exclusion. Unless prohibited by 62-210.700 F.A.C., valid hourly emission rates shall not include periods of start up, shutdown, or documented malfunction as described under the excess emissions requirements of this permit.

[Rules 62-4.130, 62-4.160(8), 62-204.800, 62-210.700, 62-297.520, F.A.C and 40 CFR 60.7].

**COMPLIANCE DEMONSTRATIONS**

35. Records Retention: All measurements, records, and other data required by this permit shall be documented in a permanent, legible format and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. Records shall be made available to the Department upon request. [Rules 62-4.160(14) and 62-213.440(1)(b)2., F.A.C.]

36. Fuel Records: The permittee shall demonstrate compliance with the fuel sulfur limits for natural gas and fuel oil specified in this permit by maintaining records required by 40 CFR 60.334 and 60.335. [Rules 62-4.070(3) and 62-4.160(15), F.A.C.]
37. Monthly Operations Summary: By the fifth calendar day of each month, the permittee shall record the hours of operation and amount of each fuel fired for the combustion turbine. The information shall be recorded in a written or electronic log and shall summarize the previous month of operation and the previous 12 months of operation. All hours of operation shall be included in the demonstration of compliance with the 12-month fuel usage limitations. Information recorded and stored as an electronic file shall be available for inspection and/or printing within at least one day of a request from the Compliance Authority. [Rule 62-4.160(15), F.A.C.]

#### REPORTS

38. Emissions Performance Test Reports: A report indicating the results of any required emissions performance test shall be submitted to the Compliance Authority no later than 45 days after completion of the last test run. The test report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8)(c), F.A.C. [Rule 62-297.310(8), F.A.C.].
39. Excess Emissions Reporting and Semi-annual Reports: If excess NO<sub>x</sub> or visible emissions occur due to malfunction, the permittee shall notify the Compliance Authority within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Following the NSPS format in 40 CFR 60.7(c), Subpart A, periods of startup, shutdown and malfunction, shall be monitored, recorded and reported as excess emissions when emission levels exceed the standards specified in this permit. Within thirty (30) days following each calendar semi-annual period, the permittee shall submit a report on any periods of excess emissions that occurred during the previous semi-annual to the Compliance Authority. [Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C., and 40 CFR 60.7]
40. Annual Operating Report: The permittee shall submit an annual report that summarizes the actual operating rates and emissions from this facility. Annual operating reports shall be submitted to the Compliance Authority by March 1st of each year. [Rule 62-210.370(2), F.A.C.]

**TECHNICAL EVALUATION AND  
FINAL BACT DETERMINATION**

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**TECHNICAL EVALUATION  
AND  
FINAL BACT DETERMINATION**

City of Tallahassee Arvah B. Hopkins Station

Combustion Turbine Addition

Leon County

0730003-005-AC



Department of Environmental Protection  
Division of Air Resources Management  
Bureau of Air Regulation  
North Permitting Section

October 20, 2004

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

## 1. GENERAL INFORMATION

### 1.1 APPLICANT NAME AND ADDRESS

City Of Tallahassee  
Arvah B. Hopkins Generating Station  
1125 Geddie Road  
Tallahassee, Florida 32310

Authorized Representative: Robert E. McGarrah, Manager – Power Production, City of Tallahassee

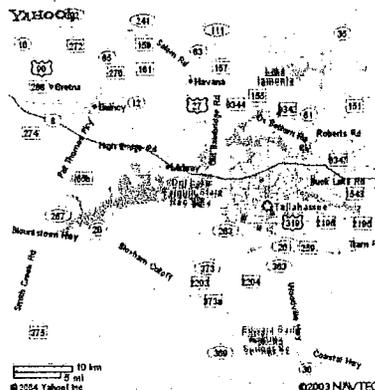
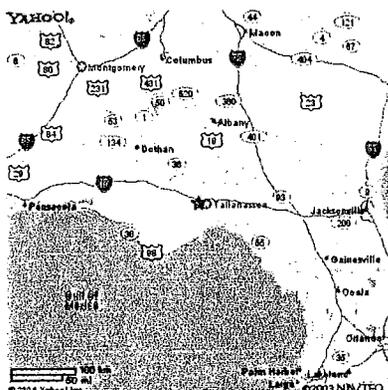
### 1.2 REVIEWING AND PROCESS SCHEDULE

