CITY OF TALLAHASSEE

# Purdom Unit 8 Site Certification Application

## VOLUME 2

March,1997

Raytheon Engineers & Constructors

FOSTER WHEELER ENVIRONMENTAL CORPORATION

MOORE/BOWERS

HOPPING GREEN SAMS & SMITH
PROFESSIONAL ASSOCIATION

# APPLICANT INFORMATION

Applicant Official Name: City of Tallahassee

Address: City Hall, 300 South Adams Street, Tallahassee, FL 32301

Address of Official Headquarters: Same

Business Entity (corporation, partnership, co-operative): City

Names, Owners, etc.: N/A

Name and Title of Chief Executive Officer: Anita R. Favors, Interim City Manager

Name, Address, and Phone Number of official Representative responsible for obtaining certification: Jennette Curtis, Environmental Administrator
City of Tallahassee, Utility Services/Third Floor
300 South Adams Street, Tallahassee, FL 32301
(904) 891-8850 Fax 891 8277

Site Location (county): Wakulla

Nearest Incorporated City: St. Marks

Latitude and Longitude: Latitude 30° 9′ 40″; Longitude 84° 12′ 01″

UTM's Northerly: 3,339.767 km
Easterly: 769.611 km

Section, Township, Range: S2, T4S, R1E

Location of any directly associated transmission facilities (counties): Wakulla and Leon (certification is sought for reconductoring as a direct project impact, not as an associated facility. See Section 6.2.)

Name Plate Generating Capacity: 250 MW (nominal)

Capacity of Proposed Additions and Ultimate Site Capacity (where applicable): N/A

Remarks: (Additional information that will help identify the applicant): Applicant is represented by: Mr. Gary Sams
Hopping Green Sams & Smith
P.O. Box 6526, Tallahassee, FL 32314
(904) 222-7500

# LIST OF ORGANIZATIONS THAT PARTICIPATED IN THE PREPARATION OF THE SCA

City of Tallahassee
Tallahassee, Florida
- Overall Management and Direction

Raytheon Engineers & Constructors
Norcross, Georgia
- Engineering Contractor

Foster Wheeler Environmental Corporation
Norcross, Georgia; Stuart, Florida
- Overall Environmental Contractor

Hopping Green Sams & Smith
Tallahassee, Florida
- Environmental Attorneys for City of Tallahassee

Moore/Bowers
Tampa, Florida
- Consultant for Land Use, Planning, Zoning, Human Resources, Public Information, and Socioeconomics

Hall Planning & Engineering, Inc.
Tallahassee, Florida
- Subconsultant for Traffic Analyses

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# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| #/100 ml | Number per 100 Mililiters |
| ° C | Degrees Celsius |
| μg/l | Micrograms per Liter |
| μmhos | Micromhos |
| μmhos/cm | Micromhos per Centimeter |
| μS | Microsiemens |
| μS/cm | Microsiemens per Centimeter |
| ° F | Degrees Fahrenheit |
| $\mu g/m^3$ | Micrograms per Cubic Meter |
| 0.05% S | 0.05 Percent Sulfur by Weight |
| 2378 TCDD | Dioxin |
| 7Q10 | Seven Consecutive Day Low Flow with a Ten Year Recurrence |
| AADT | Average Annual Daily Traffic |
| AAQS | Ambient Air Quality Standards |
| Acfm | Actual Cubic Feet per Minute |
| ACSR | Aluminum Conductor, Steel Reinforced |
| AET | Actual evapotranspiration |
| agl | Above Ground Level |
| ANSI | American National Standard Institute |
| AP-42 | Compilation of Air Pollutant Emission Factors |
| AQRV | Air Quality Related Values |
| ARPC | Apalachee Regional Planning Council |
| As | Arsenic |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| Aux | Auxiliary |
| AWG | American Wire Gage |
| BACT | Best Available Control Technology |
| BaP | Benzo(a)pyrene |
| BDL | Below Detection Level |
| Be | Beryllium |
| BEBR | Bureau of Economic and Business Research |
| BMPS | Best Management Practices |
| BOCC | Board of County Commissioners |
| BOD-5 | 5 Day Biological Oxygen Demand |
| BPIP | Building Profile Input Program |
| Btu | British Thermal Unit |
| $Btu/ft^3$ | British Thermal Units per Cubic Foot |
| Btu/kWh | British Thermal Units per Kilowatt Hour |
| Btu/lb | British Thermal Units per Pound |
| Btu/MW-hour | British Thermal Units per Megawatt Hour |
| Ca | Calcium |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| CAA | Clean Air Act |
| $CaCO_3$ | Calcium Carbonate |
| CARL | Conservation and Recreation Land |
| CBOD | Carbonaceous Biological Oxygen Demand |
| Cd | Cadmium |
| CEMS | Continuous Emissions Monitoring System |
| CFR | Code of Federal Regulations |
| cfs | Cubic Feet per Second |
| CH | Sandy Clay |
| CN | Cyanide |
| CO | Carbon Monoxide |
| Co | Cobalt |
| $CO_2$ | Carbon Dioxide |
| COD | Chemical Oxygen Demand |
| COE | U.S. Army Corps of Engineers |
| CompQAP | Comprehensive Quality Assurance Plan |
| COT | City of Tallahassee |
| Cr | Chromium |
| CSM | City of St. Marks |
| CT | Combustion Turbine |
| CWA | Clean Water Act |
| DACS | Department of Agriculture and Consumer Services |
| dB | Decibel |
| dBA | Decibel (A level) |
| DCA | Department of Community Affairs |
| DEP | Department of Environmental Protection |
| DHR | Florida Department of State, Division of Historical Resources |
| DMR | Discharge Monitoring Report |
| DO | Dissolved Oxygen |
| DOT | U.S. Department of Transportation |
| Ds | Stack Diameter |
| DSM | Demand Side Management |
| EB | Eastbound |
| EEI | Edison Electric Institute |
| EMA | Ecosystem Management Area |
| EMF | Electric and Magnetic Fields |
| EMS | Emergency Medical Services |
| EPA | U. S. Environmental Protection Agency |
| EPRI | Electric Power Research Institute |
| EPT | Etheroptera/Pleucoptera/Trichoptera |
| ESP | Electrostatic Precipitators |
| F.A.C. | Florida Administrative Code |
| F.S. | Florida Statutes |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| FAA | Federal Aviation Administration |
| FAAQS | Florida Ambient Air Quality Standards |
| FARCs | Florida Ambient Reference Concentrations |
| FBN | Fuel Bound Nitrogen |
| FCMP | Florida Coastal Management Program |
| FDACS | Florida Department of Agriculture and Consumer Services |
| FDBF | Florida Department of Banking and Finance |
| FDE | Florida Department of Education |
| FDEP | Florida Department of Environmental Protection |
| FDEP-MRD | Florida Department of Environmental Protection, Marine Resources Division |
| FDLES | Florida Department of Labor and Employment Security |
| FDNR | Florida Department of Natural Resources |
| FDOT | Florida Department of Transportation |
| FEMA | Federal Emergency Management Agency |
| FGFWFC | Florida Game and Fresh Water Fish Commission |
| FGS | Florida Geological Survey |
| FGT | Florida Gas Transmission |
| Fl | Fluoride |
| FLMs | Federal Land Managers |
| FLUCCS | Florida Land Use and Cover Classification System |
| FNAI | Florida Natural Areas Inventory |
| FPC | Florida Power Corporation |
| FR | Federal Register |
| ft | Foot |
| ft/day | Feet per Day |
| ft/sec | Feet per Second |
| $ft^2$/day | Square Feet per Day |
| FWENC | Foster Wheeler Environmental Corporation |
| FWS | U.S. Fish and Wildlife Service |
| GE | General Electric |
| GEP | Good Engineering Practice |
| Gpd | Gallons per day |
| Gpm | Gallons per minute |
| GT | Gas Turbine |
| GT/STG | Gas Turbine/Steam Turbine Generator |
| $H_2SO_4$ | Sulfuric Acid Mist |
| HAP | Hazardous Air Pollutant |
| HC | Hydrocarbon |
| HCl | Hydrochloric Acid |
| $HCO_3$ | Bicarbonate |
| HCOH | Formaldehyde |
| HF | Hydrogen Fluoride |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| Hg | Mercury |
| HGSS | Hopping Green Sams & Smith |
| HHV | Higher Heating Value |
| hp | Horse Power |
| HPE | Hall Planning and Engineering |
| Hr | Hour |
| HRSG | Heat Recovery Steam Generator |
| Hs | Stack Height |
| IRP | Integrated Resource Planning |
| ISC3 | Industrial Source Complex |
| ISCST3 | Industrial Source Complex, Short-Term |
| ISO | International Standards Organization |
| IWW | Industrial Wastewater |
| km | Kilometers |
| kV | Kilovolts |
| kV/m | Kilovolts per Meter |
| kW | Kilowatt |
| kWh | Kilowatt hour |
| $L_{10}$ | Noise Level Exceeded 10 Percent of Each Hour |
| $L_{90}$ | Noise Level Exceeded 90 Percent of Each Hour |
| LAER | Lowest Achievable Emission Rate |
| lb/hr | Pounds per Hour |
| lb/in$^2$ | Pounds per Square Inch |
| lb/mmBtu | Pounds per Million British Thermal Units |
| LDL | Larson-Davis Laboratories |
| $L_{dn}$ | Day/night noise level |
| $L_{eq}$ | Equivalent Noise Level |
| LHV | Lower Heating Value |
| ln H | Natural Log Hardness |
| LOS | Level of service |
| m/s | Meters per Second |
| MBAS | Methylene Blue Active Substance |
| MCR | Maximum Current Rating |
| MF/100ML | Membrane filtration/number per 100 milliliters |
| MFCP | Main Fire Control Panel |
| Mg | Magnesium |
| mG | MilliGauss |
| mg/l | Milligrams per Liter |
| MGD | Million Gallons Per Day |
| mmBtu/hr | Million British Thermal Units per Hour |
| Mn | Manganese |
| MODFLOW | Modular Three-Dimensional Finite-Difference Ground Water Flow Model |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| mph | Miles per Hour |
| msl | Mean Sea Level |
| MW | Megawatt |
| MW-hour/year | Megawatt Hour per Year |
| N/A | Not available |
| $N_2$ | Nitrogen |
| NAAQS | National Ambient Air Quality Standards |
| NB | Northbound |
| NFPA | National Fire Protection Association |
| Ni | Nickel |
| $NiCl_2$ | Nickel Chloride |
| $NO_2$ | Nitrogen Dioxide |
| NOAA | National Oceanic and Atmospheric Administration |
| $NO_x$ | Oxides of Nitrogen |
| NPDES | National Pollutant Discharge Elimination System |
| NR | No Restrictions |
| NRCS | Natural Resources Conservation Service |
| NSPS | New Source Performance Standards |
| NST | National Standard Thread |
| NT | Not Tested |
| NWFWMD | Northwest Florida Water Management District |
| NWS | National Weather Service |
| $O_2$ | Oxygen |
| $O_3$ | Ozone |
| OFW | Outstanding Florida Waters |
| OSN | Outfall Serial Number |
| P | Phosphorus |
| PAH | Polycyclic aromatic hydrocarbon |
| Pb | Lead |
| $PbO_3$ | Lead Oxide |
| pci/l | Picocuries per Liter |
| PD | Peak Direction |
| pH | Negative logarithm of the concentration of hydrogen ions |
| PK | Peak |
| PM | Particulate Matter |
| PM (TSP) | Total Suspended Particulate Matter |
| $PM_{10}$ | Particulate Matter less than 10 Microns in Diameter |
| POM | Polycyclic Organic Material |
| POR | Period of Record |
| POS | Plan of Study |
| POTW | Publicly Owned Treatment Works |
| ppm | Part per Million |
| ppmvd | Parts per Million by Volume on a dry basis |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| ppmvw | Parts per Million by Volume on a wet basis |
| PPSA | Florida Electrical Power Plant Siting Act |
| PSC | Public Service Commission |
| PSD | Prevention of Significant Deterioration |
| psig | Pounds per Square Inch Gauge |
| PVC | Polyvinyl Chloride |
| PWRR | Present Worth of Revenue Requirements |
| QA | Quality Assurance |
| QAPP | QA Project Plan |
| RARE | Roadless Area Review and Evaluation Area |
| RE&C | Raytheon Engineers and Constructors |
| RFP | Request for Proposal |
| RIMS | Regional Input-Output Modeling System |
| S-C-T | Salinity-Conductivity-Temperature |
| Sb | Antimony |
| SB | Southbound |
| SC | Clayey Sand |
| SCA | Site Certification Application |
| SCDHEC | South Carolina Department of Health and Environmental Control |
| SCE | Southern California Edison |
| SCF | Standard Cubic Feet |
| SCR | Selective Catalytic Reduction |
| SCRAM | Support Center for Regulatory Air Models |
| Se | Selenium |
| $SiO_2$ | Silica, as silicon dioxide |
| SMCC | St. Marks City Commission |
| SMNWR | St. Marks National Wildlife Refuge |
| SNCR | Selective Noncatalytic Reduction |
| $SO_2$ | Sulfur Dioxide |
| $SO_3$ | Sulfur Trioxide |
| SPT | Standard Penetration Test |
| SR | State Road |
| STAR | Stability Array |
| Std. | Standard |
| SWPPP | Stormwater Pollution Prevention Plan |
| TDG | Total Dissolved Gases |
| TDS | Total Dissolved Solids |
| TOC | Total Organic Carbon |
| TPY | Tons per Year |
| TRB | Transportation Research Board |
| Ts | Stack Exit Temperature |
| TSP | Total Suspended Particulates |
| TSS | Total Suspended Solids |

## LIST OF ACRONYMS AND ABBREVIATIONS (Cont'd)

| | |
|---|---|
| TTN | Technology Transfer Network |
| USCS | Unified Soil Classification System |
| USDA | United States Department of Agriculture |
| USDC | United States Department of Commerce |
| USDI | United States Department of Interior |
| USFS | U.S. Forest Service |
| USFWS | U.S. Fish & Wildlife Service |
| USGS | U.S. Geological Survey |
| UTM | Universal Transverse Mercator |
| V | Vanadium |
| VOC | Volatile Organic Compound |
| Vs | Stack Exit Velocity |
| WB | Westbound |
| WMA | Wildlife Management Area |
| WWTF | Wastewater Treatment Facility |
| YSI | Yellow Springs Instruments |

## LIST OF FREQUENTLY USED TERMS

| | |
|---|---|
| "City of Tallahassee" or "City" | Utilized to refer to the City and the Electric Utility. |
| "commercial operation" | The date on which the first electricity is generated for sale. This is expected to be in May 2000. |
| "facility-wide caps" | The federally enforceable permit conditions which would require annual emissions of $SO_2$ and $NO_x$ to remain at or below recent levels of those pollutants from Units 5, 6, and 7 and from the combustion turbines (GT1 and 2). |
| "guarantee point" | 95°F, 50% relative humidity, firing natural gas. |
| "guaranteed net heat rate" | 7,040 Btu/kWh (HHV) on a 95°F, 50% relative humidity while firing natural gas. |
| "guaranteed net power output" | 232,900 kW on a 95°F, 50% relative humidity while firing natural gas. |
| "power output" | A nominal 250 MW. |
| "Project" or "Purdom Unit 8 Project" | Describes the addition of "Unit 8" and the associated modifications to the "Purdom Station," which include but are not limited to the retirement of Units 5 and 6 and future operational limits for Unit 7, Gas Turbine 1, Gas Turbine 2, and auxiliary boiler under facility-wide cap. |
| "Sam O. Purdom Generating Station" or "Purdom Station" or "Plant" or "Purdom Plant" or "Power Plant" or "the Facility" | Describes the equipment owned or operated by the City on the site. "Purdom Station" is used after the first usage of "Sam O. Purdom Generating Station." |
| "Purdom Unit 8" or "Unit 8" | Utilized to describe the new combined cycle facility, the zero discharge facility, the cooling tower, and ancillary equipment which is installed as part of the "Project." |
| "site" | The entire property owned by the City which is being "certified" under the PPSA. |
| "Unit 8 Location" | The portion of the "site" which is being developed for "Unit 8." |
| "zero discharge facility" | Utilized to describe the wastewater treatment facility being installed with Unit 8. |

## PREFACE

The City of Tallahassee (City) is a municipally owned corporation under the laws of the State of Florida. Under the City's charter, the City owns and operates the fourth largest municipal electric utility in Florida and serves approximately 88,000 customers in a service territory of 221 square miles. The City's electric utility continues to enjoy growth in the demand for electricity. The City's current and projected growth rate is approximately 2 percent per year.

The City currently contracts for a 100 MW portion of its supply side resources, 75 MW from the Southern Company and 25 MW from Entergy. In May of 2000, the 75 MW contract will expire and the City has a need to replace this resource as well as meet the increasing customer load. To meet this need, the City proposes to expand its generating capacity at its existing Purdom Generating Station located in the City of St. Marks, Florida. The existing Purdom Station has a nominal generating capacity of 112 MW (Steam Units 5 and 6 - 22 MW each; Steam Unit 7 - 44 MW, Gas Turbines 1 & 2 - 12.5 MW each) This expansion will include the addition of a nominal 250 MW combined cycle generating facility (known as Unit 8) coupled with the early permanent retirement of the existing Purdom Units 5 and 6. This will result in a net addition of over 200 MW to the City's electric system. Unit 8 will primarily burn clean natural gas and utilize Number 2 (0.05% S) diesel fuel oil as a secondary fuel. The design of Unit 8 includes many environmentally beneficial design features that result in a reduced environmental impact from the Purdom Station while the generating capacity is doubled.

The City is seeking approval for the Purdom Unit 8 Project under the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes (PPSA). The PPSA provides for a centralized review process for new electrical generating facilities in Florida, involving a balancing of "the increasing demand for electrical power plants with the broad interests of the public," including human health, the environment, state waters and wildlife. Under the PPSA, the Florida Public Service Commission (PSC) is the sole forum for the determination of need for a proposed facility. The Florida Department of Environmental Protection (FDEP) acts as the coordinator for the remainder of the certification process, with input from various State, regional and local agencies and ultimate disposition by the Governor and Cabinet sitting as the Siting Board. The City is concurrently seeking certification under the PPSA of its entire Purdom site.

The City submitted a "Petition to Determine Need for Electrical Power Plant - Purdom Unit 8" to the PSC on December 21, 1996. The Petition, along with supporting documentation, addresses the manner in which the Purdom Unit 8 Project will: (i) meet the need for electric system reliability and integrity; (ii) meet the need for adequate electricity at reasonable cost; and (iii) be the most cost-effective alternative available. Salient points of the Need Petition are summarized in Chapter 1 of this Site Certification Application (SCA).

This SCA is being filed with FDEP pursuant to Chapter 62-17, F.A.C. It addresses the environmental and socioeconomic aspects of the Purdom Unit 8 Project by presenting information on the existing natural and human environments, on the generating and associated facilities proposed to be constructed and operated, and on the impacts of those facilities on those environments. In general, the Purdom Unit 8 Project represents a major addition to the City's total generating capacity. Use of an existing site minimizes environmental impacts.

The City provided opportunities for the public to comment on the project during a number of public meetings in Tallahassee and St. Marks in the fall of 1996. Special briefings and meetings were also held with environmental groups, officials of the City of St. Marks and Wakulla County, and regulatory agencies. These comments were considered and addressed, as appropriate, in the SCA and/or separate correspondence with the individual commentors. Appendix 10.7 includes a record of the public comments obtained on the project during preparation of this SCA.

## 3.2 SITE LAYOUT

The conceptual layout of the proposed Purdom Unit 8 is depicted in plan view on Figure 3.2-1, and a detailed footprint of the combined cycle unit is shown on Figure 3.2-2. The conceptual design for the combined cycle unit upon which the layout is based includes an advanced combustion turbine/generator, an unfired HRSG, a steam turbine/generator, a closed cycle mechanical draft cooling tower for condenser cooling, and a zero discharge wastewater treatment system.