August 13, 2004                      Received permit application  
August 13, 2004                      Application complete

## 2. FACILITY INFORMATION

### 2.1 FACILITY LOCATION

The City of Tallahassee Arvah B. Hopkins Station is located approximately 7 miles west of downtown Tallahassee and 25 miles north of the St. Marks NWR, a Class I Area. UTM coordinates for this facility are Zone 16; 749.53 km E; 3371.7 km N.



### 2.2 STANDARD INDUSTRIAL CLASSIFICATION CODES (SIC)

Industry Group No.	49	Electric, Gas and Sanitary Services
Industry No.	4911	Electric Services

### 2.3 FACILITY CATEGORY

This facility consists of two fossil fuel-fired steam generators and two fossil fuel-fired combustion turbines. The two steam generators are Phase II Acid Rain Units. Boiler Number 2 is regulated under the Florida Electrical Power Plant Siting Act. The total (nominal) combined electrical generating capacity from the facility is 356.27 megawatts electric (MW), of which, 313 MW are provided by the steam generators and 43.27 MW are provided by the combustion turbines. The fuels used at this facility are natural gas, fuel oil and on-specification used oil.

Based on the Title V permit renewal application, this facility is a major source of hazardous air pollutants (HAPs). This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM<sub>10</sub>), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY). This facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

212.400, Prevention of Significant Deterioration (PSD). This facility is located in an area designated, in accordance with Rule 62-204.340, F.A.C., as attainment for all pollutants.

### 3. PROJECT DESCRIPTION

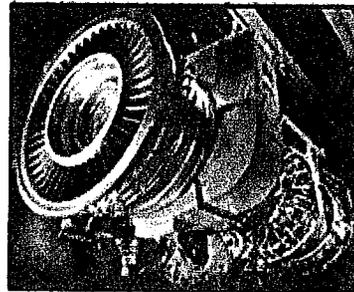
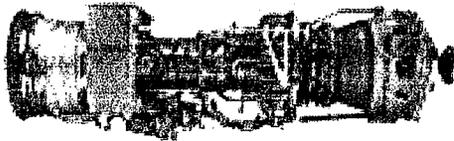
This project will add two nominal 50 megawatt GE LM6000 CT's and one 750 KW emergency (diesel) generator.

Emissions Unit No.	Emissions Unit Description
031 - 032	General Electric LM 6000PC Sprint Combustion Turbines
033	750KW Emergency Diesel Generator

The applicant proposes that these generators will be operated in simple cycle mode (only) with the hours of operation limited to 5840 per CT per year. Of the 5840 hours per year, the applicant proposes to fire 0.05% sulfur oil for up to 4000 hours per year and pipeline natural gas for the remaining 1840 hours per year. A review and P.T.E. analysis follow.

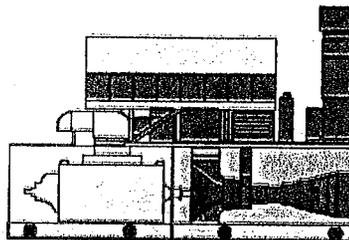
### 4. PROJECT DETAILS

Two GE LM6000 Sprint Combustion Turbines will be installed at the Hopkins plant. Each unit is expected to have an approximate maximum heat input of 445 MMBtu/hr based upon LHV natural gas. The below images represent the approximate appearance of such units, and the table indicates GE advertised specifications.



#### SPRINT 60-Hz Generator Sets

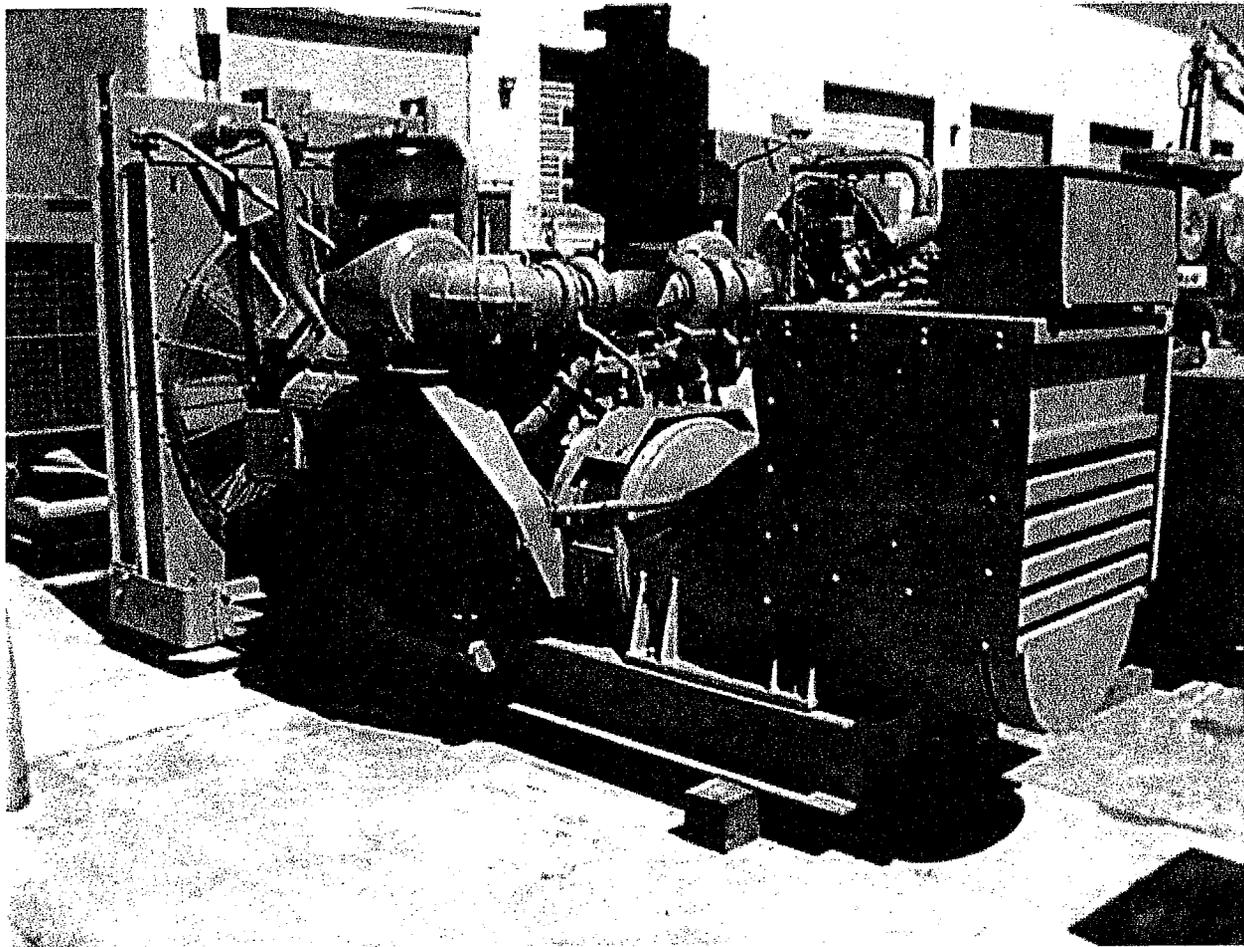
Base Plate Length	58' 6"	(17.22 m)
Base Plate Width	13' 6"	(4.11 m)
Enclosure Height	14' 6"	(4.42 m)
Overall Length	56' 9"	(17.30 m)
Overall Width*	49' 9"	(15.16 m)
Overall Height*	36' 2"	(11.02 m)
Base Plate Foundation Load*	476,000 lb	(214,200 kg)