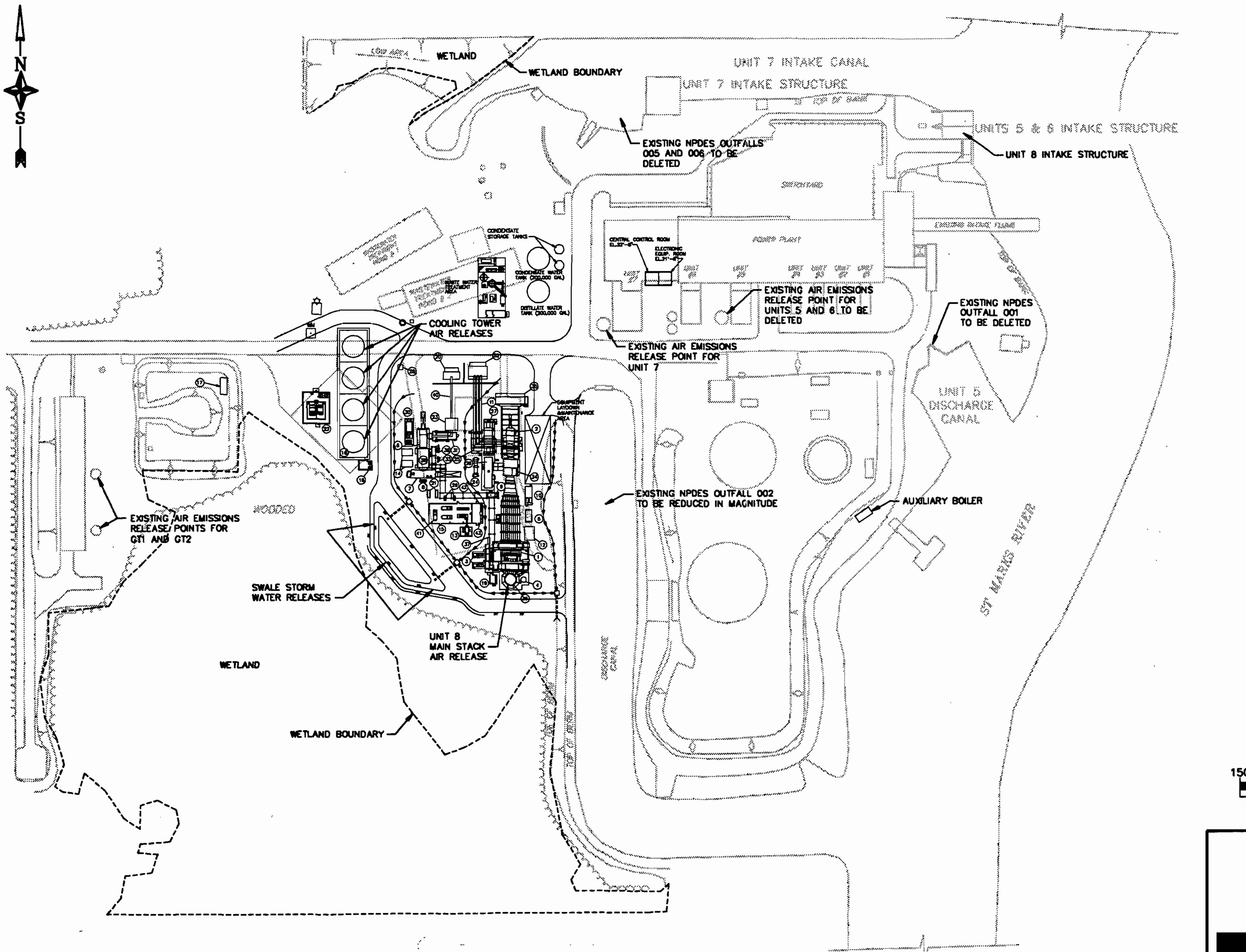
Unit 8 will be installed on the west side of the Unit 6/7 discharge canal, south of the facility access road. The combustion turbine/generator and the HRSG will be oriented north-south adjacent to the canal, and the steam turbine/generator and other equipment will be adjacent to the west. The cooling tower will be west of the steam turbine/generator. The zero discharge wastewater treatment system will be just north of the access road. A stormwater retention swale will be added to the southwest of the new unit to percolate as much uncontaminated stormwater as possible into the groundwater, and to release the remainder as a sheet flow to the southwest, as it presently flows. Other uncontaminated stormwater will use the existing stormwater outfalls. Potentially contaminated stormwater will be segregated and reused.

The combined cycle unit will utilize a stack (chimney) that meets state requirements for Good Engineering Practice (GEP), and is 200 feet tall. The GEP calculation is in Appendix 10.1.5.

New release points for air emissions will be the main stack from the combined cycle combustion turbine unit, and the cooling tower fan stacks, as shown on Figures 3.2-1 and 3.2-2. New release points for liquids are from the new retention swale, also shown on Figures 3.2-1 and 3.2-2.

A cross section of the combined cycle unit is shown on Figure 3.2-3.

As part of the Purdom Unit 8 Project, the City of Tallahassee will be permanently shutting down the existing Units 5 and 6, and ceasing all industrial wastewater discharges from Unit 7 except for the thermal discharge. This will result in the elimination of the air emission releases from Units 5 and 6 (see Section 5.6), the wastewater releases from Units 5 and 6, and the nonthermal effluents from Unit 7 (see Section 2.3.4).




## LEGEND:

1. HEAT RECOVERY STEAM GENERATOR
2. COMBUSTION TURBINE GENERATOR
3. FEEDWATER PUMPS
4. BLOWDOWN TANK
5. WATER WASH SKID
6. STEAM TURBINE GENERATOR
7. CONDENSER
8. CONDENSATE PUMPS
9. CO2 FIRE PROTECTION SKID
10. WATER INJECTION SKID
11. ISO PHASE BUS DUCT
12. HRSG CHEMICAL FEED SYSTEM
13. AUXILIARY TRANSFORMER
14. VACUUM PUMPS
15. SWITCHGEAR BUILDING
16. COOLING TOWER
17. FUEL OIL TRANSFER PUMPS
18. CIRCULATING WATER PUMPS
19. CONTINUOUS EMISSIONS MONITORING SYSTEM
20. STEAM TURBINE GENERATOR MAIN STEPUP TRANSFORMER
21. CLOSED COOLING WATER HEAT EXCHANGERS
22. COOLING TOWER CHEMICAL FEED SYSTEM
23. GENERATOR BREAKER
24. STATIC START SKID
25. COMBUSTION TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
26. ACCESSORY MODULE
27. PACKAGED ELECTRICAL ELECTRONIC CONTROL CABINET
28. NATURAL GAS FILTER/SCRUBBER
29. CLOSED COOLING WATER PUMPS
30. STEAM TURBINE GENERATOR LUBE OIL SKID
31. STEAM TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
32. COMBUSTION TURBINE GENERATOR MAIN STEPUP TRANSFORMER
33. GLAND STEAM CONDENSER
34. COMBUSTION TURBINE
35. INLET FILTER
36. STACK
37. SAMPLE PANEL
38. STEAM TURBINE
39. GLAND STEAM CONTROL VALVE SKID
40. NON SEGREGATED BUS DUCT
41. COOLING TOWER LOAD CENTER
42. BAILEY CONTROL CABINETS
43. STEAM TURBINE GENERATOR CONTROL CABINETS

150 0 150 300

SCALE IN FEET

CONCEPTUAL LAYOUT

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure 3.2-1

SOURCE: RE&C, 1997

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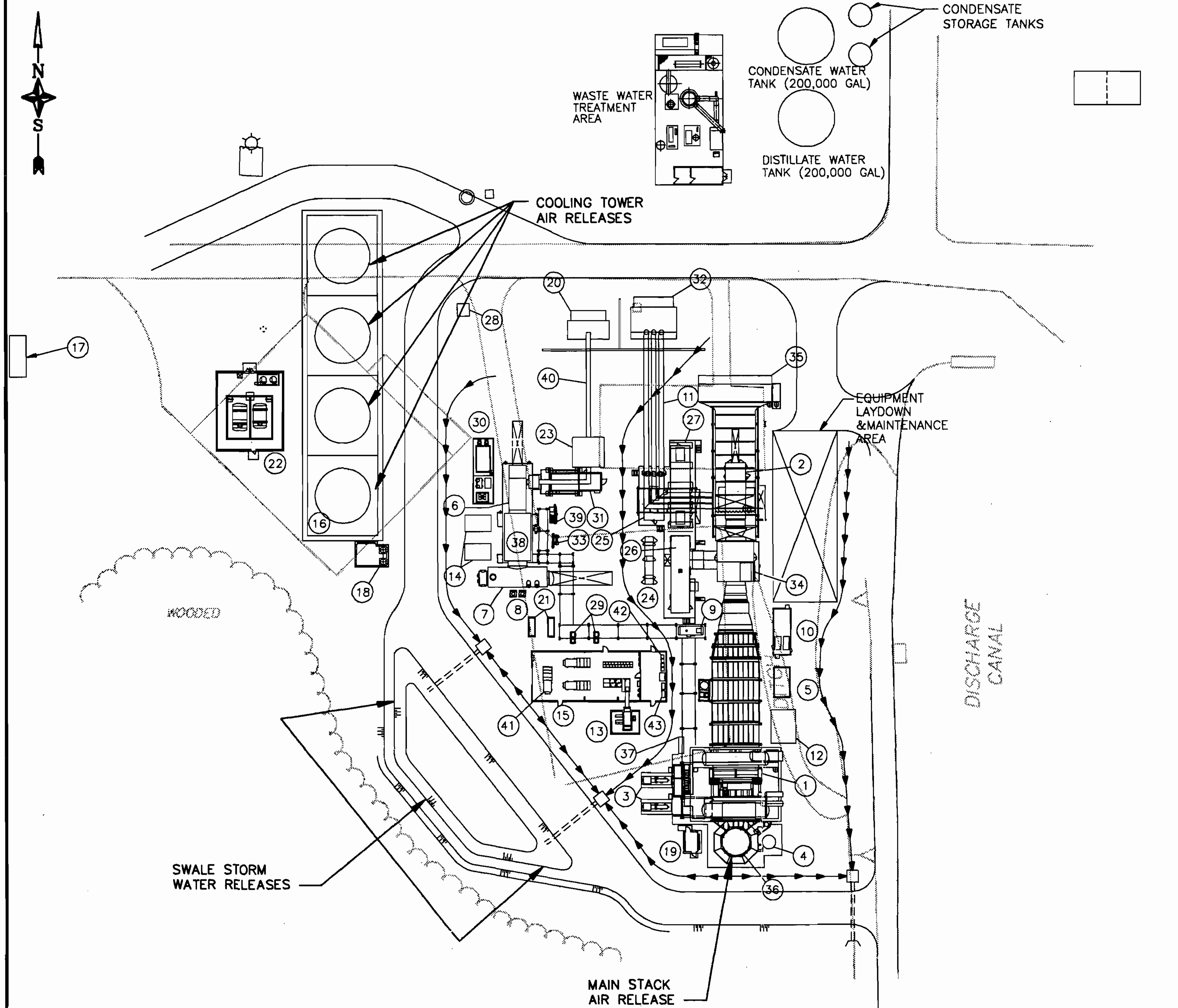


SOURCE: RE&C, 1997

## LEGEND:

1. HEAT RECOVERY STEAM GENERATOR
2. COMBUSTION TURBINE GENERATOR
3. FEEDWATER PUMPS
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41. COOLING TOWER LOAD CENTER
42. BAILEY CONTROL CABINETS
43. STEAM TURBINE GENERATOR CONTROL CABINETS

60 0 60 120

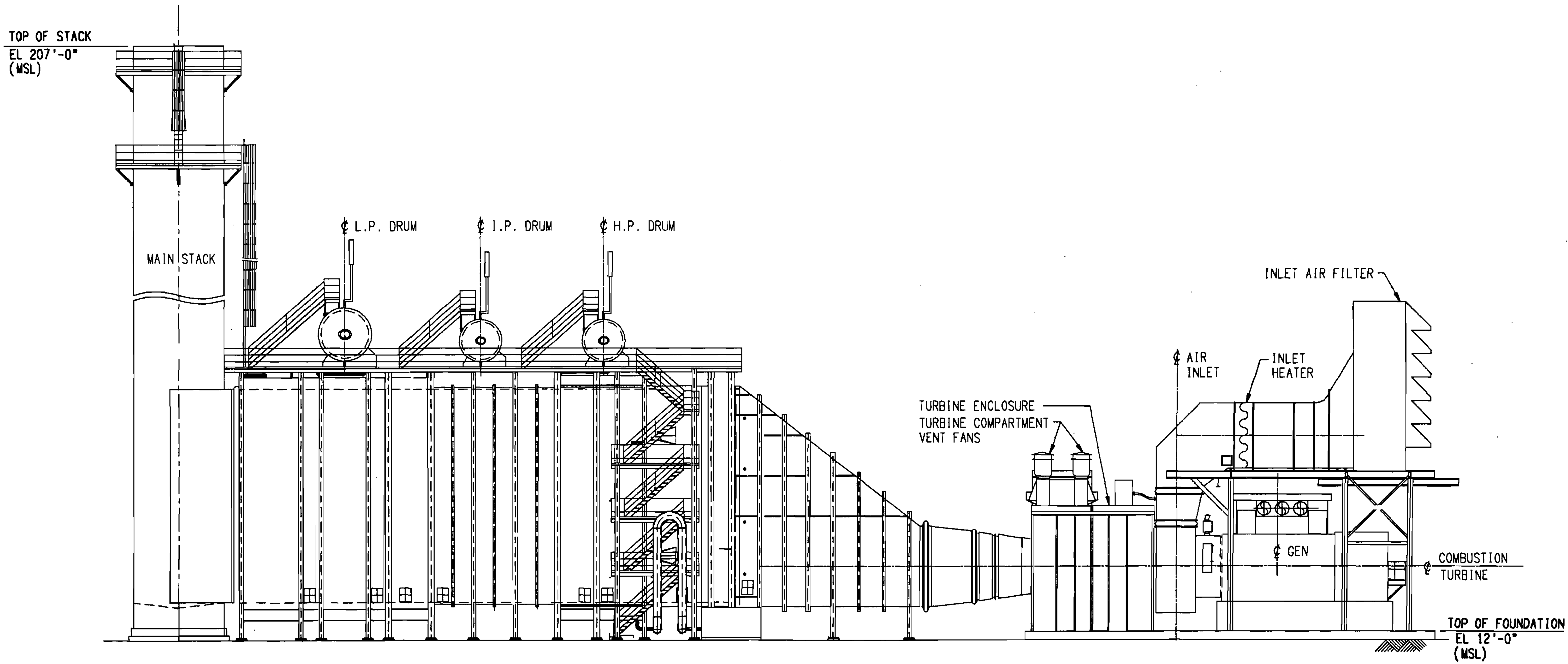
SCALE IN FEET

FOOTPRINT OF THE
COMBINED CYCLE UNIT

PURDOM UNIT 8 PROJECT – ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure
3.2-2




CROSS SECTION
COMBINED CYCLE UNIT

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure 3.2-3

SOURCE: RE&C, 1997

## 3.3 FUEL

### 3.3.1 Fuel Types

The primary fuel for Unit 8 will be natural gas, with low-sulfur (0.05%) Number 2 fuel (a.k.a. No. 2 distillate or diesel) oil as a secondary fuel. Startup and operation of the combined cycle combustion turbine over the full load range will be possible using either fuel. The combined cycle combustion turbine can be automatically switched to fuel oil in the event that natural gas pressure is lost, and manual switching from one fuel to the other is also possible.

### 3.3.2 Quantities

The fuel gas is supplied to the valve and metering station by the fuel supplier and regulated at 390 psig (± 10 psig), 40° F to 100° F and 78,200 pounds per hour (an ambient temperature of 20° F), to accommodate the gas turbine inlet requirements.

Approximately 103,200 pounds per hour of Number 2 (0.05% S) diesel fuel oil will be required for use at full load when natural gas is not being utilized. Occasional barge deliveries of Number 6 fuel oil will continue to be made at the Purdom Station. However, with the permanent shutdown of Units 5 and 6, the City's need for Number 6 fuel oil is expected to be reduced.

### 3.3.3 Transportation

Florida Gas Transmission Company (FGT) has two steel natural gas lines that run east-to-west between Capital Circle and Woodville. One of these lines has a 36-inch diameter and the other has a 30-inch diameter. The existing Purdom Station presently receives natural gas through the St. Marks lateral, which is an 8-inch steel line that enters the site at SR 363, and is buried along the south side of the facility access road (see Figure 3.3-1). The St. Marks lateral connects to the existing 30-inch diameter FGT line. As a part of FGT's upgrades to serve Purdom 8, they will: (1) connect the St. Marks lateral to the 36-inch diameter line at Woodville; (2) relocate and upgrade the existing valve and metering station to the new gas yard on site (see Figure 3.3-1); and (3) potentially install up to 3 miles of 12-inch loop to the St. Marks lateral. A new gas line will be installed from the new gas yard to the new Unit 8. The off-site portion of this work is described more fully in Section 6.3. The Number 2 (0.05% S) diesel fuel oil will continue to be supplied by truck delivery from local (most likely St. Marks) suppliers.

Number 6 fuel oil is presently delivered to the site by barge for use in Units 5, 6, and 7 and for delivery to the City of Tallahassee's Hopkins Plant. With the permanent shut-down of Units 5 and 6, the amount of Number 6 fuel oil delivered to the site and the related barge traffic on the river is expected to be reduced slightly.

### 3.3.4 Storage

The existing 10,000 barrel Number 2 (0.4% S) diesel fuel oil storage tank near the gas turbines will be used for the storage of the secondary Number 2 (0.05% S) diesel fuel oil (see Figure 3.2-1). Oil from this tank presently serves as the backup fuel for the existing combustion turbines (GT1 and GT2). The 20,000 barrel (Tank #1 ) and 80,000 barrel (Tank #3) heavy oil

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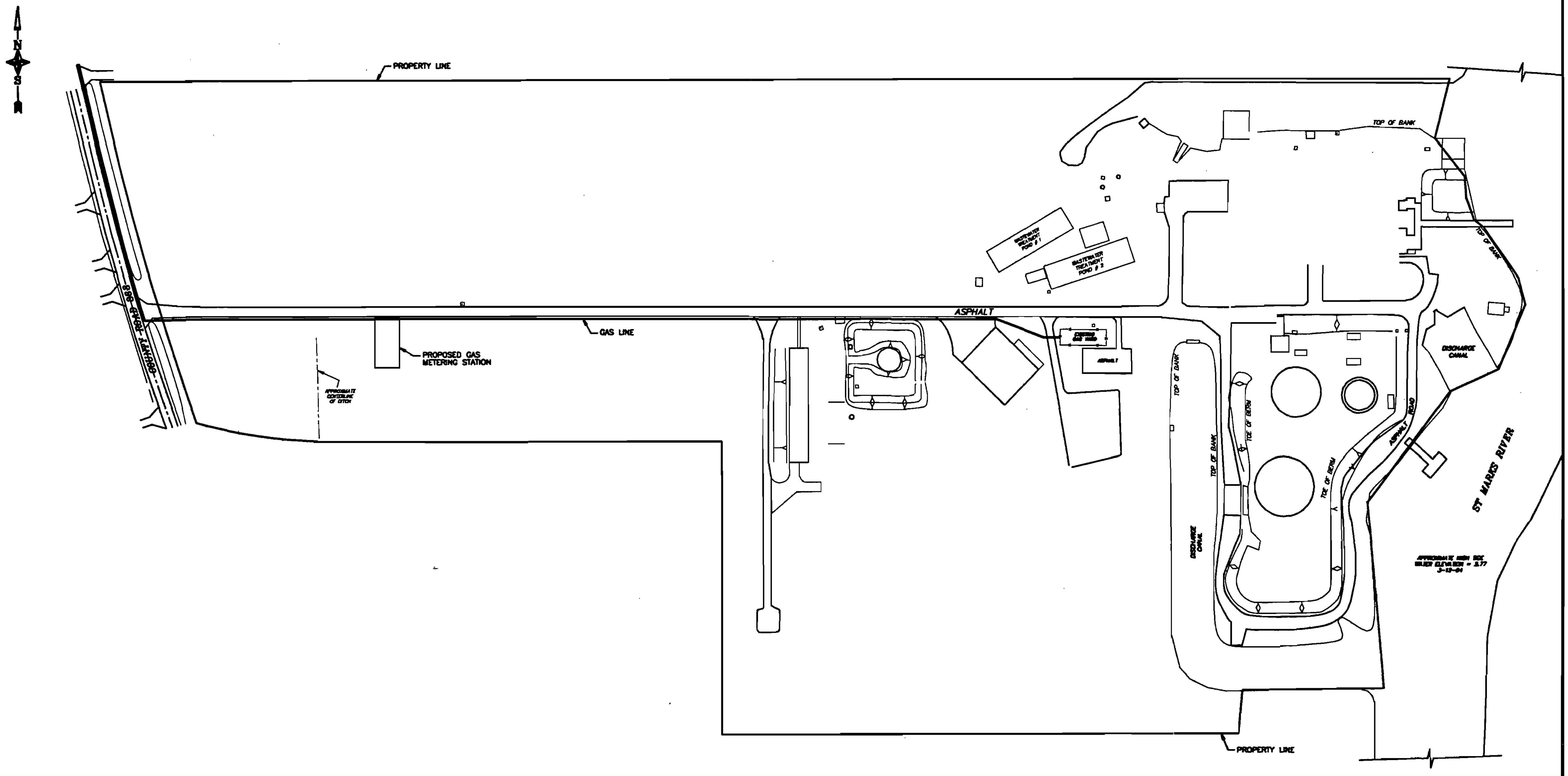


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SCALE IN FEET

SOURCE: RE&C, 1997

EXISTING ON-SITE GAS PIPELINE

PURDOM UNIT 8 PROJECT – ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure 3.3-1

storage tanks (see Figure 3.2-1) will continue to store Number 6 fuel oil for use in Purdom Unit 7. All existing fuel oil tanks have been inspected and meet 17-762, F.A.C. Because of the permanent shutdown of Purdom Units 5 and 6, the 55,000 barrel (Tank #2) heavy oil storage tank will no longer be needed for fuel oil storage, and will be cleaned and recycled as a wastewater holding tank (see Sections 3.5 and 3.6). A small steel tank (100 gallons) will be installed near the natural gas filter/scrubber (item 28 on Figure 3.2-1) to store natural gas liquids that may occasionally come through the gas line and be removed by the filter. These liquids will be disposed off site by an appropriately licensed contractor.