	Power kW	Heat Rate Btu/kWh LHV	Heat Rate kJ/MWh LHV	No. Shafts	Pressure Ratio	Shaft Speed rpm	Exhaust Flow		Exhaust Temp.	
							lb/s	kg/s	°F	°C
LM6000PC SPRINT*	50080	8434	8916	2	30.9	3600	295	134	826	441
LM6000PC	43417	8112	8549	2	29.1	3600	281	127	831	444
LM6000PD SPRINT	46824	8235	8688	2	30.7	3600	290	131	837	447
LM6000PD	42336	8308	8765	2	29.3	3600	278	126	846	452
LM6000PD (liquid fuel)	40212	8415	8878	2	28.1	3600	268	122	857	458
LM2500PK	30676	8834	9300	2	23.6	3600	192	87.1	958	514
LM2500PV	30463	8854	9069	2	22.6	6100	186	84.3	931	499
LM2500PH**	27763	8391	8775	2	20.2	3600	167	75.9	926	497
LM2500PE	22719	9311	9789	2	19.1	3600	153	69.4	992	533

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

The emergency diesel generator will likely appear as follows (Caterpillar 3412TA):



## 4.1 MAXIMUM POTENTIAL TO EMIT

The following table summarizes the maximum potential to emit (PTE) for the subject project without controls:

Pollutant	PSD Threshold (TPY)	CT Emission Rate (lb/hr)		Annual CT Emissions (lb/year)	Tons per year for 2 CT's	Emergency Generator TPY	TPY Total	PSD Applies?
		OIL	GAS					
NO <sub>x</sub>	40	72.9	43.1	370,904	370.8	1.62	372.4	Yes
CO	100	15.8	43.2	142,688	142.7	0.62	143.3	Yes
SO <sub>2</sub>	40	10.31	1.13	43,319	43.4	0.04	43.4	Yes
PM <sub>10</sub>	15	14.94	2.45	64,268	64.2	0.04	64.2	Yes
VOC	40	4.43	1.78	20,995	21	0.24	21.2	No
SAM	7	9.66	1.15	40,756	40.8	Neg.	40.8	Yes

Note: Assumed 4000 hours of oil operation and 1840 hours of natural gas operation.

In summary, a PSD Review and BACT Determination are required for NO<sub>x</sub>, CO, SO<sub>2</sub>, SAM and PM<sub>10</sub>. Additionally, the LM6000's are subject to the NESHAP (which is currently "stayed") for which a MACT based standard of 91 ppb exists. The applicant suggests that the AP-42 formaldehyde emission factor (3,100 lb/10<sup>12</sup> Btu for all loads) is inappropriate and recommends a value which is approximately 10% of that value. Given the

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

conservative nature of a PSD and MACT analysis, the Department finds inadequate reason to reject the higher (3,100 lb/10<sup>12</sup>) emission factor and has applied it within its analysis, resulting in an uncontrolled formaldehyde emission rate of approximately 1.38 lb/hr.

## 4.2 APPLICANT'S PROPOSAL

**NO<sub>x</sub>:** The applicant provided a vendor estimate of a packaged SCR/Oxidation Catalyst system (including Direct Installation Cost, or DAC) of \$2.48M. Based upon information from the supplier, the City has indicated that 60% of this cost is required for the SCR system and the remaining 40% for the OC system. Accordingly, total capital costs are calculated at \$1.49M for the installation of a high temperature SCR. Although the Department does not completely accept the analysis of cost effectiveness the applicant has estimated it at \$6700 per ton of NO<sub>x</sub> removed (based upon 4000 hours of annual oil operation) which is acceptable.

**CO:** The applicant indicated that since the NESHAP applies to this application, an oxidation catalyst is proposed. As a result, the applicant did not calculate cost-effectiveness for purposes of BACT. However, the capital costs including direct installation are 40% of the SCR/OC system or \$990k, and the CO removed will be 26 TPY per CT.

**PM<sub>10</sub>:** The applicant stated that a "review of EPA's BACT/LAER Clearinghouse Documents did not reveal any post-combustion particulate control technologies being used on gas-fired or light-oil fired CTs."

**SO<sub>2</sub>/SAM:** The applicant indicates that fuel quality is the only technically feasible method of controlling SO<sub>2</sub> and SAM emissions. As a result, the applicant contends that pipeline natural gas and 0.05% sulfur distillate represent BACT.

## 4.3 SUMMARY OF APPLICANT'S PROPOSAL AFTER CONTROLS

Pollutant	PSD Threshold (TPY)	CT Emission Rate (lb/hr)		Annual CT Emissions (lb/year)	Tons per year for 2 CT's	Emergency Generator TPY	TPY Total	PSD Applies?
		OIL	GAS					
NO <sub>x</sub>	40	8.67	8.62	50,541	50.5	1.62	52.2	Yes
CO	100	6.35	6.27	36,937	36.9	0.62	37.5	No
SO <sub>2</sub>	40	10.31	1.13	43,319	43.4	0.04	43.4	Yes
PM <sub>10</sub>	15	14.94	2.45	64,268	64.2	0.04	64.2	Yes
VOC	40	2.66	1.79	13,934	13.9	0.24	14.1	No
SAM	7	9.66	1.15	40,756	40.8	Neg.	40.8	Yes

Note: Assumed 4000 hours of oil operation and 1840 hours of natural gas operation.

The Department will make a determination of BACT for NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub>/SAM.

## 5. DEPARTMENT DETERMINATION

In accordance with Rule 62-212.400, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

The EPA currently stresses that BACT should be determined using the "Top-Down" approach. The Department considers Top-Down to be a useful tool, though not a unique or required approach to achieve a BACT under the State regulations. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The minimum basis for a BACT determination is 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines (NSPS). The Department adopted subpart GG by reference in Rule 62-204.800, F.A.C. The key emission limits required by Subpart GG are 75 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub> (assuming 25 percent efficiency) and 150 ppmvd SO<sub>2</sub> @ 15% O<sub>2</sub> (or <0.8% sulfur in fuel). The BACT proposed by the City of Tallahassee is well within the NSPS limit.

## 5.1 NO<sub>x</sub> CONTROL

Much has been made through the years of the detrimental effects of combusting liquid fuels and the corresponding application of SCR. Often-times, applicants will cite either the limited domestic experience which is available, or the removal of an SCR at the PREPA project in San Juan, Puerto Rico (see: <http://www.epa.gov/Region2/news/2000/00048.htm>). Conversely, the Department has long been aware of the successful application of SCR on liquid fired applications in Japan and Europe, as well as the documentation available by such organizations as the European Power Plant Suppliers Association (see: [http://www.epps.org/BAT\\_LCP/BAT\\_LCP\\_Draft\\_2/BAT\\_LCP\\_Draft\\_2\\_CH\\_06.pdf](http://www.epps.org/BAT_LCP/BAT_LCP_Draft_2/BAT_LCP_Draft_2_CH_06.pdf)) and the European Integrated Pollution Prevention and Control Bureau (see: <http://www.eel.nl/index9.htm>). Furthermore, consultants which have been hired by the Department confirm that the application of SCR is now commercially available and likely cost-effective for nearly any fuel, including synthetic gas (syngas) whether generated from coal, petroleum products or even biomass; MSW, kerosene, naphtha or even biomass, presuming that the flue gas characteristics can be adequately defined.

For this project, the applicant provided a vendor estimate of \$1.49M (which included the Direct Installation Cost, or DAC) for the installation of a high temperature SCR. Considering all other potential expenses, a total annualized cost of \$1.08M at an annual removal of 160 TPY of NO<sub>x</sub> was estimated. The TPY was based upon reducing NO<sub>x</sub> from 42 ppmvd while firing oil (the predominant fuel) and from 25 ppmvd while firing gas to 5 ppm for either fuel. The overall cost effectiveness is well below \$10,000 per ton of NO<sub>x</sub>, and therefore properly considered as reasonable. The Department concurs with the applicant's proposal and agrees that a reduction of NO<sub>x</sub> by 90% (from 42 ppm to 5 ppm) for firing distillate oil represents BACT. In this regard, the Department sees no reason to believe that the application of an SCR will yield NO<sub>x</sub> emissions while firing natural gas any higher than 3.5 ppmvd (an 85% reduction from 25 ppm), but due to the limited *state-wide* experience with high-temperature SCR, the requested BACT emission rate of NO<sub>x</sub> (5 ppmvd) for natural gas as well as an ammonia slip rate of 10 ppmvd will be allowed.