### 3.3.5 Quality

Fuel quality estimates supplied herein are projected based on typical values in the literature adjusted for known changes to be required in the sulfur content (fuel oil only).

Two types of fuel quality analysis have been estimated: an ultimate analysis and a proximate analysis. An ultimate analysis is a gravimetric (i.e., weight-based) breakdown of a fuel to the following: carbon, hydrogen, sulfur, nitrogen, oxygen and ash. A proximate analysis is a gravimetric breakdown of a fuel to the following components: volatile matter, fixed carbon, moisture and ash.

The results of the estimated analyses are presented in Table 3.3.5-1 for natural gas and Table 3.3.5-2 for Number 2 (0.05% S) diesel fuel oil.

**TABLE 3.3.5-1**
**TYPICAL NATURAL GAS ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur[2] | 0 - 0.34 |
| Ash | 0.0 |
| Proximate Analysis | |
| Volatile Matter | 99.65 - 100.0 |
| Fixed Carbon | 0.0 |
| Moisture | 0.0 - 0.00138 |
| Ash | 0.0 |

(1) Heating value (HHV): 964 - 1129 Btu/$ft^3$
(2) Total sulfur (maximum) 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**TABLE 3.3.5-2**
**TYPICAL NUMBER 2 (0.05% S) DIESEL FUEL OIL ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 86.1 - 88.2 |
| Hydrogen | 11.8 - 13.9 |
| Oxygen | 0.0 |
| Nitrogen | 0.0 - 0.1 |
| Sulfur[2] | 0.0 - 0.05 |
| Ash | 0.0 - 0.05 |
| Proximate Analysis | |
| Volatile Matter | 99.05 - 99.5 |
| Fixed Carbon | 0.25 - 1.0 |
| Moisture | 0.0 - 0.1 |
| Ash | 0.0 - 0.05 |

(1) Heating value (HHV): 19,170 - 19,750 Btu/lb
(2) Total sulfur (maximum) 0.05%

Source: Babcock & Wilcox, 1972 and RE&C, 1997

## 3.4 AIR EMISSIONS AND CONTROLS

Upon completion of this Project, the Purdom Station will have increased its generating capacity from a nominal 113 megawatts (MW) to a nominal 319 MW. This new total reflects the addition of Unit 8 (nominal 250 MW), the continued operation of existing Unit 7 (nominal 44 MW) and two existing combustion turbines (nominal 12.5 MW each), and the permanent shutdown of Units 5 and 6. Appendix 10.1.5 of this SCA contains the complete application for Prevention of Significant Deterioration (PSD) and Title V air operation permits for the Project. The permit application further describes the Purdom Station's existing capacity, the proposed modifications, and issues associated with current and future air emissions.

This section of the SCA describes the proposed approach to the Project and the resulting air pollutant emissions and control strategies.

### 3.4.1 Emission Types and Sources

The SCA proposes the construction of a new Unit 8 at the Purdom Station which will consist of a nominal 160 MW combustion turbine/generator, a non-fired heat-recovery steam generator (HRSG), a nominal 90 MW reheat steam turbine/generator, and a multi-celled cooling tower. Therefore, the types of air pollutants expected to be emitted include the products of combustion resulting from burning clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil in the combustion turbine, and small quantities of particulate matter resulting from the cooling tower drift losses.

While the SCA proposes an increase of approximately 200 MW of generating capacity for the Purdom Station, annual facility-wide emissions of oxides of nitrogen ($NO_x$) and sulfur dioxide ($SO_2$) will not be increased above their current actual levels. This is possible through the use of efficient combined cycle technology, the permanent shutdown of existing Units 5 and 6, and reduced annual operation of the remaining units in conjunction with the proposed Unit 8. Through the $NO_x$ and $SO_2$ caps, facility emissions of other regulated air pollutants will also be minimized. The following subsections describe the existing and future air emission units, including the proposed Unit 8 and cooling tower.

6/4/03

#### *3.4.1.1 Emissions Sources*

The entire list of future emission units at the Purdom Station (existing and proposed) is provided in Appendix 10.1.5. The existing emissions units of primary interest include the Unit 7 steam generator, which is capable of firing clean pipeline quality natural gas and/or fuel oil in various combinations; a new auxiliary boiler (currently being installed), which has authorization to fire only natural gas; and two existing combustion turbines, which can fire either Number 2 (0.4% S) fuel oil or clean pipeline quality natural gas. Unit 8, as proposed, would consist of a combustion turbine, capable of firing either clean pipeline quality natural gas or Number 2 (0.05% S) diesel fuel oil, and equipped with a non-fired heat recovery steam generator (HRSG). Following completion of the compliance testing on Unit 8, the existing combustion turbines will no longer fire the Number 2 (0.4% S) fuel oil and will also fire Number 2 (0.05% S) diesel fuel oil. In addition, a cooling tower will be installed at the site to supply cooling water for the Unit 8 steam turbine condenser. The locations of these units and their associated emission points were identified in Figures 3.2-1 and 3.2-2. Other emission units at the Purdom Station include emergency generators, fuel oil storage tanks, fuel dispensing operations, surface coating operations, and maintenance operations.

The proposed Unit 8 combustion turbine is an advanced GE MS7231FA equipped with an evaporative cooler. The combustion turbine exhausts through a single non-fired HRSG into a stack designed to meet good engineering practice (GEP) height requirements. The combustion turbine powers a nominal 160 MW generator with output varying based on ambient conditions and fuel input. The HRSG provides steam to a steam turbine which powers a nominal 90 MW generator. The combustion turbine is equipped with dry low-$NO_x$ combustors and a water injection system for controlling $NO_x$ emissions while firing clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil, respectively.

The cooling tower is a multi-cell mechanical draft evaporative cooling tower operating at five cycles of concentration. The unit will be equipped with drift eliminators to reduce drift losses associated with the normal operation of the cooling tower. The drift eliminators are primarily designed to reduce water usage but also result in the minimization of particulate matter emissions.

#### *3.4.1.2 Emissions*

The recent annual emissions for the existing regulated units at the Purdom Station have been estimated for the PSD regulated pollutants, and a summary is provided in Table 3.4.1-1. The future annual emissions for the Purdom Station after the proposed project have also been estimated, based on various worst-case scenarios for the facility operating under the $SO_2$ and $NO_x$ caps, and these estimates are also included in Table 3.4.1-1. The emission rates for the Unit 8 combustion turbine and the cooling tower were based on Best Available Control Technology (BACT) evaluations, described below, which considered technical, economic, energy, and environmental factors. The net emission increases associated with the Project and the significant emission rate thresholds for the various PSD pollutants are also summarized in Table 3.4.1-1.

#### *3.4.1.3 Emissions Inventory*

The Purdom Station's complete emissions inventory is included in Appendix 10.1.5. Appendix 10.1.5 contains FDEP Form 62-210.900(1), *Application for Air Permit-Long Form*, for both the PSD and Title V permits.

### 3.4.2 Air Emission Controls

A review of the various control technologies and associated emission rates for Unit 8 and the cooling tower was completed for the proposed Project, The results of the review included the identification of the most efficient control technologies available and the most stringent emission limitations imposed for each of the PSD pollutants. The BACT analysis, which considered technical, economic, energy, and environmental factors, is presented in Section 3.4.3. This analysis resulted in the selection of the air emission controls for this Project, which include:

**TABLE 3.4.1-1**
**PURDOM STATION PSD APPLICABILITY SUMMARY**

| Pollutant | Current Actual Emissions (tons/year)[1] | Future Estimated Emissions (tons/year)[1] | Net Increase in Emissions (tons/year) | Applicable PSD Significance Criterion (tons/year)[3] | PSD Applicability Determination |
|---|---|---|---|---|---|
| Carbon Monoxide | 66 | 193 | 127 | 0[2] | Yes |
| Nitrogen Oxides | 467 | 467 | 0 | 0[2] | No |
| Sulfur Dioxide | 80 | 80 | 0 | 0[2] | No |
| Ozone (VOCs) | 2.8 | 14.7 | 11.9 | 40 | No |
| Particulate Matter (TSP) | 10.7 | 59.0 | 48.3 | 25 | Yes |
| Particulate Matter ($PM_{10}$) | 10.7 | 59.0 | 48.3 | 15 | Yes |
| Total Reduced Sulfur | NA | NA | NA | 10 | No |
| Reduced Sulfur Compounds | NA | NA | NA | 10 | No |
| Sulfuric Acid Mist | 3.0 | 8.6 | 5.6 | 7 | No |
| Fluorides | .08 | 1.64 | 1.56 | 3 | No |
| Vinyl Chloride | NA | NA | NA | 1 | No |
| Lead | .091 | .011 | 0.080 | 0.6 | No |
| Mercury | .0020 | .0024 | 0.0004 | 0.1 | No |
| Asbestos | NA | NA | NA | 0.007 | No |
| Beryllium | .00052 | .00030 | - 0.00022 | 0.0004 | No |

NA - No emissions information available or no emissions expected.

(1) For information on these values see appendix B and C PSD report (section 10.1.5)

(2) Due to the proximity to the Class I area, lower criteria apply for those pollutants with a maximum projected 24-hour average impact of 1.0 microgram per cubic meter or more in the Class I area

(3) Table 212.400-2, Rule 62-212.400, F.A.C.

Source: Foster Wheeler Environmental, 1997

- Good Combustion Practices
- Combustion Controls
- Fuel Quality
- Dry-Low $NO_x$ Combustion
- Water Injection
- Drift Eliminators

### 3.4.3 Best Available Control Technology (BACT)

#### *3.4.3.1 Introduction*

NO

Under both federal and Florida PSD programs, PSD review is triggered for a modification to an existing major facility that results in a significant net emissions increase. As part of the proposed Project, federally enforceable facility-wide caps on the annual emissions of $SO_2$ and $NO_x$ are being proposed to hold the facility's future emissions of these pollutants to their current actual levels. Because of this commitment, the Project will net out of PSD review for these pollutants. To determine the worst-case emissions of other pollutants from the Project under the proposed facility-wide caps, eleven potential operating scenarios were identified. These scenarios, while not intended to represent limits on the facility, bracket the expected operating ranges of the individual units within the facility. Based on the proposed $SO_2$ and $NO_x$ caps and the various pollutant-specific worst-case operating scenarios within those caps, the Project will also net out of PSD review for volatile organic compounds (VOCs), sulfuric acid mist ($H_2SO_4$), lead (Pb), mercury (Hg), beryllium (Be), and total fluorides (Fl). PSD review was triggered only for carbon monoxide (CO) and particulate matter (TSP and $PM_{10}$). The PSD applicability analysis is summarized in Table 3.4.1-1, and the supporting calculations for the current actual emissions and future allowable emissions are contained in Appendix 10.1.5

Because PSD was triggered for CO and particulate matter (TSP and $PM_{10}$), the BACT requirements of Rule 62-213.400(6), F.A.C., will apply to new and modified emission units for which a net emissions increase of these pollutants is expected to occur. This BACT analysis therefore addresses control strategies for CO and particulate matter (TSP and $PM_{10}$) emissions from the Unit 8 combustion turbine, and for particulate matter (TSP and $PM_{10}$) emissions from the cooling tower. In addition, the BACT analysis includes an evaluation for all PSD pollutants emitted from the combustion turbine to ensure that the proposed Project incorporates the most appropriate control strategies, regardless of the applicability of the BACT requirements.

The Florida PSD regulations require, among other things, that a proposed new facility or major modification: (a) comply with all applicable emission limitations contained in Chapter 62-296, F.A.C., and Title 40 of the Code of Federal Regulations Parts 60 and 61 (40 CFR Parts 60 and 61); and (b) apply BACT for each pollutant subject to PSD review. As defined in Rule 62-210.200(40), F.A.C., BACT is:

> "An emission limitation, including a visible emissions standard, based on the maximum degree of reduction of each pollutant emitted which the 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 (including cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant."

In order to ensure consistent BACT determinations, and provide guidance to state and local regulatory programs as well as the regulated community, the EPA published guidance for conducting BACT determinations. The guidance includes the following documents:

- *Draft Top-Down BACT Summary* (EPA, 1990a)
- *Draft New Source Review Manual* (EPA, 1990b)
- *OAQPS Control Cost Manual, Fourth Edition* (EPA, 1990c)

Currently the FDEP requires applicants to follow the EPA's draft "top-down" procedures when conducting BACT evaluations, which are done on a case-by-case basis. These draft procedures have recently been formally proposed by EPA as part of the New Source Review Reform Package (61 Federal Register (FR) 38250, 7/23/96).

The "top-down" process requires initial consideration of the most stringent control technologies available, which may then be eliminated based on unacceptable source-specific energy, environmental, or economic impacts. This analysis includes technology transfers when applicable. For combustion turbines, the technical feasibility and economic impacts associated with the most stringent control technologies are typically the determinative factors. For the proposed Project, the economic impact analyses followed the procedures outlined in the above references.

The "top-down" process begins with the identification of various control technologies and strategies available to reduce emission levels of the pollutants subject to PSD review. The following sources were reviewed for identification of control technologies available for the proposed Project:

- California BACT Clearinghouse
- EPA BACT/LAER Clearinghouse
- Recent FDEP BACT Determinations
- EPA's Alternative Controls Techniques Document -- "Emissions from Stationary Gas Turbines" (EPA, 1993)

These sources provide the best information related to available control technologies and the most stringent emission limitations. The EPA BACT/LAER Clearinghouse data was downloaded from EPA's electronic bulletin board and a query was run on "internal combustion.". A separate query was run for the cooling tower. The results of the combustion turbine query are contained in Appendix 10.1.5.

The most stringent control technologies and strategies identified are as follows:

- Fuel Quality
- Good Combustion Practices

- Combustion Techniques
- Add-On Air Pollution Control Systems

The "top-down" evaluation included a review of each control technology and strategy including combinations, technology transfers, and the associated emission limitations.

Associated with each most stringent control technology is an emission limitation. These emission limitations form the basis of the BACT evaluation. For the proposed Unit 8 combustion turbine, the General Electric (GE) operating and emissions data are contained within Appendix 10.1.5.

### *3.4.3.2 Requirements and Assumptions*

As required under the "top-down" process, the technical feasibility, economic impacts, energy impacts, and environmental impacts of each of the various control technologies and strategies were evaluated. These impacts were used to determine the most appropriate control strategies for the Unit 8 combustion turbine and the cooling tower.

For the pollutants requiring an economic impact evaluation, annual emissions from the Unit 8 combustion turbine were estimated based on 8,760 hours of operation and reasonably expected future operations of the unit. Because the short-term emission rates for the unit vary based on fuel type, load, and ambient temperature, certain assumptions were made. For CO and VOCs, the short-term emission rates increase with decreasing load; for all other pollutants, the short-term emission rates remain unchanged or increase with load. The short-term rates generally increase with lower ambient temperatures. An ambient temperature of 59° F was used, which is conservative since the average annual ambient temperature at the site is about 67° F. For the economic analyses that were required, base-case annual emissions from the Unit 8 combustion turbine were based on GE emissions data and the following reasonable assumptions:

> For CO and VOCs, the unit was assumed to operate for 8,260 hours on clean pipeline quality natural gas and 500 hours on Number 2 (0.05% S) diesel fuel oil. Based on future expected operations, the unit was conservatively assumed to operate at 50 percent load for 19 percent of those hours, and at 100 percent load for the remainder of the hours. At these emission levels, the unit can operate within the proposed facility-wide $SO_2$ and $NO_x$ caps.
>
> For $NO_x$, the unit was assumed to operate at 100 percent load for 8,260 hours on clean pipeline quality natural gas and 500 hours on Number 2 (0.05% S) diesel fuel oil.

The cooling tower's conceptual design incorporates drift eliminators, allows for operation at five cycles of concentration, and reduces drift losses to 0.002 percent of the cooling tower water recirculation rate. Annual emissions of particulate matter (TSP and $PM_{10}$) were based on continuous (100 percent load) operation and the conceptual design.

### *3.4.3.3 Carbon Monoxide*

CO is formed within a combustion turbine through the incomplete combustion of liquid and gaseous fuels. High temperatures, adequate excess air, and good fuel/air mixing during combustion minimize CO emissions. CO formation is therefore a function of the unit's overall combustion efficiency, which is a measure of the percentage of carbon and hydrogen within a fuel that is converted to carbon dioxide and water. Complete or 100 percent conversions are only theoretical, so that products of incomplete combustion, including CO, are formed. The Unit 8 combustion turbine, as proposed, includes advanced GE dry-low $NO_x$ combustor technology that maximizes $NO_x$ reductions while minimizing CO and VOC emissions by varying the parameters which impact combustion efficiency. For the BACT analysis, the base-case CO emissions were estimated at 167 tons per year from the combustion turbine.

The combined use of good combustion practices and an oxidation catalyst was identified as the most stringent control technology currently available to control CO emissions. Combustion turbines equipped with an oxidation catalyst have had CO emissions limited to levels of about 2 and 3 ppm while firing natural gas and Number 2 fuel oil, respectively. For the proposed Unit 8 combustion turbine, this control equipment is known to be technologically feasible, but has been shown to have unacceptable economic, energy, and environmental impacts. "Good combustion practices" are typically determined to be the appropriate control technology for projects not required to meet the most stringent control technology's "Lowest Achievable Emission Rate" (LAER) limits that apply in nonattainment areas. The impacts of the control strategies are discussed in the following subsections.

*Summary of Technologies Evaluated*

The following control technologies were evaluated based on their control effectiveness:

- Oxidation Catalyst to reduce CO emissions by 90 percent; and
- Combustion controls to ensure good combustion.

Combustion controls represent the base case. Emission reductions were based the emission levels associated with the base case and a 90 percent control level.

*Energy Impacts*

An oxidation catalyst will result in a reduction in a combined cycle combustion turbine's overall performance and output capacity. The main loss is associated with the additional pressure drop across the catalyst bed. This pressure drop can range from 1 to 2 inches of water and can also reduce the unit's overall output by as much as 0.5 percent (1.25 MW). Although the energy impact may be measurable, it is not, by itself, considered significant enough to reject the control technology. Costs associated with the energy loss are included within the economic analysis.

*Environmental Impacts*

The environmental impacts resulting from the use of an oxidation catalyst can include increases of sulfur trioxide ($SO_3$) emissions and waste disposal. Increased $SO_3$ emissions are a result of the conversion of $SO_2$ to $SO_3$ in the presence of the oxidation catalyst. Water vapor within the exhaust gases can react with this additional $SO_3$ to form $H_2SO_4$. In addition, the disposal of the spent catalyst every two years also would place additional burdens on available landfill space. These potential environmental impacts alone were not considered significant enough to reject the control technology.

*Economic Impacts*

The economic impacts were based on the costs of an oxidation catalyst in accordance with the procedures outlined in the EPA's "*Cost Control Manual*" (EPA, 1990c) and the draft '*New Source Review Workshop Manual*" (EPA, 1990b). Appendix 10.1.5 contains the capital and operating cost factors used in the oxidation catalyst and later selective catalytic reduction (SCR) analyses.

Engelhard provided an estimated oxidation catalyst system cost of \$830,000 for the 90 percent reduction of CO emissions, with a warranty period of two years. Seventy-five percent of this system's cost was reported to be associated with the catalyst, including replacement. The design criteria were based on firing Number 2 (0.05 % S) diesel fuel oil at 50 percent load and meeting the 2 and 3 ppm LAER limits for gas and oil firing.

The economic analysis reduces capital and operating costs to annualized values based on a 20-year economic life of the Project and a 7.25 percent return. On this basis, an oxidation system would add approximately \$1.5 million to the capital cost of the Project.

The total levelized annual costs for the Project would increase by about \$1.2 million per year, resulting in an incremental removal cost of approximately \$7,720 per ton. The cost per ton for controlling CO emissions through the use of an oxidation catalyst is prohibitively expensive. This result is consistent with other recent BACT determinations by FDEP where good combustion practices were determined to be BACT. The use of good combustion practices to minimize CO emissions is therefore proposed as BACT for the Unit 8 combustion turbine.

### *3.4.3.4 Particulate Matter (TSP) And $PM_{10}$*

*Combustion Turbine*

Emissions of particulate matter (TSP) and $PM_{10}$ result from inert materials within the fuel, products of incomplete combustion, and inert materials within the combustion turbine inlet air. The New Source Performance Standards (NSPS) for combustion turbines, 40 CFR 60 Subpart GG do not establish emission limits for particulate matter. All of the particulates emitted from the combustion turbine are expected to be less than 10 microns in diameter. Thus, the emissions of TSP equal the emissions of $PM_{10}$ and further discussion of particulate matter will refer to $PM_{10}$.

The combustion turbine has $PM_{10}$ emissions levels of 9 lb/hr (0.0058 lb/mmBtu) while firing clean pipeline quality natural gas and 17 lb/hr (0.0096 lb/mmBtu), while firing Number 2 (0.05% S) diesel fuel oil, exclusive of background concentrations per the GE data sheets. These factors are based more on the uncertainties in $PM_{10}$ stack testing methods than on the expectation of large quantities of inert materials within the combustion turbine inlet air or the fuel (GE, 1996a). Since inert materials can cause turbine damage resulting in additional downtime and maintenance, combustion turbines are normally fired with clean fuels such as natural gas and Number 2 diesel fuel oil. Air filtration systems are also employed to avoid the introduction of inert materials into the combustion turbine through the inlet air. In addition, good combustion practices are followed for both environmental and economic reasons.

The most stringent control technology associated with combustion turbines for $PM_{10}$ is a combination of fuel quality, good combustion practices, and combustion turbine inlet air filtration. Add-on air pollution control strategies such as baghouses, scrubbers, and electrostatic precipitators (ESPs) have not been used on combustion turbines and their use as a transfer technology has been deemed neither technically nor economically feasible for combustion turbines due to anticipated back pressure problems. The emission levels associated with the most stringent controls were based on a North Carolina BACT determination of 9 lb/hr and 17 lb/hr when firing natural gas and Number 2 fuel oil, respectively. The Unit 8 combustion turbine has $PM_{10}$ emission levels equal to those associated with the most stringent technology. Therefore, no further energy, environmental, or economic analysis was required. For the combustion turbine, BACT for the $PM_{10}$ emissions is proposed as combustion turbine inlet air filtration, good combustion practices, and the use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil.

***Cooling Tower***

Emissions of particulate matter (TSP and $PM_{10}$) result from the direct contact between the cooling water and the air passing through it. As the air and water make contact, some water may become entrained within the air stream and carried out of the tower as "drift" droplets, which is known as drift loss. The cooling water, and consequently the drift droplets, typically contain dissolved and suspended solids. These solids constitute the particulate matter within the droplet and are considered in calculating the total $PM_{10}$ emissions. The amount of drift loss depends on the number and size of the droplets produced within the cooling tower and is related to the overall design of the cooling tower. Typically, larger droplets will fall to the ground near the tower while smaller droplets may evaporate, leaving the solids suspended within the atmosphere. The amount of particulate emissions including TSP and $PM_{10}$ depends on the amount of drift loss and the concentration of solids within the cooling tower water.

To reduce drift losses from cooling towers, and therefore indirectly lower particulate emissions, drift eliminators can be incorporated into the tower design. A single BACT determination for a cooling tower was identified in the control technology review, establishing drift eliminators as BACT, with an emission limitation of 0.002 percent of the recirculating water flow. The proposed cooling tower for the Purdom Station will incorporate drift eliminators, operate at 5 cycles of concentration, and reduce drift losses to 0.002 percent of the cooling tower recirculation rate. BACT for particulate matter emissions from the cooling tower is therefore proposed as the use of drift eliminators.

### *3.4.3.5 Other Pollutants*

In addition to the pollutants subject to BACT, evaluations of the Unit 8 combustion turbine's emissions of other PSD pollutants was also conducted, although not required by the applicable regulations. These other pollutants included $SO_2$, $H_2SO_4$, $NO_x$, VOC, Fl, and trace metals. The findings regarding each of these pollutants are discussed in the following sections.

### *Sulfur Dioxide and Sulfuric Acid Mist*

Sulfur dioxide emissions are a direct result of the oxidation of the various sulfur compounds contained within the fuel stream. Both natural gas and Number 2 fuel oil contain some sulfur compounds. In either case, the oxidation process follows the general chemical reaction:

$$S + O_2 \Rightarrow SO_2$$

Sulfuric acid mist is the result of the oxidation of $SO_2$ to $SO_3$ and the subsequent reaction with moisture to form $H_2SO_4$. This process follows the following general chemical reactions:

$$2SO_2 + O_2 \Rightarrow 2SO_3$$

$$SO_3 + H_2O \Rightarrow H_2SO_4$$

Combustion of both clean pipeline quality natural gas and the Number 2 (0.05% S) diesel fuel oil will result in emissions of $SO_2$ and $H_2SO_4$. Because $SO_2$ and $H_2SO_4$ emissions are directly proportional to the sulfur content of the fuel, they can be controlled through fuel quality. The most stringent $SO_2$ and $H_2SO_4$ emission standards for combustion turbines are related to fuel quality. The $SO_2$ and $H_2SO_4$ emissions from the Unit 8 combustion turbine are based on GE data which Project that 95 percent of the sulfur in the fuel would be emitted as $SO_2$ and the remaining 5 percent emitted as $H_2SO_4$.

The Unit 8 combustion turbine will fire clean pipeline quality natural gas as the primary fuel with Number 2 (0.05% S) diesel fuel oil as the secondary fuel, which meets the most stringent emission levels reported. In addition, the use of the Number 2 fuel oil with a sulfur content of 0.05 percent by weight is well within the NSPS requirements of Subpart GG, which specifies a maximum sulfur content of 0.8 percent by weight.

### *Oxides of Nitrogen*

Emissions of $NO_x$ from combustion turbines are generated by two primary mechanisms known as "fuel $NO_x$" and "thermal $NO_x$." Fuel $NO_x$ is related to the nitrogen content of the fuels fired in the combustion turbine. Most solid and liquid fuels contain some quantities of nitrogen within their chemical structure, known as fuel bound nitrogen (FBN), which when burned can produce $NO_x$ emissions or "fuel $NO_x$." Within combustion turbines, FBN is only a concern when firing fuel oils, since clean pipeline quality natural gas typically contains little or no FBN. The production of fuel $NO_x$ can follow the generalized chemical reaction:

$$C_xH_yN + zO_2 \Rightarrow xCO_2 + (y/2)H_2O + NO_x$$

Fuel $NO_x$ represents a relatively small but measurable portion of the overall $NO_x$ emissions generated by a combustion turbine. For combustion turbines, NSPS Subpart GG establishes a base $NO_x$ emissions standard of 75 parts per million by volume on a dry basis (ppmvd) corrected to 15 percent oxygen at ISO ambient conditions. This standard includes additional allowances for the heat rate and for FBN.

The second mechanism by which $NO_x$ emissions are formed within a combustion turbine is known as "thermal NOx" and is a result of the dissociation of nitrogen ($N_2$) and Oxygen ($O_2$) in the combustion air and the subsequent reactions to form $NO_x$. The Zeldovich mechanism has been proposed for this reaction and is based on the following general equations:

**Dissociation**

$$N_2 \Leftrightarrow 2N\bullet$$

$$O_2 \Leftrightarrow 2O\bullet$$

**Reaction**

$$N_2 + 3O\bullet \Leftrightarrow 2NO + O\bullet$$

$$O_2 + N\bullet \Leftrightarrow NO + O\bullet$$

$$N\bullet + O\bullet \Leftrightarrow NO$$

The dissociation reactions, which produce elemental nitrogen and oxygen, are favored under conditions of high temperatures and pressures. Combustion controls focus on reducing thermal $NO_x$ production by reducing the peak flame temperatures within the combustion zone. Peak flame temperatures are controlled by either wet injection systems or by varying the stoicheometric ratio of the combustion air and fuels within the combustion zones. Wet injection systems involve the injection of either water or steam into the combustion zone to act as a heat sink and lower flame temperatures. Varying the stoicheometric ratios through staged combustion reduces flame temperatures and the nitrogen concentrations within the combustion zone. This later technique forms the basis of the dry low-$NO_x$ combustors offered by various manufacturers. Appendix A of the PSD Report in Appendix 10.1.5 contains information provided by General Electric on its dry-low NOx development program, a technical paper on dry-low NOx technology, and the emissions data sheets for the proposed Unit.

For Unit 8, $NO_x$ emission levels of 9 ppmvd (0.037 lb/mmBtu) while firing clean pipeline quality natural gas and 42 ppmvd (0.181 lb/mmBtu) while firing Number 2 (0.05% S) diesel fuel oil have been guaranteed up to a maximum of 0.015 percent FBN. Thermal $NO_x$ emissions will be controlled by the use of an advanced dry low-$NO_x$ combustor while firing clean pipeline quality natural gas and water injection while firing Number 2 (0.05% S) diesel fuel oil, respectively. The proposed emission ~~limits~~ levels are well below those of 40 CFR 60 Subpart GG and also below those considered BACT in recent FDEP determinations. However, the proposed combustion turbine's $NO_x$ levels are above those associated with the most stringent emission limitations (3.5 ppmvd - natural gas and 10 ppmvd - fuel oil) placed on projects located within non-attainment areas. As such Foster Wheeler examined the costs associated with the installation of an add-on air pollution control technology were examined.

Add-on air pollution control systems for reducing emissions of $NO_x$ from combustion sources include selective catalytic reduction (SCR) and selective noncatalytic reduction (SNCR). Currently, SCR in combination with either wet injection or dry low-$NO_x$ technologies is the most efficient control technology employed to control $NO_x$ emissions from combustion turbines. Combustion turbines equipped with SCR systems have demonstrated compliance with emission limits as low as 3.5 ppmvd and 10 ppmvd, corrected to 15 percent $O_2$, while firing natural gas and Number 2 fuel oil, respectively. Because of the current temperature limitations of the available SNCR systems, their use on combustion turbines is not considered to be technologically feasible. Therefore, the evaluation addressed only SCR as an available add-on control technology for $NO_x$.

As part of the evaluation, the economic impact of an SCR system was considered. The economic impact analysis followed EPA's suggested procedures. A vendor quote was received for an SCR system, with a three-year catalyst warranty. The quote estimated the initial capital cost for an SCR system to be $1,676,000. In addition to this initial cost, the vendor estimated additional costs of $300,000 to $350,000 per year for catalyst replacement. The SCR design criteria was based on meeting the 3.5 and 10 ppmvd LAER limits for all gas and oil firing.

The economic impacts analysis reduced capital and operating costs to annualized values based on a twenty-year economic life of the Project and a 7.25 percent return. The analysis indicated that an SCR system would add approximately $3.1 million to the overall capital cost of the Project. The total levelized annual costs for the Project would increase by about $1.5 million per year, resulting in an incremental removal cost of approximately $7,225 per ton. Based on the economics impacts alone, it was determined that controlling $NO_x$ emissions through an SCR system would be prohibitively expensive, consistent with other recent BACT determinations by FDEP.

In addition to the economic impacts, the use of an SCR system would result in a reduction in the combined cycle combustion turbine's performance and output capacity. The main loss is associated with the additional pressure drop across the ammonia injection grid and the catalyst bed. This pressure drop can range from 2 to 5 inches of water and can reduce the overall unit output by as much as 0.5 percent. In addition, energy losses are associated with the pumps and instrumentation used to control and operate the ammonia injection system. Although these energy impacts may be measurable, they were not by themselves considered significant enough to reject the control technology. Costs associated with the energy loss have been included within the economic analysis.

Environmental impacts resulting from the use of an SCR system include emission increases of $SO_3$ and $PM_{10}$ emissions, waste disposal, increased water usage, and the storage, handling, and emissions of ammonia and ammonia products. Increased $SO_3$ emissions are a result of the catalytic oxidation of $SO_2$ to $SO_3$ in the presence of the SCR catalyst. As discussed previously, $SO_3$ can be expected to form $H_2SO_4$ in the presence of water vapor within the exhaust gases. $SO_3$ can also be expected to react with ammonia to form either ammonium bisulfate or ammonium sulfate, which will be reflected as increased $PM_{10}$ emissions and which could potentially cause fouling in the HRSG. In addition to the increases in $SO_3$ and $PM_{10}$ emissions, the SCR system could also introduce ammonia emissions into the environment. Disposal of the spent catalyst every three years will place additional burdens on available landfill space. Water usage would increase by about 136,500 gallons per year through the use of the aqueous ammonia solution. The handling, storage, and use of aqueous ammonia does pose less of an environmental threat than that of anhydrous ammonia from the standpoint of an accidental air release. However, because of the Purdom Station's location along the banks of the St. Marks River, the potential handling and storage of an aqueous ammonia solution would have to be addressed from an accidental spill and release perspective.

Based on the various impact analyses, BACT for $NO_x$ emissions from the combustion turbine is proposed to be the use of clean pipeline quality natural gas as the primary fuel and Number 2 (0.05% S) diesel fuel oil as the secondary fuel, and the use of dry-Low-$NO_x$ combustors and a water injection system when firing clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil, respectively.

### *Volatile Organic Compounds*

Within a combustion process, emissions of VOCs are related to the combustion efficiency of the unit. Combustion control strategies for VOCs are similar to those for CO which target high temperatures, long residence times, and adequate excess air. For combustion turbines, NSPS Subpart GG does not establish emission limits for VOC emissions.

The Unit 8 combustion turbine will have VOC levels of 2 parts per million volume on a wet basis (ppmvw) (0.0018 lb/mmBtu) and 5 ppmvw (0.0042 lb/mmBtu), while firing clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil, respectively, for loads above 75 percent. These values are representative of BACT for these loads. For loads below 75 percent, the VOC levels are higher, as reported in the GE data sheets. The most stringent control technology for VOCs have associated emission levels of 1.5 and 3 ppmvw for natural gas and Number 2 (0.05% S) diesel fuel oil firing, respectively.

For combustion turbines, add-on air pollution control strategies for VOCs include oxidation catalysts. The use of an oxidation catalyst for the reduction of CO emissions was evaluated for the Unit 8 combustion turbine. Since VOC emissions were not subject to BACT review, a separate cost analysis for an oxidation catalyst to reduce VOCs was not conducted. However, by assuming a 30 percent reduction of VOC emissions across the CO oxidation catalyst, and by adding the additional reduction in VOC emissions to those of CO, the additional benefit of a lower incremental cost of the system was identified. This lower incremental cost was estimated at $7,510 per ton of CO and VOC removed. Although the combination of VOC and CO reductions is slightly higher, making the incremental removal cost lower, the economic cost of an oxidation catalyst was still considered to be unreasonably expensive.

### *Trace Metals*

Emissions of trace metals result from inert materials within the fuel and combustion turbine inlet air. Clean pipeline quality natural gas contains little, if any, noncombustible inert materials; trace metal emissions are considered negligible. For mercury, an emission factor of 0.078 lb/$10^{12}$ Btu has been used for this analysis. Number 2 fuel oil has a reported ash content of less than 0.01 percent by weight (Perry, 1973). Emissions of trace metals from the use of Number 2 (0.05% S) diesel fuel oil are therefore expected to be higher when compared to clean pipeline quality natural gas, but are still relatively low. For the Unit 8 combustion turbine on fuel oil, emissions of trace metals have been estimated based on AP-42 emission factors (EPA, 1995) for lead (194 lb/$10^{12}$ Btu), beryllium (4.2 lb/$10^{12}$ Btu), and mercury (32 lb/$10^{12}$ Btu).

As discussed under the section regarding $PM_{10}$ emissions, BACT for trace metal emissions from combustion turbines has been determined to be fuel quality, good combustion practices, and combustion turbine inlet air filtration. NSPS Subpart GG does not contain any emission standards for trace metals nor did any of the reported BACT determinations. Consistent with other recent FDEP determinations of BACT for trace metal emissions from combustion turbines, the use of clean pipeline quality natural gas as the primary fuel with Number 2 (0.05% S) diesel fuel oil as the secondary fuel, good combustion practices, and combustion turbine inlet air filtration are proposed as BACT for Unit 8.

*Total Fluorides*

The review of the most stringent control technologies did not identify any emission limitations associated with fluoride emissions from combustion turbines. Fluoride emissions are associated with the use of fuel oil. Fuel quality is therefore proposed as BACT for fluoride emissions from the Unit 8 combustion turbine, with clean pipeline quality natural gas as the primary fuel and Number 2 (0.05% S) diesel fuel oil as the secondary fuel.

#### *3.4.3.6 BACT Summary*

The BACT evaluation examined the available fuels, combustion technologies, and add-on air pollution control systems. Based on the evaluations, BACT for the Project includes the following:

- For the primary control of CO and VOC emissions from the combustion turbine, good combustion practices, which maximize $NO_x$ reductions while minimizing CO, VOCs, and $PM_{10}$ emissions are proposed as BACT. For CO, the evaluation is based on the economic impacts of an oxidation catalyst, which represents the most stringent control technology.
- For the primary control of PM, $PM_{10}$, trace metals, and total fluorides emissions from the combustion turbine, inlet air filtration coupled with good combustion practices and fuel quality are proposed as BACT. The use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil is the most stringent control technology available.
- For the primary control of $NO_x$, combustion controls including dry-low $NO_x$ combustors and wet injection techniques coupled with fuel quality are representative of BACT. The evaluation is based on the economic impacts associated with an SCR system, which represents the most stringent control technology available.
- For the primary control of $SO_2$ and $H_2SO_4$, and the secondary control of $NO_x$ and $PM_{10}$, the use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil is the most stringent control technology available.
- For the primary control of PM and $PM_{10}$ from the cooling towers, drift eliminators which reduce drift losses are proposed as BACT and are the most stringent control technology available.

### 3.4.4 Design Philosophy

The proposed Project design reflects an appreciation for the environment in Wakulla County. The Project's goals include the protection of that environment while providing for the growing electrical needs of the Tallahassee area. Design commitments include special protections for air quality due to the Purdom Station's proximity to the Bradwell Bay National Wilderness Area, and the St. Marks National Wildlife Refuge and its location along the St. Marks River.

These special protections are reflected in an overall plant-wide control strategy, which includes no net increases in annual emissions of $SO_2$ and $NO_x$ above recent actual levels, the application of BACT for all PSD pollutants, the use of clean fuels including clean pipeline quality natural gas as the primary fuel and Number 2 (0.05% S) diesel fuel oil as the secondary fuel, the installation of advanced combined cycle technology, and the early retirement of two older units. The use of advanced combined cycle technology will allow the Purdom Station to run more efficiently with nearly triple the current plant capacity. In addition, Unit 8 will have the lowest $NO_x$ emissions permitted to date for a major natural-gas-fired electric generating station in Florida.

### 3.4.5 References

EPA (U.S. Environmental Protection Agency). 1990a. "Top-Down" Best Available Control Technology Guidance Document (Draft). Office of Air Quality Planning and Standards, March 15. Research Triangle Park, North Carolina.

EPA. 1990b. New Source Review Workshop Manual (Draft). Office of Air Quality Planning and Standards. October. Research Triangle Park, North Carolina.

EPA. 1990c. OAQPS Control Cost Manual, Fourth Edition. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

EPA. 1993. Alternative Control Techniques Document - $NO_x$ Emissions from Stationary Gas Turbines. EPA-453/R-93-007. Research Triangle Park, North Carolina.

EPA. 1995. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, AP-42, 5th Edition January. Research Triangle Park, North Carolina.

Perry, R. H., and C. H. Chilton. 1973. Chemical Engineer's Handbook, 5th Edition. McGraw-Hill Book Company. New York, New York.

## 4.5 AIR IMPACTS

### 4.5.1 Air Quality Impacts

During the construction period, unavoidable air pollutant emissions are likely to occur from various construction-related activities. The most prevalent construction emissions are fugitive dust. However, minor emissions of oxides of nitrogen ($NO_x$), sulfur dioxide ($SO_2$), carbon monoxide (CO), particulate matter (TSP and $PM_{10}$), and volatile organic compounds (VOCs) are also likely during construction. Emissions of these pollutants generally are minimized through standard control measures.

#### *4.5.1.1 Fugitive Dust*

Fugitive emissions are defined in Rule 62-210.200(136), F.A.C., as "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." Fugitive dust, one component of fugitive emissions, is generally defined as natural and/or man-associated dusts that become airborne due to the forces of wind or human activity. Construction-phase fugitive dust emissions will be generated during site grading and excavation, and due to vehicular activity.

The quantities of fugitive dust emitted by the site construction vehicular traffic will be dependent on a number of factors, including the frequency of operations, specific operations being conducted, weather, and soil conditions. During the earthwork operations, dust control measures will be in force and will typically require moisture conditioning of the soils in the excavation and compaction areas and along the defined roadways between these areas.

#### *4.5.1.2 Other Air Pollutant Emissions*

It is anticipated that total gaseous emissions during construction will be extremely small. Potential sources of VOC emissions include evaporative losses associated with on-site painting, refueling of construction equipment, and the application of adhesives and waterproofing chemicals. The frequency and extent of these activities are limited and they will have minimal impact on air quality.

Exhaust emissions from construction equipment will also contain small amounts of $NO_x$, $SO_2$, CO, TSP, $PM_{10}$, and VOCs resulting from incomplete combustion of fuel. However, due to the nature of heavy-duty diesel-powered construction vehicles, which allow for more complete combustion and less volatile fuels than spark-ignited engines, these emissions are relatively low.

Open burning is not anticipated since the site for Unit 8 is already cleared, and construction debris will be hauled off to a landfill rather than being burned. Thus, air pollutant emissions due to open burning are not anticipated. Also, since an on-site concrete batch plant is not planned, there will be no fugitive emissions from such a plant.

### 4.5.2 Air Quality Control Methods

The impact of heavy construction activities and site preparation on air quality will be short-term and confined to the immediate vicinity of the construction activity. This is primarily because most of the fugitive dust created by construction traffic consists of relatively large particles (i.e., larger than those which constitute $PM_{10}$). These large particles tend to settle quickly rather than remain suspended for transport over long distances.

Job site guidelines for minimizing emissions of fugitive dust from identifiable construction sources will include a combination of the following techniques:

- Contractors will be instructed to comply with any applicable state and local regulations governing open-bodied trucks hauling sand, gravel, or soil between on-site and off-site areas. This could include providing covers or moistening the load with water and wheel washing to reduce dusting.
- Areas disturbed during construction will be stabilized by mulching or seeding as soon as practicable.
- When construction occurs on bare ground, water (possibly together with non-hazardous wetting agents) will be used as necessary to help suppress dust.
- Temporary vehicular surfaces of crushed rock will be used in high traffic areas. Areas not subject to heavy traffic or continual disturbance will be wetted down as needed using nontoxic substances to help suppress dust.
- Sandblasting operations will be localized to minimize effects on adjacent work areas. Protective covers will also be utilized where practicable.