## 5.2 PM<sub>10</sub> CONTROL

PM<sub>10</sub>: The applicant stated that a "review of EPA's BACT/LAER Clearinghouse Documents did not reveal any post-combustion particulate control technologies being used on gas-fired or light-oil fired CTs." The Department agrees that the combustion of clean fuels is BACT for this combustion turbine.

## 5.3 SO<sub>2</sub>/SAM CONTROL

SO<sub>2</sub>/SAM: The applicant indicates that fuel quality is the only technically feasible method of controlling SO<sub>2</sub> and SAM emissions. As a result, the applicant contends that pipeline natural gas and 0.05% sulfur distillate represent BACT. Although the Department has been proactively supporting the use of lower sulfur distillate fuels within new PSD projects (e.g. FPL Turkey Point and JEA Brandy Branch), given the relatively low annual SO<sub>2</sub> emission (PTE) of this project (43.3 TPY), 0.05% sulfur oil and pipeline natural gas are accepted as BACT for this project.

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

## 6. AIR QUALITY IMPACT ANALYSIS

### 6.1 INTRODUCTION

The proposed project will increase emissions of four pollutants at levels in excess of PSD significant amounts: NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub> and sulfuric acid mist (SAM). NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub> are criteria pollutants and have national and state ambient air quality standards (AAQS), PSD increments, and significant impact levels defined for them. There are no applicable PSD increments, AAQS or de minimus monitoring levels for SAM; the BACT determination will limit maximum potential SAM emissions.

The applicant's initial NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub> air quality impact analyses for this project predicted no significant impacts in the Class II area in the vicinity of the project; therefore, further applicable AAQS and PSD increment impact analyses for these pollutants were not required in the vicinity of the project. The nearest PSD Class I areas are the Bradwell Bay and St. Marks National Wilderness Areas (NWA) located approximately 28 and 38 km, respectively from the project site. The applicant's PSD Class I air quality analysis showed no significant impacts due to the project. Therefore, a cumulative PSD Class I increment analysis was not required for these pollutants. Also, the maximum predicted impacts for all pollutants were below their respective *de minimus* ambient impact levels. Therefore, pre-construction monitoring at the proposed site was not required for this project. Based on the preceding discussion the air quality analyses required by the PSD regulations for this project are the following:

- A significant impact analysis for NO<sub>x</sub>, PM<sub>10</sub> and SO<sub>2</sub>;
- A significant impact analysis for PM<sub>10</sub>, SO<sub>2</sub>, and NO<sub>2</sub> in the Bradwell Bay and St Marks NWA;
- An analysis of impacts on soils, vegetation, visibility, and of growth-related air quality modeling impacts.

Based on these required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A more detailed discussion of the required analyses follows.

### 6.2 MODELS AND METEOROLOGICAL DATA USED

The EPA-approved Industrial Source Complex Short-Term (ISCST3) dispersion model was used to evaluate the pollutant emissions from the proposed project in the Class II area in the vicinity of the project, and in the portions of the Bradwell Bay and St. Marks NWA PSD Class I areas less than 50 km from the proposed facility. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. It incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Tallahassee and Apalachicola, Florida (surface and upper air data). The 5-year period of meteorological data was from 1986 through 1990. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

For determining potential plume visibility effects in the portions of the St. Marks NWA that are within 50 km of the project, the VISCREEN model was used. The VISCREEN model can be used to calculate potential plume impact of specific pollutant emissions for specific transport and meteorological dispersion conditions.