Because of mitigative measures which will be employed, it is not expected that vehicular emissions or fugitive dust will present any significant air quality problems during the construction period.

### 4.5.3 Ambient Air Quality Monitoring Program

Air quality monitoring for construction-related fugitive dust or other air pollutants is not proposed. Periodic visual inspections of the job site will be conducted to ensure compliance with guidelines for minimizing emissions of fugitive dust during construction of the proposed facility.

## 10.5.6 Meteorology/Air Quality

### *10.5.6.1 Joint Frequency Distribution of Wind Direction and Speed by Atmospheric Stability Class (Star Program Output) Tallahassee Regional Airport 1985-1989*

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION A STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .001072 | .002259 | .000000 | .000000 | .000000 | .000000 | .003331 |
| NNE | .000502 | .001164 | .000000 | .000000 | .000000 | .000000 | .001666 |
| NE | .000561 | .000890 | .000000 | .000000 | .000000 | .000000 | .001451 |
| ENE | .000221 | .000639 | .000000 | .000000 | .000000 | .000000 | .000860 |
| E | .000456 | .000753 | .000000 | .000000 | .000000 | .000000 | .001209 |
| ESE | .000320 | .000593 | .000000 | .000000 | .000000 | .000000 | .000913 |
| SE | .000324 | .000616 | .000000 | .000000 | .000000 | .000000 | .000940 |
| SSE | .000452 | .000730 | .000000 | .000000 | .000000 | .000000 | .001182 |
| S | .000789 | .001118 | .000000 | .000000 | .000000 | .000000 | .001907 |
| SSW | .000239 | .000593 | .000000 | .000000 | .000000 | .000000 | .000833 |
| SW | .000272 | .000319 | .000000 | .000000 | .000000 | .000000 | .000591 |
| WSW | .000277 | .000502 | .000000 | .000000 | .000000 | .000000 | .000779 |
| W | .000252 | .000662 | .000000 | .000000 | .000000 | .000000 | .000913 |
| WNW | .000218 | .000319 | .000000 | .000000 | .000000 | .000000 | .000537 |
| NW | .000190 | .000616 | .000000 | .000000 | .000000 | .000000 | .000806 |
| NNW | .000475 | .000707 | .000000 | .000000 | .000000 | .000000 | .001182 |
| TOTAL | .006618 | .012482 | .000000 | .000000 | .000000 | .000000 | |

FREQUENCY OF OCCURENCE OF A STABILITY = .019100
FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH A STABILITY = .002875

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION B STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .004790 | .010634 | .007416 | .000000 | .000000 | .000000 | .022840 |
| NNE | .002620 | .005887 | .004085 | .000000 | .000000 | .000000 | .012592 |
| NE | .001680 | .004062 | .002579 | .000000 | .000000 | .000000 | .008320 |
| ENE | .001568 | .002738 | .001643 | .000000 | .000000 | .000000 | .005949 |
| E | .002357 | .002967 | .002168 | .000000 | .000000 | .000000 | .007492 |
| ESE | .001803 | .003103 | .001232 | .000000 | .000000 | .000000 | .006139 |
| SE | .001692 | .002510 | .001757 | .000000 | .000000 | .000000 | .005959 |
| SSE | .001793 | .002852 | .001483 | .000000 | .000000 | .000000 | .006129 |
| S | .001989 | .004039 | .002807 | .000000 | .000000 | .000000 | .008835 |
| SSW | .001003 | .001894 | .001073 | .000000 | .000000 | .000000 | .003969 |
| SW | .001254 | .001826 | .000981 | .000000 | .000000 | .000000 | .004061 |
| WSW | .000931 | .001575 | .000593 | .000000 | .000000 | .000000 | .003099 |
| W | .001117 | .001780 | .001004 | .000000 | .000000 | .000000 | .003901 |
| WNW | .000813 | .001301 | .000822 | .000000 | .000000 | .000000 | .002935 |
| NW | .001127 | .002031 | .001232 | .000000 | .000000 | .000000 | .004390 |
| NNW | .001852 | .003081 | .001962 | .000000 | .000000 | .000000 | .006895 |
| TOTAL | .028388 | .052280 | .032837 | .000000 | .000000 | .000000 | |

FREQUENCY OF OCCURENCE OF B STABILITY = .113505
FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH B STABILITY = .010132

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION C STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .002595 | .010337 | .018781 | .001871 | .000000 | .000000 | .033584 |
| NNE | .000984 | .004016 | .008694 | .001095 | .000000 | .000000 | .014790 |
| NE | .000566 | .002601 | .004997 | .000822 | .000000 | .000000 | .008987 |
| ENE | .000568 | .002077 | .004244 | .000525 | .000000 | .000000 | .007413 |
| E | .000828 | .002601 | .004769 | .000616 | .000023 | .000000 | .008838 |
| ESE | .000604 | .002145 | .003263 | .000593 | .000000 | .000000 | .006605 |
| SE | .000499 | .002145 | .003240 | .000662 | .000000 | .000000 | .006546 |
| SSE | .000712 | .002168 | .005043 | .000981 | .000023 | .000000 | .008927 |
| S | .000900 | .003446 | .006777 | .001711 | .000000 | .000000 | .012835 |
| SSW | .000583 | .001826 | .002328 | .000456 | .000000 | .000000 | .005193 |
| SW | .000586 | .001666 | .002031 | .000251 | .000000 | .000000 | .004533 |
| WSW | .000463 | .001187 | .001415 | .000251 | .000000 | .000000 | .003315 |
| W | .000582 | .001460 | .001620 | .000183 | .000000 | .000000 | .003845 |
| WNW | .000582 | .001460 | .001506 | .000160 | .000000 | .000000 | .003708 |
| NW | .000459 | .002054 | .001826 | .000137 | .000000 | .000000 | .004476 |
| NNW | .000950 | .002716 | .003857 | .000274 | .000000 | .000000 | .007795 |
| TOTAL | .012459 | .043905 | .074392 | .010588 | .000046 | .000000 | |

FREQUENCY OF OCCURENCE OF C STABILITY = .141390
FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH C STABILITY = .007234

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION D STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .006319 | .019465 | .022044 | .011478 | .000274 | .000000 | .059580 |
| NNE | .002505 | .009447 | .015175 | .004746 | .000114 | .000000 | .031987 |
| NE | .002317 | .006869 | .008535 | .002442 | .000251 | .000000 | .020413 |
| ENE | .001388 | .005112 | .006093 | .001620 | .000046 | .000091 | .014350 |
| E | .002055 | .006298 | .006412 | .001643 | .000160 | .000046 | .016614 |
| ESE | .001646 | .005203 | .004769 | .001415 | .000205 | .000000 | .013238 |
| SE | .001718 | .005157 | .005294 | .003560 | .000251 | .000068 | .016049 |
| SSE | .002283 | .005614 | .008352 | .004906 | .000342 | .000023 | .021520 |
| S | .003376 | .009516 | .012459 | .009219 | .000456 | .000046 | .035073 |
| SSW | .001514 | .003240 | .003560 | .001552 | .000068 | .000023 | .009957 |
| SW | .001222 | .002807 | .002807 | .000799 | .000023 | .000000 | .007657 |
| WSW | .000957 | .001917 | .001415 | .000525 | .000000 | .000000 | .004813 |
| W | .001246 | .002487 | .001392 | .000548 | .000023 | .000000 | .005696 |
| WNW | .001199 | .001917 | .001826 | .000525 | .000000 | .000000 | .005466 |
| NW | .001084 | .002784 | .001848 | .000844 | .000000 | .000000 | .006560 |
| NNW | .001965 | .004427 | .003491 | .001620 | .000023 | .000000 | .011527 |
| TOTAL | .032792 | .092260 | .105472 | .047442 | .002236 | .000297 | |

FREQUENCY OF OCCURENCE OF D STABILITY = .280498

FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH D STABILITY = .018803

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION E STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .000000 | .014217 | .007439 | .000000 | .000000 | .000000 | .021656 |
| NNE | .000000 | .005112 | .002967 | .000000 | .000000 | .000000 | .008078 |
| NE | .000000 | .005385 | .001848 | .000000 | .000000 | .000000 | .007234 |
| ENE | .000000 | .003674 | .001552 | .000000 | .000000 | .000000 | .005226 |
| E | .000000 | .005226 | .001392 | .000000 | .000000 | .000000 | .006618 |
| ESE | .000000 | .003172 | .000662 | .000000 | .000000 | .000000 | .003834 |
| SE | .000000 | .002921 | .000525 | .000000 | .000000 | .000000 | .003446 |
| SSE | .000000 | .003583 | .000822 | .000000 | .000000 | .000000 | .004404 |
| S | .000000 | .005773 | .001780 | .000000 | .000000 | .000000 | .007553 |
| SSW | .000000 | .002693 | .000525 | .000000 | .000000 | .000000 | .003218 |
| SW | .000000 | .001643 | .000662 | .000000 | .000000 | .000000 | .002305 |
| WSW | .000000 | .001324 | .000205 | .000000 | .000000 | .000000 | .001529 |
| W | .000000 | .001004 | .000228 | .000000 | .000000 | .000000 | .001232 |
| WNW | .000000 | .000958 | .000319 | .000000 | .000000 | .000000 | .001278 |
| NW | .000000 | .001232 | .000570 | .000000 | .000000 | .000000 | .001803 |
| NNW | .000000 | .002624 | .001575 | .000000 | .000000 | .000000 | .004199 |
| TOTAL | .000000 | .060540 | .023071 | .000000 | .000000 | .000000 | |

FREQUENCY OF OCCURENCE OF E STABILITY = .083611
FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH E STABILITY = .000000

TALLAHASSEE FLORIDA 1985 - 1989 STAR DECK (ISCST3)
FREQUENCY DISTRIBUTION F STABILITY

SPEED(MPH)

| DIRECTION | 1 - 3 | 4 - 7 | 8 - 12 | 13 - 18 | 19 - 24 | GREATER THAN 24 | TOTAL |
|---|---|---|---|---|---|---|---|
| N | .079293 | .021154 | .000000 | .000000 | .000000 | .000000 | .100447 |
| NNE | .014046 | .004861 | .000000 | .000000 | .000000 | .000000 | .018907 |
| NE | .013762 | .004495 | .000000 | .000000 | .000000 | .000000 | .018257 |
| ENE | .009621 | .003309 | .000000 | .000000 | .000000 | .000000 | .012929 |
| E | .014763 | .004404 | .000000 | .000000 | .000000 | .000000 | .019167 |
| ESE | .008461 | .002259 | .000000 | .000000 | .000000 | .000000 | .010720 |
| SE | .006320 | .001346 | .000000 | .000000 | .000000 | .000000 | .007667 |
| SSE | .008765 | .001826 | .000000 | .000000 | .000000 | .000000 | .010590 |
| S | .020512 | .003788 | .000000 | .000000 | .000000 | .000000 | .024300 |
| SSW | .015507 | .002556 | .000000 | .000000 | .000000 | .000000 | .018062 |
| SW | .014806 | .002282 | .000000 | .000000 | .000000 | .000000 | .017088 |
| WSW | .011427 | .001438 | .000000 | .000000 | .000000 | .000000 | .012865 |
| W | .013924 | .001734 | .000000 | .000000 | .000000 | .000000 | .015658 |
| WNW | .013889 | .002419 | .000000 | .000000 | .000000 | .000000 | .016308 |
| NW | .017366 | .003035 | .000000 | .000000 | .000000 | .000000 | .020401 |
| NNW | .032071 | .006458 | .000000 | .000000 | .000000 | .000000 | .038529 |
| TOTAL | .294532 | .067363 | .000000 | .000000 | .000000 | .000000 | |

FREQUENCY OF OCCURENCE OF F STABILITY = .361896
FREQUENCY OF CALMS DISTRIBUTED ABOVE WITH F STABILITY = .234791

## 10.1.5 Prevention of Significant Deterioration Application (and Title V and IV)

## APPLICATION SUMMARY

The City of Tallahassee is proposing the construction of a new Unit 8 at its existing Purdom Generating Station located in Wakulla County, Florida. The proposed Unit 8 will include a combustion turbine equipped with a nonfired heat recovery steam generator (HRSG), a steam turbine/generator, a mechanical draft cooling tower, and associated facilities. The proposed unit will have a nominal generating capacity of 250 mega-Watts (MW). The combustion turbine will generate a nominal 160 MW and will be fired by either clean pipeline quality natural gas or Number 2 diesel fuel oil with a maximum sulfur content of 0.05 percent by weight. The proposed combustion turbine is an advanced General Electric (GE) unit equipped with dry low-$NO_x$ combustors and a water injection system for minimizing emissions of oxides of nitrogen ($NO_x$) while firing natural gas and Number 2 diesel fuel oil, respectively. The HRSG will be a nonfired unit coupled with a steam turbine/generator with a nominal capacity of 90 MW. The mechanical draft cooling tower will be equipped with drift eliminators to minimize drift losses while reducing particulate matter (TSP & $PM_{10}$) emissions.

As part of the construction project, the Purdom Generating Station will be subject to federally enforceable facility-wide emission caps on sulfur dioxide ($SO_2$) and $NO_x$ to be implemented following completion of the compliance testing of the Unit 8 combustion turbine. As part of the proposed project and emission caps, existing stream generating units 5 and 6 will be permanently shut down and annual operation of the existing Unit 7 steam generator, the existing combustion turbines, and the auxiliary boiler will be indirectly restricted. The proposed emission caps will hold future allowable emissions of $SO_2$ and $NO_x$ to their current actual levels so that there will be no net annual increase in emissions of these pollutants. In addition, the caps will indirectly limit emissions of other pollutants including, but not limited to, carbon monoxide (CO), particulate matter (TSP & $PM_{10}$) volatile organic compounds (VOC), trace metals, fluorides and sulfuric acid mist. Based on the proposed emission caps and the various pollutant specific worst-case operating scenarios within those caps, the project was determined to be a major modification to an existing major source under Florida's stationary source preconstruction review regulations (Chapter 62-212, F.A.C.). As defined within the regulations, the project was determined to have net emission increases above the thresholds for CO and particulate matter (TSP & $PM_{10}$). These increases required evaluation of Best Available Control Technology (BACT) and an analysis of ambient impacts on the nearby Class I and II areas, the Air Quality Related Values (AQRVs), and the Ambient Air Quality Standards (AAQS).

The project is being licensed under Florida's Power Plant Siting Act. The State will be required to issue a separate Prevention of Significant Deterioration (PSD) permit. A supplemental Title V operating permit application is also required, and the City has elected to have issuance of this permit coordinated with the PPSA process.

Appendix 10.1.5 of the Site Certification Application contains the State air permit long-form application (Form 62-210.900(1)) for the PSD permit and supplemental Title application. The PSD permit application is contained within the air permit application form as Attachment PGS-06, Supplemental Information for Construction Permit Application. The facility will be operated in accordance with the current operation and construction permits, and once issued, the initial Title V permit. After the proposed unit has been constructed and the compliance testing has been completed, the Purdom Generating Station will begin operating under the facility-wide emission caps on $SO_2$ and $NO_x$, as described in the Title V and PSD permit application attached.

As noted above, the proposed project required BACT evaluations and ambient impact analyses for CO and particulate matter (TSP & $PM_{10}$). In addition to these, the City instructed its engineers to evaluate BACT and the ambient impacts for all regulated pollutants emitted as a result of the project. These additional evaluations were requested to ensure that the proposed project will protect the surrounding environment to the greatest degree technically, environmentally and economically achievable. The evaluations included a BACT analysis for $SO_2$, $NO_x$, VOCs, trace metals, fluorides, and sulfuric acid mist, and ambient impact assessments for the Class I and II areas, AAQSs, AQRVs, and draft Florida Ambient Reference Concentrations (FARCs). Based on the findings of these additional evaluations, the proposed project represents a highly protective addition to the existing Purdom Generating Station.

Application Contact

Jennette Curtis
Environmental Service Administrator
City of Tallahassee, Electric Utility
300 South Adams Street, 3rd Floor
Tallahassee, Florida 32301
Phone No.: (904) 891-8850
Fax No.: (904) 891-8277

FLORIDA DEP LOGO

# Department of
# Environmental Protection

## DIVISION OF AIR RESOURCES MANAGEMENT

## APPLICATION FOR AIR PERMIT - LONG FORM

See Instructions for Form No. 62-210.900(1)

## I. APPLICATION INFORMATION

This section of the Application for Air Permit form identifies the facility and provides general information on the scope and purpose of this application. This section also includes information on the owner or authorized representative of the facility (or the responsible official in the case of a Title V source) and the necessary statements for the applicant and professional engineer, where required, to sign and date for formal submittal of the Application for Air Permit to the Department. If the application form is submitted to the Department using ELSA, this section of the Application for Air Permit must also be submitted in hard-copy.

**Identification of Facility Addressed in This Application**

Enter the name of the corporation, business, governmental entity, or individual that has ownership or control of the facility; the facility site name, if any; and the facility's physical location. If known, also enter the facility identification number.

| | |
|---|---|
| 1. Facility Owner/Company Name: **City of Tallahassee** | |
| 2. Site Name: **Sam O. Purdom Generating Station** | |
| 3. Facility Identification Number: **1290001** [ ] Unknown | |
| 4. Facility Location:<br>Street Address or Other Locator: **667 Port Leon Drive**<br>City: **St. Marks** County: **Wakulla** Zip Code: **32355** | |
| 5. Relocatable Facility?<br>[ ] Yes [X] No | 6. Existing Permitted Facility?<br>[X] Yes [ ] No |

**Application Processing Information (DEP Use)**

| | |
|---|---|
| 1. Date of Receipt of Application: | |
| 2. Permit Number: | |
| 3. PSD Number (if applicable): | |
| 4. Siting Number (if applicable): | |

Owner/Authorized Representative or Responsible Official

| | |
|---|---|
| 1. | Name and Title of Owner/Authorized Representative or Responsible Official:<br>**Robert E. McGarrah, Production Superintendent** |
| 2. | Owner/Authorized Representative or Responsible Official Mailing Address:<br><br>Organization/Firm: **City of Tallahassee, Electric Utility**<br>Street Address: **2602 Jackson Bluff Road**<br>City: **Tallahassee** State: **Florida** Zip Code: **32304** |
| 3. | Owner/Authorized Representative or Responsible Official Telephone Numbers:<br>Telephone: **( 904 ) 891 - 5534** Fax: **( 904 ) 891 - 5162** |
| 4. | Owner/Authorized Representative or Responsible Official Statement:<br><br>*I, the undersigned, am the owner or authorized representative* of the non-Title V source addressed in this Application for Air Permit or the responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*<br><br>R.E. McGarrah      3/4/97<br>Signature      Date |

* Attach letter of authorization if not currently on file.

## Scope of Application

This Application for Air Permit addresses the following emissions unit(s) at the facility. An Emissions Unit Information Section (a Section III of the form) must be included for each emissions unit listed.

| Emissions Unit ID | Description of Emissions Unit | Permit Type |
|---|---|---|
| EU01 | Unregulated Particulate Sources | |
| EU02 | Unregulated VOC Sources | |
| EU03 | Combustion Turbine No. 1 | |
| EU04 | Combustion Turbine No. 2 | |
| EU11 | Boiler No. 7 | |
| EU12 | Auxiliary Boiler | |
| EU13 | Unit 8 Combustion Turbine | |
| | | |
| | | |
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| | | |
| | | |

## Purpose of Application and Category

Check one (except as otherwise indicated):

**Category I: All Air Operation Permit Applications Subject to Processing Under Chapter 62-213, F.A.C.**

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for an existing facility which is classified as a Title V source.

[ ] Initial air operation permit under Chapter 62-213, F.A.C., for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number: ______________________________

[ ] Air operation permit renewal under Chapter 62-213, F.A.C., for a Title V source.

Operation permit to be renewed: ______________________________

[ ] Air operation permit revision for a Title V source to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: ______________________________

Operation permit to be revised: ______________________________

[X] Air operation permit revision or administrative correction for a Title V source to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. Also check Category III.

Operation permit to be revised/corrected: N/A - Operating Permit Not Yet Issued

[ ] Air operation permit revision for a Title V source for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit to be revised: ______________________________

Reason for revision: ______________________________

______________________________

**Category II: All Air Operation Permit Applications Subject to Processing Under Rule 62-210.300(2)(b), F.A.C.**

This Application for Air Permit is submitted to obtain:

[ ] Initial air operation permit under Rule 62-210.300(2)(b), F.A.C., for an existing facility seeking classification as a synthetic non-Title V source.

Current operation/construction permit number(s): ______________________

[ ] Renewal air operation permit under Rule 62-210.300(2)(b), F.A.C., for a synthetic non-Title V source.

Operation permit to be renewed: ______________________

[ ] Air operation permit revision for a synthetic non-Title V source. Give reason for revision; e.g., to address one or more newly constructed or modified emissions units.