Since portions of the Bradwell Bay and St. Marks NWA PSD Class I areas are greater than 50 km from the proposed facility, long-range transport modeling was required for the Class I increment impact assessment and for regional haze and nitrogen and sulfur deposition impacts. The California Puff (CALPUFF) dispersion model, Version 5.7 (EPA, 2003) was used to evaluate the potential impact of the proposed pollutant emissions on the PSD Class I increments. CALPUFF is a non-steady state, Lagrangian, long-range transport model that incorporates Gaussian puff dispersion algorithms. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, line, area, and volume sources. The CALPUFF model has the capability to treat time-varying sources. It is also suitable for modeling domains from tens of meters to hundreds of kilometers, and has mechanisms to handle rough or complex terrain situations. Finally, the CALPUFF model is applicable for inert pollutants as well as pollutants that are subject to linear removal and chemical conversion mechanisms.

The meteorological data used in the CALPUFF model was processed by the California Meteorological (CALMET) model. The CALMET model utilizes data from multiple meteorological stations and produces a three-dimensional modeling grid domain of hourly temperature and wind fields. The wind field is enhanced by the use of terrain data, which is also input into the model. Two-dimensional fields such as mixing heights, dispersion properties, and surface characteristics are produced by the CALMET model as well. Meteorological data were obtained and processed for the calendar years of 1990, 1992 and 1996, the years for which MM4 and MM5 data are available. The CALMET wind field and the CALPUFF model options used were consistent with the suggestions of the federal land managers.

## 6.3 AMBIENT MONITORING REQUIREMENTS

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review unless otherwise exempted or satisfied. When available, the use of existing representative monitoring data may satisfy the monitoring requirement. An exemption to the monitoring requirement may be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined by air quality modeling, is less than a pollutant-specific de minimus concentration. The table below shows that predicted ambient impacts from the power plant are substantially less than the respective de minimus levels; therefore, preconstruction ambient air quality monitoring is not required for any pollutant.

**PREDICTED MAXIMUM AIR QUALITY IMPACTS FROM THE PROJECT  
COMPARED TO THE DE MINIMIS AMBIENT IMPACT LEVELS**

Pollutant	Averaging Time	Max Predicted Impact (ug/m <sup>3</sup> )	De Minimus Level (ug/m <sup>3</sup> )	Impact Greater Than De Minimus?
PM <sub>10</sub>	24-hour	2	10	No
NO <sub>2</sub>	Annual	0.05	14	No
SO <sub>2</sub>	24-hour	1	13	No

## 6.4 SIGNIFICANT IMPACT ANALYSIS

Initially, the applicant conducts modeling using only the proposed project's emissions at worst load conditions. In order to determine worst load conditions the ISCST3 model was used to evaluate dispersion of emissions from the simple cycle facility for three loads (50, 75% and 100%) and three seasonal operating conditions (summer, winter, and average) for each fuel type. Once the worst-case loads are identified, the applicant utilizes the ISCST3 model to evaluate impacts at these loads, and compares the results to the significant impact levels. If modeling at worst load conditions shows significant impacts, additional multi-facility modeling is required to determine the project's impacts on existing air quality and any applicable AAQS or PSD increments.

**TECHNICAL EVALUATION AND  
FINAL BACT DETERMINATION**

Receptors were placed around the facility, which is located in a PSD Class II area. The receptor grid for predicting maximum concentrations in the vicinity of the project was a discrete receptor grid that extended along the property boundary and out to 10 km. Receptor spacing along the property boundary was 50 m. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant impacts due to the project are predicted in the vicinity of the facility. For the Class I analysis, the maximum concentrations were predicted by CALPUFF modeling at 233 receptors in the Bradwell Bay and St. Marks NWA PSD Class I areas. These receptors have been provided by the federal land manager. The table below shows the results of the significant impact modeling.

**MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO THE  
PSD CLASS II SIGNIFICANT IMPACT LEVELS IN THE VICINITY OF THE FACILITY**

Pollutant	Averaging Time	Max. Predicted Impact (ug/m <sup>3</sup> )	Significant Impact Level (ug/m <sup>3</sup> )	Significant Impact?
SO <sub>2</sub>	Annual	0.05	1	NO
	24-hour	1	5	NO
	3-hour	5	25	NO
PM <sub>10</sub>	Annual	0.1	1	NO
	24-hour	2	5	NO
NO <sub>2</sub>	Annual	0.05	1	NO