Operation permit to be revised: ______________________

Reason for revision: ______________________

______________________

**Category III: All Air Construction Permit Applications for All Facilities and Emissions Units**

This Application for Air Permit is submitted to obtain:

[ X ] Air construction permit to construct or modify one or more emissions units within a facility (including any facility classified as a Title V source).

Current operation permit number(s), if any: **Operating Permit Not Yet Issued**

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

Current operation permit number(s): ______________________

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

## Application Processing Fee

Check one:

[ ] Attached - Amount: $__________________ [X] Not Applicable.

## Construction/Modification Information

| | |
|---|---|
| 1. | Description of Proposed Project or Alterations:<br><br>**The City of Tallahassee's Electric Department is proposing the construction of two new emissions units as part of a modification to its Purdom Generating Station. The modifications include the construction of a new 250 mega-Watt combined cycle gas turbine and an associated cooling tower. The project also includes a request for facility-wide $SO_2$ and $NO_x$ caps and the permanemt shutdown of two existing steam generators (Unit Nos. 5 & 6). The project is being licensed under the Florida Power Plant Siting Act. The project, as proposed, triggers PSD for particulate matter (TSP & $PM_{10}$) and carbon monoxide. The Purdom Generating Station is an existing major source (PSD & Title V).**<br><br>**This application is for a site certification, a Prevention of Significant Deterioration (PSD) permit and a modification to the not-yet-issued Title V Operating permit.** |
| 2. | Projected or Actual Date of Commencement of Construction:<br>**Projected**<br>**January 1, 1999** |
| 3. | Projected Date of Completion of Construction:<br>**May 15, 2000** |

## Professional Engineer Certification

| | |
|---|---|
| 1. | Professional Engineer Name: **Darrel J. Graziani**<br>Registration Number: **44685** |
| 2. | Professional Engineer Mailing Address:<br><br>Organization/Firm: **Foster Wheeler Environmental Corporation**<br>Street Address: **759 South Federal Highway, Suite 100**<br>City: **Stuart** State: **Florida** Zip Code: **34994** |
| 3. | Professional Engineer Telephone Numbers:<br>Telephone: **( 561 ) 781-3434** Fax: **( 561 ) 781-3411** |

4. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein*, that:*

*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*If the purpose of this application is to obtain a Title V source air operation permit (check here [X ] if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X] if so), I further certify that the engineering features of each such emissions unit described in this application have been ~~designed or~~ examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ] if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*

Darrell J Graziani 3-4-97

Signature Date

(seal)

DARRELL JAMES GRAZIANI
NO. 44685
STATE OF FLORIDA
REGISTERED ENGINEER

* Attach any exception to certification statement.

DEP Form No. 62-210.900(1) - Form
Effective: 3/21/96

## Application Contact

| | |
|---|---|
| 1. Name and Title of Application Contact:<br>**Jennette Curtis**<br>**Environmental Services Administrator** | |
| 2. Application Contact Mailing Address:<br><br>Organization/Firm: **City of Tallahassee, Electric Utility**<br>Street Address: **3rd Floor, 300 South Adams Street**<br>City: **Tallahassee** State: **Florida** Zip Code: **32301** | |
| 3. Application Contact Telephone Numbers:<br>Telephone: **( 904 ) 891 -8850** | Fax: **( 904 ) 891-8277** |

## Application Comment

**This package includes a Prevention of Significant Deterioration (PSD) permit application and a supplementary Title V application, which is an appendix to the Site Certification application.**

**Under the PSD regulations, the proposed project is classified as a major modification at an existing facility. The modification is considered major since the net increase in potential emissions of Particulate Matter (TSP), PM10, and Carbon Monoxide are greater than the PSD significant emission rates based on current actual emissions. The PSD requirements for the application of the Best Available Control Technology (BACT) is applicable only to those pollutants. The New Source Performance Standards for Gas Turbines (40 CFR 60 Subpart GG) establishes maximum short-term emission rates for Sulfur Dioxide ($SO_2$) and Oxides of Nitrogen ($NO_x$). Through the PSD and State Construction permits, the City seeks federally enforceable facility-wide caps on annual $SO_2$ and $NO_x$ emissions. These proposed caps set future allowable emissions equal to the current actual emissions such that the net increase is zero. These caps also effectively minimize emission increases of other pollutants.**

**The City has submitted an initial Title V application to the Department as required. The initial Title V application reflects the current method of operating at the facility. The supplemental Title V application reflects the future method of operating following the installation, operation and initial compliance testing of Unit 8. The emission caps will be enforceable after the compliance testing has been completed.**

## II. FACILITY INFORMATION

### A. GENERAL FACILITY INFORMATION

**Facility Location and Type**

| | | | |
|---|---|---|---|
| 1. Facility UTM Coordinates:<br>Zone: **16** | East (km): **769.50** | North (km): **3339.97** | |
| 2. Facility Latitude/Longitude:<br>Latitude (DD/MM/SS): **30/09/47** | Longitude (DD/MM/SS): **84/12/10** | | |
| 3. Governmental Facility Code:<br>**4** | 4. Facility Status Code:<br>**A** | 5. Facility Major Group SIC Code:<br>**49** | 6. Facility SIC(s):<br>**4911** |
| 7. Facility Comment (limit to 500 characters): | | | |

**Facility Contact**

| |
|---|
| 1. Name and Title of Facility Contact: **Jennette Curtis**<br>**Environmental Services Administrator** |
| 2. Facility Contact Mailing Address<br>Organization/Firm: **City of Tallahassee, Electric Utility**<br>Street Address: **3rd Floor, 300 South Adams Street**<br>City: **Tallahassee** State: **Florida** Zip Code: **32301** |
| 3. Facility Contact Telephone Numbers:<br>Telephone: **( 904 ) 891-8850** Fax: **( 904 ) 891-8277** |

## Facility Regulatory Classifications

| | | |
|---|---|---|
| 1. Small Business Stationary Source?<br>[ ] Yes | [X] No | [ ] Unknown |
| 2. Title V Source?<br>[X] Yes | [ ] No | |
| 3. Synthetic Non-Title V Source?<br>[ ] Yes | [X] No | |
| 4. Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)?<br>[X] Yes | [ ] No | |
| 5. Synthetic Minor Source of Pollutants Other than HAPs?<br>[ ] Yes | [X] No | |
| 6. Major Source of Hazardous Air Pollutants (HAPs)?<br>[X] Yes | [ ] No | |
| 7. Synthetic Minor Source of HAPs?<br>[ ] Yes | [X] No | |
| 8. One or More Emissions Units Subject to NSPS?<br>[X] Yes | [ ] No | |
| 9. One or More Emission Units Subject to NESHAP?<br>[ ] Yes | [X] No | |
| 10. Title V Source by EPA Designation?<br>[ ] Yes | [X] No | |
| 11. Facility Regulatory Classifications Comment (limit to 200 characters):<br><br>**The Purdom Generating Station is an existing major source under Title I of the Clean Air Act. The project, as proposed, triggers PSD for particulate matter (TSP), PM10, and carbon monoxide. The application package includes a PSD (BACT) evaluation for these pollutants. The City of Tallahassee is licensing the project under the Power Plant Siting Act. As allowed under Rule 62-213.420(1)(a)2., F.A.C., the site certification application includes a supplemental Title V application.** | | |

## B. FACILITY REGULATIONS

<u>**Rule Applicability Analysis**</u> (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| **Rule 62-4.030 F.A.C.*** | **Rule 62-213.460 F.A.C.** |
| **Rule 62-4.040(1) F.A.C.*** | **Rule 62-213.900(1) F.A.C.** |
| **Rule 62-4.050(1),(2),(3) F.A.C.*** | **Rule 62-256.300 F.A.C.*** |
| **Rule 62-4.100 F.A.C.*** | **Rule 62-256.450 F.A.C.*** |
| **Rule 62-4.130 F.A.C.*** | **Rule 62-256.500 F.A.C.*** |
| **Rule 62-204.800(9)(b)8,(9)(d) F.A.C.*** | **Rule 62-256.600 F.A.C.*** |
| **Rule 62-210.300(2)[except (b)] F.A.C.** | **Rule 62-256.700 F.A.C.*** |
| **Rule 62-210.300(3)(a) F.A.C.** | **Rule 62-257.301 F.A.C.*** |
| **Rule 62-210.300(3)(b) F.A.C.** | **Rule 62-257.301 F.A.C.*** |
| **Rule 62-210.350(1);(2);(3) F.A.C.** | **Rule 62-257.400 F.A.C.*** |
| **Rule 62-210.370(3) F.A.C.** | **Rule 62-257.900 F.A.C.*** |
| **Rule 62-210.900(5) F.A.C.** | **Rule 62-296.320(2),(3)*,(4)(b) & (c) F.A.C.** |
| **Rule 62-212.300(1)(a);(2);(3) F.A.C.** | **Rule 62-297.310(7)a10 F.A.C.** |
| **Rule 62-212.400(2)(d)4,(e),(f);(3)(e);(5) & (6)(a), F.A.C.** | **40 CFR 61.05** |
| **Rule 62-213.205(1)[except (d) & (h)]; (4);(6) F.A.C.** | **40 CFR 61.12(b), (c)** |
| **Rule 62-213.300(1) F.A.C.** | **40 CFR 61.19** |
| **Rule 62-213.400 F.A.C.** | **40 CFR 61.145** |

__List of Applicable Regulations__ (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| **Rule 62-213.410 F.A.C.** | **40 CFR 61.148** |
| **Rule 62-213.420(1)(a)1a,(b)1-4,(2)-(4)F.A.C.** | **40 CFR 82.42(a)(b)(1)(2)(4)(5)** |
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* State-Only Enforceable

## C. FACILITY POLLUTANTS

**Facility Pollutant Information**

| 1. Pollutant Emitted | 2. Pollutant Classification |
|---|---|
| **CO** | **A** |
| **NOx** | **A** |
| **PM10** | **SM** |
| **SO2** | **SM** |
| **H106** | **A** |
| **H107** | **SM** |
| **H133** | **SM** |
| **HAPs** | **SM** |
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## D. FACILITY POLLUTANT DETAIL INFORMATION

Facility Pollutant Detail Information: Pollutant 1 of 2

| | | |
|---|---|---|
| 1. Pollutant Emitted: **SO2** | | |
| 2. Requested Emissions Cap: | (lb/hour) | **80** (tons/year) |
| 3. Basis for Emissions Cap Code: **ESCPSD** | | |
| 4. Facility Pollutant Comment (limit to 400 characters): **The City of Tallahassee is requesting a facility wide emissions cap of 80 tons per year of sulfur dioxide. Compliance with the emissions cap will be ensured through a monitoring and tracking program (Attachment PGS-10).** | | |

Facility Pollutant Detail Information: Pollutant 2 of 2

| | | |
|---|---|---|
| 1. Pollutant Emitted: **NOx** | | |
| 2. Requested Emissions Cap: | (lb/hour) | **467** (tons/year) |
| 3. Basis for Emissions Cap Code: **ESCPSD** | | |
| 4. Facility Pollutant Comment (limit to 400 characters): **The City of Tallahassee is requesting a facility wide emissions cap of 467 tons per year of oxides of nitrogen. Compliance with the emissions cap will be ensured through a monitoring and tracking program (Attachment PGS-10).** | | |

## E. FACILITY SUPPLEMENTAL INFORMATION

**Supplemental Requirements for All Applications**

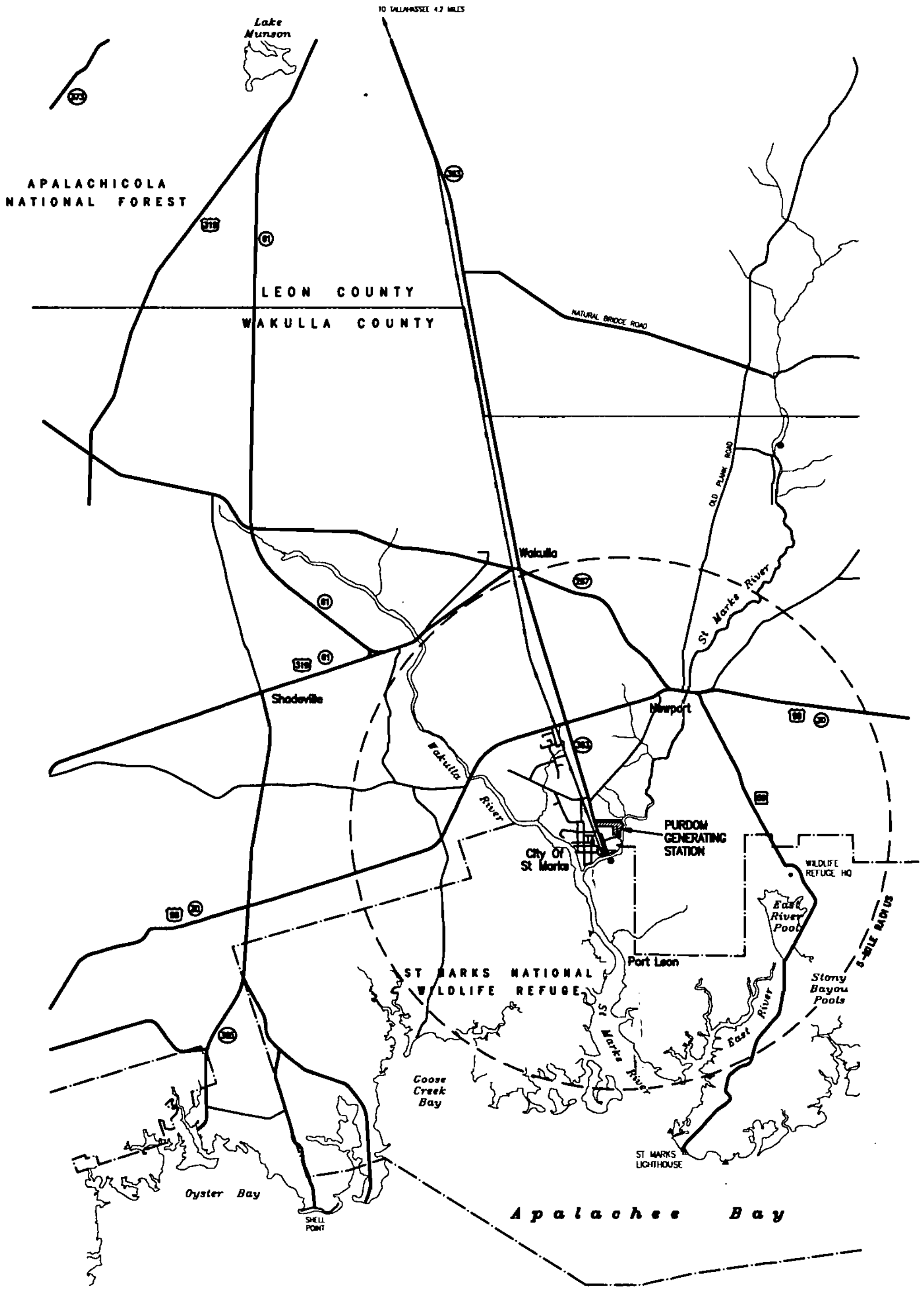
| | |
|---|---|
| 1. Area Map Showing Facility Location: [ X ] Attached, Document ID: **PGS-01** [ ] Not Applicable [ ] Waiver Requested | |
| 2. Facility Plot Plan: [ X ] Attached, Document ID: **PGS-02** [ ] Not Applicable [ ] Waiver Requested | |
| 3. Process Flow Diagram(s): [ X ] Attached, Document ID: **PGS-03** [ ] Not Applicable [ ] Waiver Requested | |
| 4. Precautions to Prevent Emissions of Unconfined Particulate Matter: [ X ] Attached, Document ID: **PGS-04** [ ] Not Applicable [ ] Waiver Requested | |
| 5. Fugitive Emissions Identification: [ X ] Attached, Document ID: **PGS-05** [ ] Not Applicable [ ] Waiver Requested | |
| 6. Supplemental Information for Construction Permit Application: [ X ] Attached, Document ID: **PGS-06** [ ] Not Applicable | |

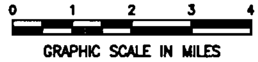
**Additional Supplemental Requirements for Category I Applications Only**

| | |
|---|---|
| 7. List of Proposed Exempt Activities: [ X ] Attached, Document ID: **PGS-07** [ ] Not Applicable | |
| 8. List of Equipment/Activities Regulated under Title VI: [ ] Attached, Document ID:________ [ X ] Equipment/Activities On site but Not Required to be Individually Listed [ ] Not Applicable | |
| 9. Alternative Methods of Operation: [ X ] Attached, Document ID: **PGS-08** [ ] Not Applicable | |
| 10. Alternative Modes of Operation (Emissions Trading): [ ] Attached, Document ID: _______ [ X ] Not Applicable | |

| |
|---|
| 11. Identification of Additional Applicable Requirements:<br>[ X ] Attached, Document ID:<u>PGS-09</u> [ ] Not Applicable |
| 12. Compliance Assurance Monitoring Plan:<br>[ ] Attached, Document ID:_______ [ X ] Not Applicable |
| 13. Risk Management Plan Verification:<br><br>[ ] Plan Submitted to Implementing Agency - Verification Attached,<br>Document ID:________<br><br>[ ] Plan to be Submitted to Implementing Agency by Required Date<br><br>[ X ] Not Applicable |
| 14. Compliance Report and Plan:<br>[ X ] Attached, Document ID: <u>PGS-10</u> [ ] Not Applicable |
| 15. Compliance Certification (Hard-copy Required):<br>[ X ] Attached, Document ID: <u>PGS-11</u> [ ] Not Applicable |

**Attachment PGS-01**




- ▲ LIGHTHOUSE
- ● GAGING STATION
- U. S. ROUTE
- STATE ROUTE
- COUNTY ROUTE

- PRIMARY ROAD, HARD SURFACE
- SECONDARY ROAD, IMPROVED SURFACE
- BIKE TRAIL
- COUNTY LINE
- WILDLIFE REFUGE BOUNDARY

CITY OF TALLAHASSEE, FLORIDA
PSD & TITLE V PERMIT APPLICATIONS
PURDOM GENERATING STATION

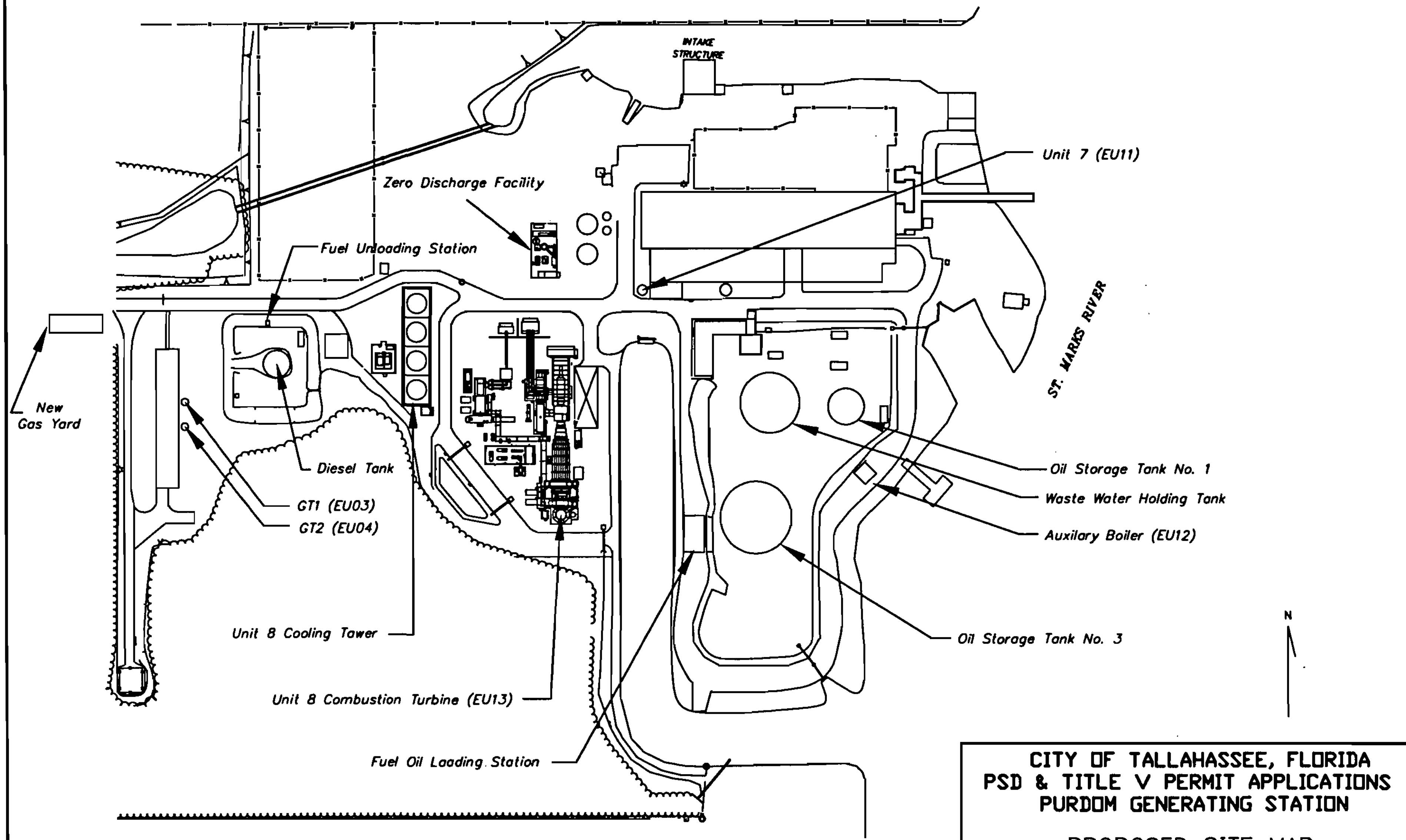
AREA MAP
PURDOM GENERATING STATION

FOSTER WHEELER ENVIRONMENTAL CORPORATION

| | | |
|---|---|---|
| SCALE: AS SHOWN<br>DATE: 2/19/97 | BY: DJG<br>CKD' BY: DF<br>REV. BY: MAE | CAD FILE NO. PAREA.DWG<br>ATTACHMENT NO. PGS-01 |

Drawing Reference: Cad File: 00000-03.DWG

**Attachment PGS-02**




**CITY OF TALLAHASSEE, FLORIDA**
**PSD & TITLE V PERMIT APPLICATIONS**
**PURDOM GENERATING STATION**

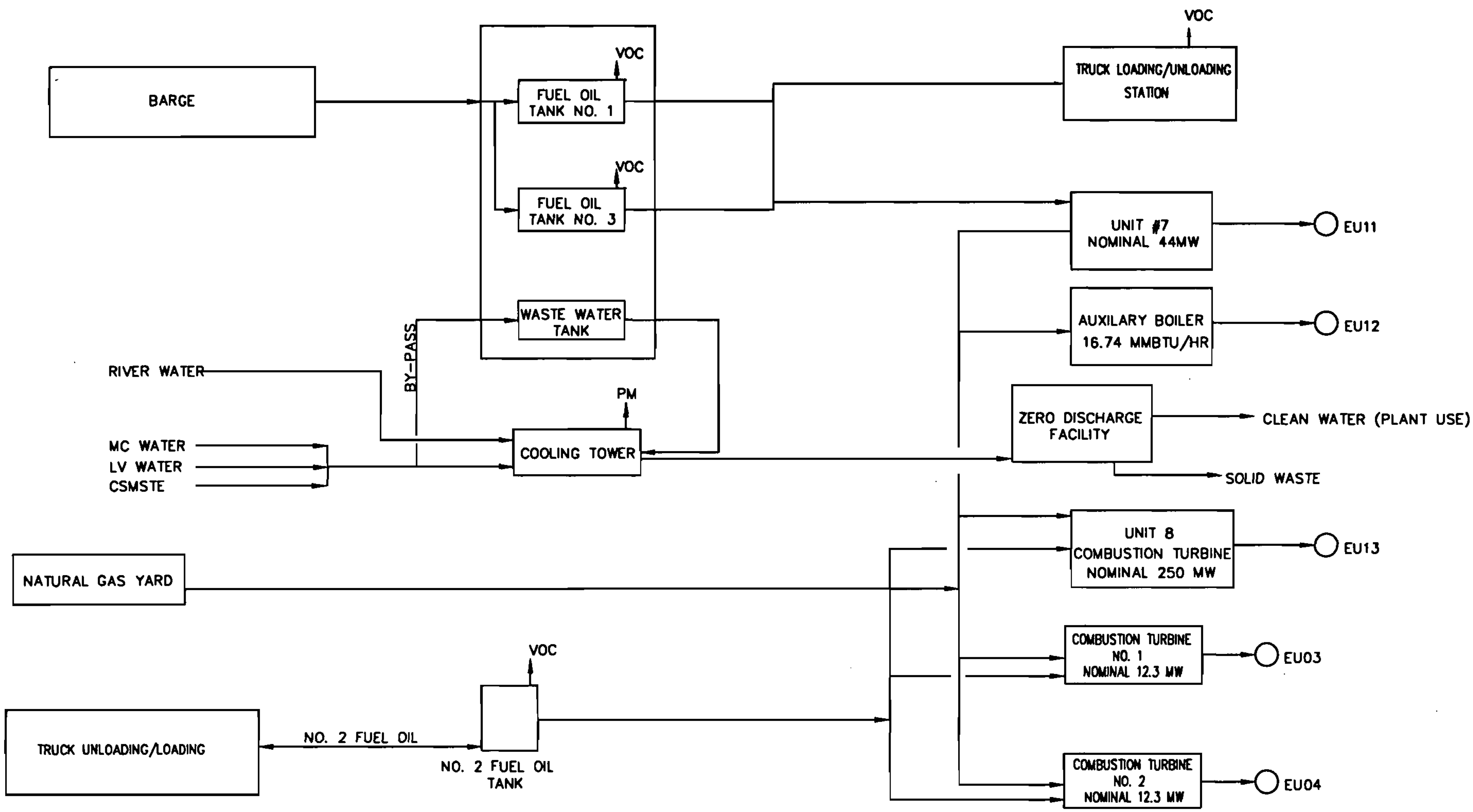
PROPOSED SITE MAP

FOSTER WHEELER ENVIRONMENTAL CORPORATION

| | | |
|---|---|---|
| SCALE: 1" = 225'<br>DATE: 2/26/97 | BY: DJG<br>CKD' BY: DF<br>REV. BY: DJG | FILE NO: SITEPLAN.DWG<br>FIGURE NO. PGS-02 |

Source: Raytheon Engineers & Constructors, 1997

Attachment PGS-03




LV WATER – LOW VOLUME DISCHARGE WATER

MC WATER – METAL CLEANING DISCHARGE WATER

CSMSTE – CITY OF ST. MARKS SEWAGE TREATMENT EFFLUENT

SOURCE: FOSTER WHEELER ENVIRONMENTAL CORPORATION, 1997

**CITY OF TALLAHASSEE, FLORIDA**
**PSD & TITLE V PERMIT APPLICATIONS**
**PURDOM GENERATING STATION**

PROPOSED
SIMPLIFIED PROCESS FLOW DIAGRAM
PURDOM GENERATING STATION

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**

| | | |
|---|---|---|
| SCALE: N/A<br>DATE: 2/27/97 | BY: DJG<br>CKD' BY: DF<br>REV. BY: DJG | CAD FILE NO. PPFD.DWG<br>FIGURE NO. PGS-03 |

Attachment PGS-04

As part of the initial Title V application development, the City of Tallahassee reviewed the potential sources of unconfined particulate emissions at its Purdom Generating Station. The intent of the review was to ensure that reasonable precautions were in place to prevent and/or control these potential particulate emissions. The potential sources which were identified included the following:

1. Concrete mixing;
2. Abrasive blasting
3. Aggregate handling and storage;
4. Heavy construction activities;
5. Driving on paved/unpaved roads; and
6. Spray application of surface coatings.

Based on the City of Tallahassee's review of these potential sources, the following reasonable precautions have been established to control unconfined emissions of particulate matter:

- The portable concrete mixer is operated on an as-needed basis. Reasonable precautions include enclosing the activity wherever practical.

- The abrasive blasting activities are associated with normal maintenance and corrosion control activities. These activities are also enclosed wherever practical.

- The aggregate storage piles occur on a temporary basis and are associated with miscellaneous construction activities. Water is applied on an as-needed basis to control unconfined emissions from the handling and storage of aggregate materials and the related construction activities.

Unconfined emissions associated with the limited on-site traffic are controlled through limiting vehicle speeds and unnecessary traffic within the plant grounds.

The spray applications of surface coatings are associated with normal maintenance and corrosion activities. These activities are enclosed whenever practical.

During the construction of Unit 8, unavoidable particulate matter emissions are likely to occur from various construction-related activities. Emissions of these pollutants will be minimzed using the above reasonable precautions. The quantities of fugitive dust emitted by the site construction vehicular traffic will be dependent on a number of factors, including the frequency of operations, specific operations being conducted, weather, and soil conditions.

The impact of heavy construction activities and site preparation on air quality will be short term and confined to the immediate vicinity of the construction activity. This is primarily because most of the fugitive dust created by construction traffic consists of relatively large particles (i.e., larger than those which constitute $PM_{10}$). These large particles tend to settle quickly rather than remain suspended for transport over long distances.

During construction activities a combination of the following techniques will be implemented:

> Contractors will be instructed to comply with any applicable state and local regulations governing open-bodied trucks hauling sand, gravel, or soil between on-site and off-site areas.
>
> Areas disturbed during construction will be stabilized by mulching or seeding as soon as practicable.
>
> When construction occurs on bare ground, water (possibly together with non-hazardous wetting agents) will be used as necessary to help suppress dust, as needed.
>
> Temporary vehicular surfaces of crushed rock may be used in high traffic areas. Areas not subject to heavy traffic or continual disturbance will be wetted down as needed using nontoxic substances to help suppress dust.
>
> Sandblasting operations will be localized to minimize effects on adjacent work areas. Protective covers will also be utilized where practicable.

Surface coating activities will include the initial painting of the Combined Cycle Unit 8 and the associated facilities. As with normal surface coating operations, activities will be enclosed whenever practical.

Because of mitigative measures which will be employed, it is not expected that fugitive dust will present any significant air quality problems during the construction period.

**Attachment PGS-05**

Fugitive emissions resulting from the operation of the Purdom Generating Station are generally addressed in Attachment PGS-07 of this application form, Exempt Activities. For those units or activities whose fugitive emissions exceed the emissions thresholds of Section III (G) of the application form the City has assigned an emissions unit identification number. For particulate matter, the emissions unit identification number (EU01) includes those unregulated activities which emit above the threshold. For volatile organic compounds, the emissions unit identification number (EU02) includes those unregulated activities which emit above the threshold.

Attachment PGS-06

The proposed project is subject to the preconstruction review regulations of Chapters 62-210. 300, 62-212.300, and 62-212.400, F.A.C. For the facility, the supplemental information contained in this attachment includes the following data for the Prevention of Significant Deterioration (PSD) permit:

- Introduction
- Project Description
- Air Quality Review Requirements and Applicability
- Best Available Control Technology Evaluation
- Ambient Air Quality Monitoring Data Analysis
- Air Quality Modeling Approach
- Air Quality Impact Analysis Results
- Additional Impacts Analysis

The application of Best Available Control Technology (BACT) has been evaluated only for the proposed Unit 8's combustion turbine and cooling tower.

CITY OF TALLAHASSEE

# PREVENTION OF SIGNIFICANT DETERIORATION REPORT

## PURDOM UNIT 8

## MARCH 1997

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TABLE OF CONTENTS (Cont'd)

**TABLE OF CONTENTS (Cont'd)**

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**LIST OF TABLES (Cont'd)**

**LIST OF TABLES (Cont'd)**

## List of Figures

**LIST OF FIGURES (Cont'd)**

# 1. INTRODUCTION

The City of Tallahassee (City) is planning to install a 250 MW (nominal), dual fuel, combined cycle combustion turbine and cooling tower at its Sam O. Purdom Generating Station in the City of St. Marks in Wakulla County. The Project includes both the addition of this new unit (Unit 8) with cooling tower and the permanent shut down of two existing units (Units 5 and 6). Figure 1-1 presents a general location map of the area and Figure 1-2 is a site location map. Figure 1-3 presents the existing Purdom site layout with the location of the proposed Unit 8 and new cooling tower identified.

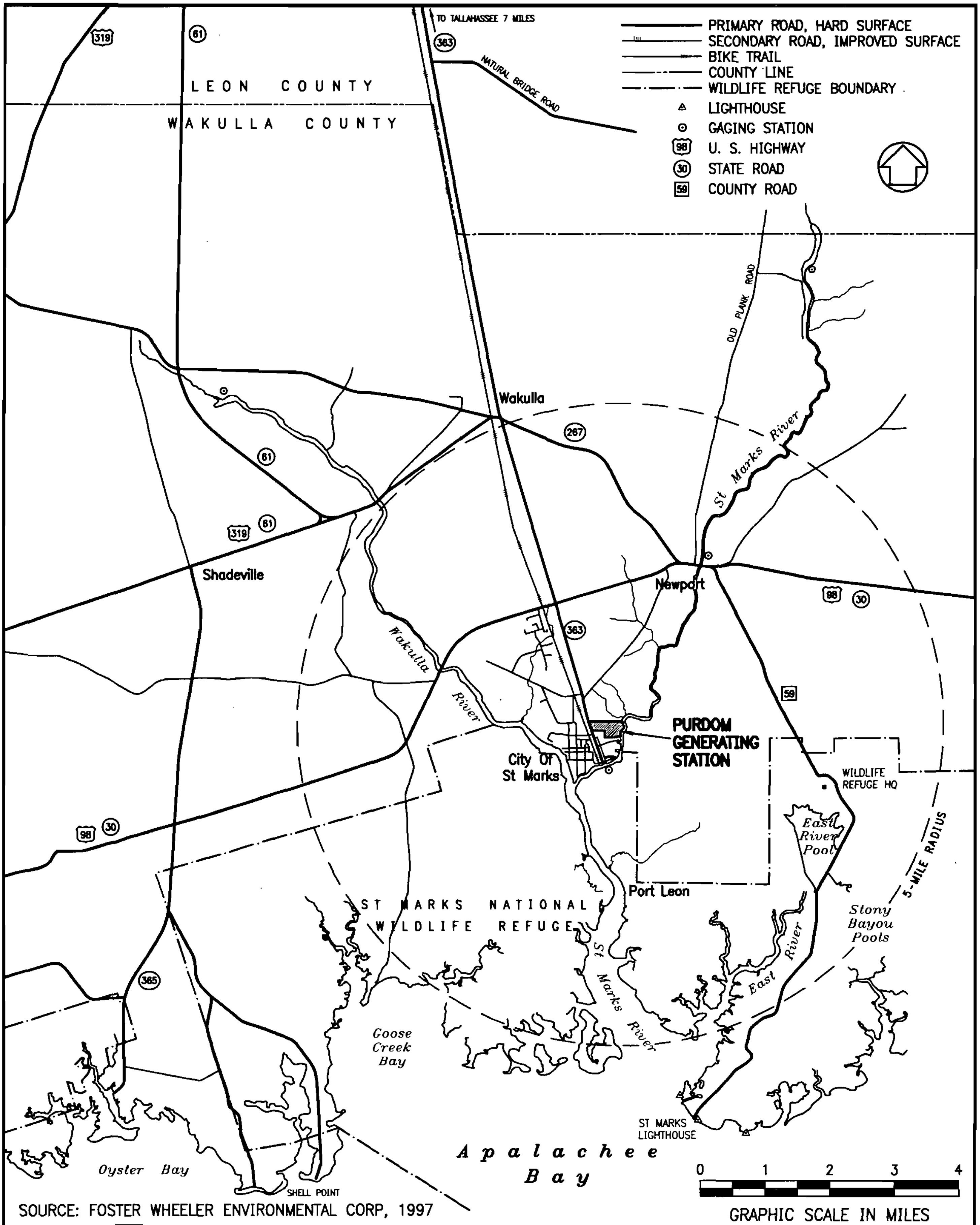
The existing Purdom Generating Station consists of the retired steam electric Units 1-4 (currently being dismantled), the active steam electric Units 5-7 and their associated facilities, and two simple cycle combustion turbines (GT1 and GT2). The steam electric units can fire natural gas and/or No. 6 fuel oil while the existing combustion turbines can fire natural gas or Number 2 diesel oil. Units 5 and 6 share a common stack and Unit 7, GT1, and GT2 have their own stacks. A new, small gas-fired auxiliary boiler has recently been permitted and is being installed.

The addition of the new gas/oil fired combined cycle combustion turbine (Unit 8) is being licensed under the Florida Electrical Power Plant Siting Act (PPSA). This Prevention of Significant Deterioration (PSD) application is being submitted in conjunction with the Site Certification Application (SCA) rather than as a separate federal application because the Florida Department of Environmental Protection (FDEP) has been authorized to issue PSD permits for projects covered by the Power Plant Siting Act.

The Project design includes the reduction of emissions from existing units to offset the emissions of some of the pollutants associated with the new Unit, to the maximum extent practicable, in order to provide special air quality protection to nearby Class I PSD areas. In fact, federally enforceable emission caps for sulfur dioxide ($SO_2$) and oxides of nitrogen ($NO_x$), covering the proposed Unit 8, existing Unit 7, the existing combustion turbines (GT1 and GT2), and the new small auxiliary boiler is being sought. These "facility-wide caps" will require annual emissions of $SO_2$ and $NO_x$ to remain at or below recent emission levels of these pollutants from Units 5, 6 and 7 and the two combustion turbines (GT1 and GT2).

FDEP's PSD regulations are codified in the Florida Administrative Code (F.A.C.) at Rule 62-212.400. They require a permit review and approval for new or modified existing sources that increase air pollutant emissions above specified threshold levels. These emission threshold levels will be exceeded by the Project for selected pollutants regulated by the PSD rules. As a result, the Project is subject to PSD review. The federal PSD program is implemented by FDEP through EPA approval of Florida's PSD program.

The technical information and analysis required by the federal and state PSD regulations is contained in this PSD permit application. Although this document and the application form are in an appendix to the SCA, this document has been formatted as a stand-alone PSD report. The report is divided into eight major sections. Presented in Section 2.0 is a description of the Project including both air pollutant emissions from Unit 8 and the emission reductions associated with the permanent shut down of Units 5 and 6. Air quality review requirements and applicability are presented in Section 3.0. The best available control technology (BACT) analysis is presented in




SOURCE: FOSTER WHEELER ENVIRONMENTAL CORP, 1997

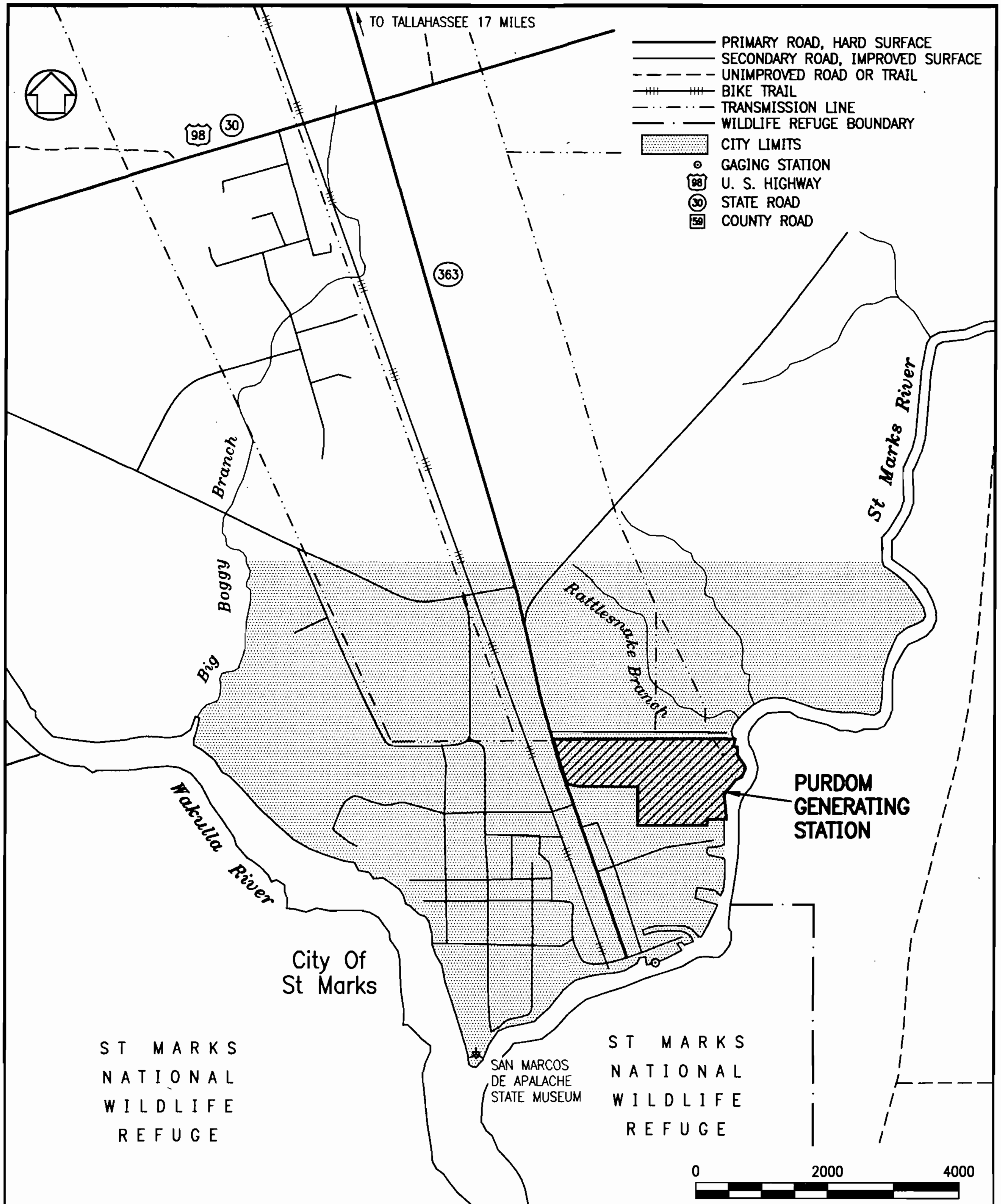
PLOT DATE MAR 1, 1997, 1996 C:\15840002\----\00000-36.DWG