**MAXIMUM PROJECT AIR QUALITY IMPACTS FOR COMPARISON TO  
THE PSD CLASS I SIGNIFICANT IMPACT LEVELS ST.MARKS AND BRADWELL BAY NWA**

Pollutant	Averaging Time	Max. Predicted Class I Impact Area (ug/m <sup>3</sup> )	Proposed EPA Significant Impact Level (ug/m <sup>3</sup> )	Significant Impact?
SO <sub>2</sub>	Annual	0.01	0.1	NO
	24-hour	0.12	0.2	NO
	3-hour	0.35	1.0	NO
PM <sub>10</sub>	Annual	0.02	0.2	NO
	24-hour	0.18	0.3	NO
NO <sub>2</sub>	Annual	0.01	0.1	NO

The results of the significant impact modeling show that there are no significant impacts predicted due to the emissions from this project.

**6.5 ADDITIONAL IMPACTS ANALYSIS**

Impacts on Soils, Vegetation, and Wildlife

Very low emissions are expected from these natural gas-fired/low sulfur fuel oil combustion turbines in comparison with a conventional power plant generating equal power. Emissions of acid rain and ozone precursors will be very low. The maximum ground-level concentrations predicted to occur for SO<sub>2</sub>, PM<sub>10</sub>, CO and NO<sub>x</sub>, as a result of the proposed project, including background concentrations and all other nearby sources, will be less than the respective ambient air quality standards (AAQS). The project impacts are less than the significant impact levels, which are in

# TECHNICAL EVALUATION AND FINAL BACT DETERMINATION

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turn less than the applicable allowable increments for each pollutant. Because the AAQS are designed to protect both the public health and welfare and the project impacts are less than significant, it is reasonable to assume the impacts on soils, vegetation, and wildlife will be minimal or insignificant.

The maximum predicted total nitrogen and sulfur depositions predicted for the project in the Bradwell Bay and St. Marks NWA are less than the federal land manager's recommended significant impact levels.

## Impact on Visibility

Natural gas and low sulfur distillate fuel oil are clean fuels and produce little ash. This will minimize smoke formation. The low NO<sub>x</sub> and SO<sub>2</sub> emissions will also minimize plume opacity. Because no add-on control equipment and no reagents are required, there will be no steam plume or tendency to form ammoniated particulate species.

A regional haze analysis that used the CALPUFF modeling system was performed and showed a maximum predicted change in visibility, which is less than the NPS threshold of 5%. Therefore, the proposed project is not predicted to have an adverse impact on visibility and regional haze in the St. Marks NWA.

## Growth-Related Air Quality Impacts

There will be short-term increases in the labor force to construct the project. These temporary increases will not result in significant commercial and residential growth in the vicinity of the project. Operation of the additional unit will require few new permanent employees, which will cause no significant impact on the local area.

## 7. CONCLUSION

Based on the foregoing technical evaluation of the application, additional information submitted by the applicant and other available information, the Department has made a final determination that the proposed project as outlined will comply with all applicable state and federal air pollution regulations.

Michael P. Halpin, Professional Engineer   
Department of Environmental Protection, Bureau of Air Regulation  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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- G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
- G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
- G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
- G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
- G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:
- a) Have access to and copy and records that must be kept under the conditions of the permit;
  - b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
  - c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
- Reasonable time may depend on the nature of the concern being investigated.
- G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
- a) A description of and cause of non-compliance; and
  - b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

**APPENDIX GC**  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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The permittee shall be responsible for any and all damages, which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

- G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
- G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.
- G.13 This permit also constitutes:
- a) Determination of Best Available Control Technology (X)
  - b) Determination of Prevention of Significant Deterioration (X); and
  - c) Compliance with New Source Performance Standards (X).
- G.14 The permittee shall comply with the following:
- a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
  - b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c) Records of monitoring information shall include:
    - 1. The date, exact place, and time of sampling or measurements;
    - 2. The person responsible for performing the sampling or measurements;
    - 3. The dates analyses were performed;
    - 4. The person responsible for performing the analyses;
    - 5. The analytical techniques or methods used; and
    - 6. The results of such analyses.
- G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law, which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.