CITY OF TALLAHASSEE

SITE LOCATION MAP

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 1-1




SOURCE: FOSTER WHEELER ENVIRONMENTAL CORP, 1997

CITY OF TALLAHASSEE

SITE LOCATION

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 1–2

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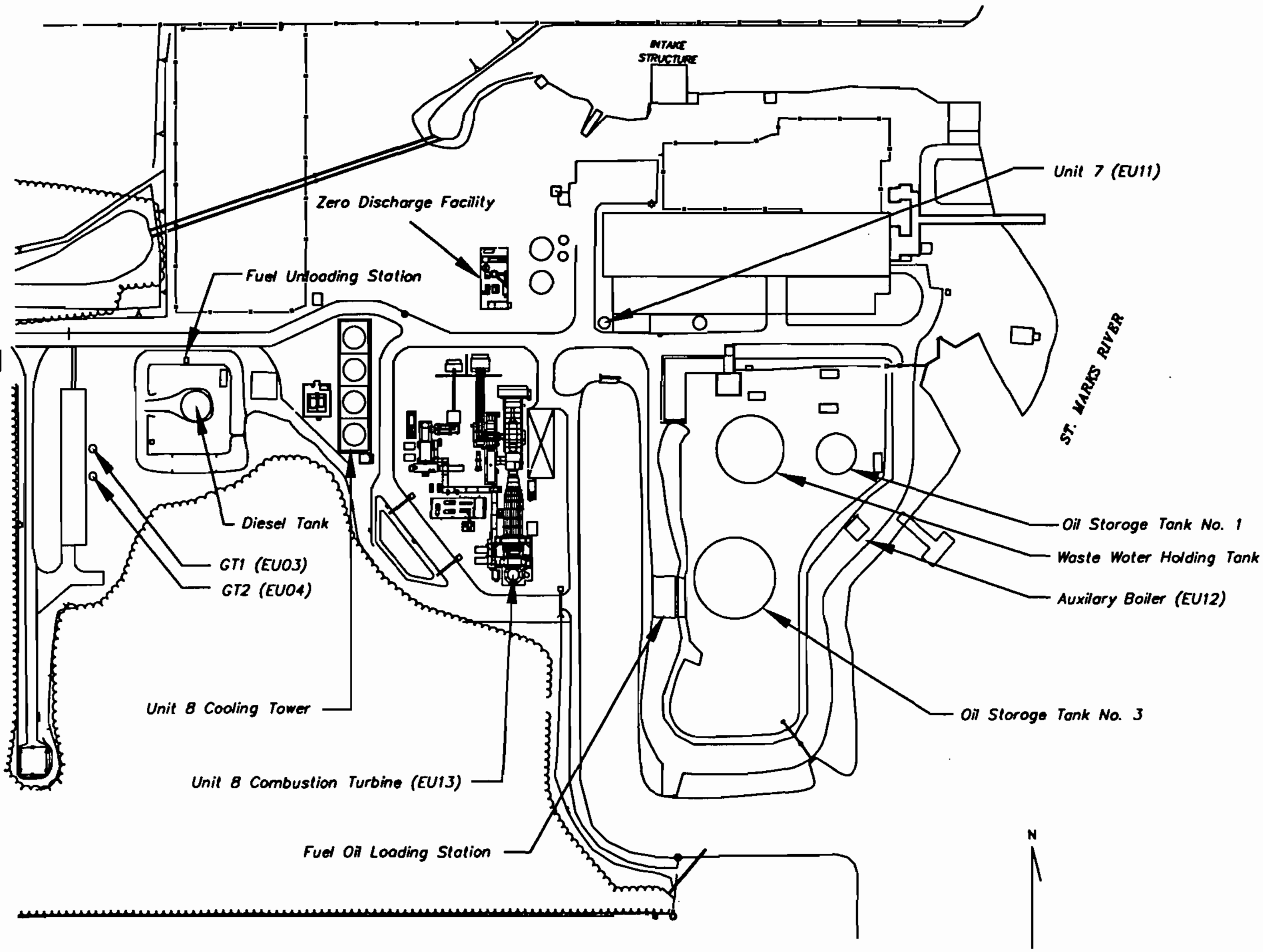
PLOT DATE FEB 28 C:\DARREL\COT\CAD\SITEPLAN.DWG




Source: Raytheon Engineers & Constructors, 1997

CITY OF TALLAHASSEE

**PROPOSED SITE PLAN**

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 1-3

Section 4.0. An ambient air quality monitoring data analysis is presented in Section 5.0, and the air quality modelling methodology, the results of the air quality impact assessment, and additional air quality analyses performed for the proposed Project are presented in Sections 6.0, 7.0, and 8.0, respectively. A brief conclusion is presented in Section 9.0. Section 10.0 contains a list of references and materials cited. Copies of the emissions source material and calculations are included as Appendices. This PSD report is itself an attachment (PGS-06) to the FDEP Long Form Application (FDEP Form 62-210.900(1)).

# 2. PROJECT DESCRIPTION

## 2.1 GENERAL DESCRIPTION

The proposed Purdom Unit 8 Project will consist of the construction of a new combined cycle combustion turbine and a cooling tower at the existing Purdom Generating Station. The new Unit will provide a nominal 250 MW of new generating capacity at the site. The Unit will fire pipeline quality natural gas as the primary fuel, with Number 2 (0.05% S) diesel fuel oil as the secondary fuel and will function as a base load unit, operating as many as 8,760 hours per year. The combustion turbine selected is a General Electric (GE) Model MS7231FA dry low $NO_x$ unit. A simplified flow diagram (20° F, 60% relative humidity, sea level pressure) is provided in Figure 2-1.

During natural gas firing operations, $NO_x$ emissions will be controlled through the use of staged combustion with GE dry low $NO_x$ combustors. During fuel oil firing, $NO_x$ emissions will be controlled by use of water injection to reduce peak flame temperature. $SO_2$ and sulfuric acid mist ($H_2SO_4$) emissions will be limited through the primary use of natural gas, the secondary use of Number 2 (0.05% S) diesel fuel oil, and through the "facility-wide cap," such that emissions of $SO_2$ do not exceed 80 tons per year. Carbon monoxide (CO), volatile organic compounds (VOCs) and particulate matter (both TSP and $PM_{10}$) emissions will be controlled through good combustion practices and the primary use of natural gas. Trace metal emissions (i.e., lead (Pb), beryllium (Be), arsenic (As), mercury (Hg)) and fluoride (Fl) will be minimized by using natural gas as the primary fuel. Particulate matter emissions from the cooling tower will be controlled through the use of drift eliminators.

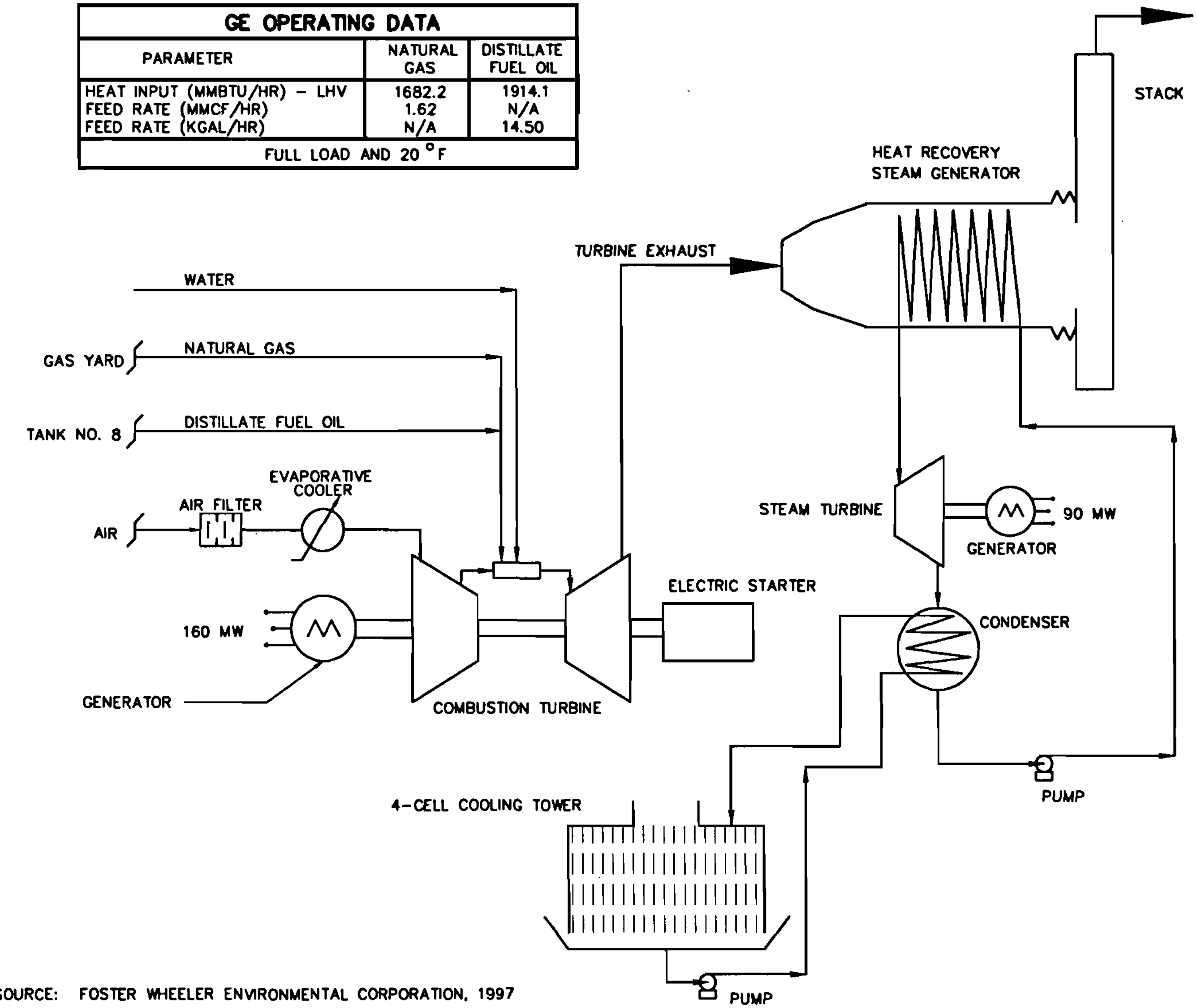
## 2.2 PROPOSED UNIT 8 EMISSIONS AND STACK PARAMETERS

The estimated stack emissions and exhaust parameters that are representative of the advanced combustion turbine design (General Electric, 1996) proposed for the Project are presented in Tables 2-1 through 2-6 for the nominal 160 MW combustion turbine unit. These tables present emissions and stack parameters for both the natural gas and fuel oil cases for three ambient temperatures: 20°F, 59°F, and 95°F. GE data sheets which form the basis for these tables are contained in Appendix A. These tables include emissions data for both the regulated criteria air pollutants ($NO_x$, CO, $SO_2$, $PM_{10}$, VOC and Pb) and the regulated noncriteria air pollutants listed in Table 212.400-2 of Rule 62-212.400, F.A.C. Together these are referred to as the PSD regulated pollutants.

Worst-case air quality impacts due to the proposed facility are a function of both the emission rate and the plume rise. Emission rates and plume rise from all fossil fuel fired power plants are functions of plant load. However, unlike conventional steam generating units, the fuel consumption, emission rates, and plume rise from combustion turbines are also functions of ambient meteorological conditions (primarily temperature). Although it is not practical to model all possible operating scenarios for the facility, a large number of cases (combinations of load, ambient conditions and fuel types) were examined to represent the range of conditions that will occur during actual operations. The low (20° F) and high (95° F) ambient temperatures are reasonable extreme points selected to indicate the influence of compressor inlet temperature on

| GE OPERATING DATA | | |
|---|---|---|
| PARAMETER | NATURAL GAS | DISTILLATE FUEL OIL |
| HEAT INPUT (MMBTU/HR) - LHV | 1682.2 | 1914.1 |
| FEED RATE (MMCF/HR) | 1.62 | N/A |
| FEED RATE (KGAL/HR) | N/A | 14.50 |
| FULL LOAD AND 20 °F | | |

| EU13 – EXHAUST PARAMETERS |
|---|
| EXHAUST TEMP. – 171 TO 203 °F |
| STACK HEIGHT – 200' |
| SO2 EMISSIONS – 80 TPY |
| NOx EMISSIONS – 467 TPY |
| OPACITY – 20% EXCEPT AS ALLOWED |




SOURCE: FOSTER WHEELER ENVIRONMENTAL CORPORATION, 1997

CITY OF TALLAHASSEE

SIMPLIFIED PROCESS FLOW DIAGRAM

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 2-1

| TABLE 2-1<br>COMBINED CYCLE UNIT 8<br>ESTIMATED[1] PERFORMANCE ON NATURAL GAS (100% LOAD) | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure (lb/in$^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)[2] | 1,682.2 | 1,563.2 | 1,467.7 |
| Evaporative Cooler | Off | Off | On |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 31 | 29 | 26 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (9ppmvd) | 62 | 58 | 54 |
| Sulfur Dioxide ($SO_2$) [3] | 51 | 47 | 44 |
| Particulate Matter ($PM_{10}$) | 9 | 9 | 9 |
| Volatile Organic Compounds (non-methane HC) | 3 | 2.8 | 2.6 |
| Lead (Pb) | N/A | N/A | N/A |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be) | N/A | N/A | N/A |
| Mercury (Hg) [4] | 1.31E-06 | 1.22E-06 | 1.14E-06 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) | N/A | N/A | N/A |
| Sulfuric Acid Mist ($H_2SO_4$)[5] | 5.1 | 4.7 | 4.4 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 190 | 193 | 198 |
| Stack Gas Exit Velocity (ft/sec) | 80 | 75 | 70 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Sulfur dioxide emissions based on 10 grains/100 SCF total sulfur in natural gas and 95% conversion.
(4) Emission factor from (EPRI 1994)
(5) $H_2SO_4$ emissions based on 5% of sulfur in fuel.

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997

| TABLE 2-2<br>COMBINED CYCLE UNIT 8<br>ESTIMATED [1] PERFORMANCE ON NATURAL GAS (75% LOAD) | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure ($lb/in^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)[2] | 1,360.7 | 1,274.4 | 1,202.1 |
| Evaporative Cooler | Off | Off | Off |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 28 | 26 | 24 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (9 ppmvd) | 50 | 47 | 44 |
| Sulfur Dioxide ($SO_2$)[3] | 41 | 38 | 36 |
| Particulate Matter ($PM_{10}$) | 9 | 9 | 9 |
| Volatile Organic Compounds (non-methane HC) | 2.4 | 2.2 | 2.2 |
| Lead (Pb) | N/A | N/A | N/A |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be) | N/A | N/A | N/A |
| Mercury (Hg) [4] | 1.06E-06 | 9.94E-07 | 9.38E-07 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) | N/A | N/A | N/A |
| Sulfuric Acid Mist ($H_2SO_4$)[5] | 4.1 | 3.8 | 3.6 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 171 | 185 | 190 |
| Stack Gas Exit Velocity (ft/sec) | 63 | 61 | 57 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Sulfur dioxide emissions based on 10 grains/100 SCF total sulfur in natural gas and 95% conversion.
(4) Emission factor from (EPRI 1994)
(5) $H_2SO_4$ emissions based on 5% of sulfur in fuel.

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997.

**TABLE 2-3**
**COMBINED CYCLE UNIT 8**
**ESTIMATED [1] PERFORMANCE ON NATURAL GAS (50% LOAD)[4]**

| | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure (lb/in$^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)[2] | 1,083.5 | 1,020.4 | 965 |
| Evaporative Cooler | Off | Off | Off |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 56 | 53 | 50 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (9 ppmvd) | 39 | 37 | 35 |
| Sulfur Dioxide ($SO_2$)[3] | 23 | 31 | 29 |
| Particulate Matter ($PM_{10}$) | 9 | 9 | 9 |
| Volatile Organic Compounds (non-methane HC) | 2.8 | 2.6 | 2.8 |
| Lead (Pb) | N/A | N/A | N/A |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be) | N/A | N/A | N/A |
| Mercury (Hg) [5] | 8.45E-07 | 7.96E-07 | 7.53E-07 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) | N/A | N/A | N/A |
| Sulfuric Acid Mist ($H_2SO_4$)[6] | 3.3 | 3.1 | 2.9 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 171 | 176 | 183 |
| Stack Gas Exit Velocity (ft/sec) | 51 | 50 | 47 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Sulfur dioxide emissions based on 10 grains/100 SCF total sulfur in natural gas and 95% conversion.
(4) At 95°F, the minimum load at which 9 ppm can be achieved is approximately 55% rather than 50%.
(5) Emission factor from (EPRI, 1994).
(6) $H_2SO_4$ emissions based on 5% of sulfur in fuel.

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997.

**TABLE 2-4**
**COMBINED CYCLE UNIT 8**
**ESTIMATED [1] PERFORMANCE ON**
**NUMBER 2 (0.05% S) DIESEL FUEL OIL (100% LOAD)**

| | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure (lb/in$^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)[2] | 1,914.1 | 1,779.5 | 1,659.5 |
| Evaporative Cooler | Off | Off | On |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 104 | 96 | 89 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (42 ppmvd)[3] | 347 | 322 | 297 |
| Sulfur Dioxide ($SO_2$) [4] | 98 | 92 | 85 |
| Particulate Matter ($PM_{10}$) | 17 | 17 | 17 |
| Volatile Organic Compounds (non-methane HC) | 8 | 7.5 | 6.6 |
| Lead (Pb)[5] | 1.11E-01 | 1.03E-01 | 9.25E-02 |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be)[5] | 6.32E-04 | 5.87E-04 | 5.26E-04 |
| Mercury (Hg)[5] | 1.74E-03 | 1.62E-03 | 1.45E-03 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) [6] | 2.03 | 1.89 | 1.69 |
| Sulfuric Acid Mist ($H_2SO_4$)[4] | 10 | 10 | 9 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 198 | 201 | 205 |
| Stack Gas Exit Velocity (ft/sec) | 85 | 80 | 75 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Based on FBN content of 0.015% or less. Maximum FBN content = 0.03% = an additional 12ppmvd $NO_x$ above 42 ppmvd.
(4) Sulfur dioxide and sulfuric acid mist based on 0.05% sulfur by weight in fuel (future Number 2 fuel oil supply); 95% S conversion to $SO_2$, 5% conversion to $H_2SO_4$.
(5) Emission estimates from U.S. EPA (1993).
(6) Emission estimate based on City of Tallahassee oil analysis

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997

| TABLE 2-5<br>COMBINED CYCLE UNIT 8<br>ESTIMATED [1] PERFORMANCE ON<br>NUMBER 2 (0.05% S) DIESEL FUEL OIL (75% LOAD) | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure (lb/in$^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)[2] | 1,567 | 1,465.5 | 1,313.3 |
| Evaporative Cooler | Off | Off | Off |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 101 | 97 | 94 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (42 ppmvd)[3] | 281 | 263 | 235 |
| Sulfur Dioxide ($SO_2$)[4] | 80 | 75 | 67 |
| Particulate Matter ($PM_{10}$) | 17 | 17 | 17 |
| Volatile Organic Compounds (non-methane HC) | 8.5 | 8 | 7.5 |
| Lead (Pb)[5] | 9.09E-02 | 8.05E-02 | 7.62E-02 |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be)[5] | 5.17E-04 | 4.84E-04 | 4.33E-04 |
| Mercury (Hg)[5] | 1.43E-03 | 1.33E-03 | 1.20E-03 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) [6] | 1.66 | 1.55 | 1.39 |
| Sulfuric Acid Mist ($H_2SO_4$)[4] | 8 | 8 | 7 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 186 | 190 | 196 |
| Stack Gas Exit Velocity (ft/sec) | 65 | 62 | 59 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Based on FBN content of 0.015% or less. Maximum FBN content = 0.03% = an additional 12ppmvd $NO_x$ above 42 ppmvd.
(4) Sulfur dioxide and sulfuric acid mist based on 0.05% sulfur by weight in fuel (future Number 2 fuel oil supply); 95% S conversion to $SO_2$, 5% conversion to $H_2SO_4$.
(5) Emission estimates from U.S. EPA (1993).
(6) Emission based on City of Tallahassee oil analysis

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997

**TABLE 2-6**
**COMBINED CYCLE UNIT 8**
**ESTIMATED (1) PERFORMANCE ON**
**NUMBER 2 (0.05% S) DIESEL FUEL OIL (50% LOAD)**

| | | | |
|---|---|---|---|
| **CONDITIONS** | | | |
| Ambient Temperature (°F) | 20 | 59 | 95 |
| Ambient Relative Humidity (%) | 60 | 60 | 60 |
| Ambient Pressure (lb/in$^2$) | 14.7 | 14.7 | 14.7 |
| Maximum Heat Input Rate (mmBtu/hr)(2) | 1,219.9 | 1,148.9 | 1027.3 |
| Evaporative Cooler | Off | Off | Off |
| **EMISSIONS** (lb/hr) | | | |
| Carbon Monoxide (CO) | 192 | 189 | 177 |
| Oxides of Nitrogen ($NO_x$) (at 15% $O_2$) (42pmvd)(3) | 217 | 204 | 182 |
| Sulfur Dioxide ($SO_2$)(4) | 62 | 60 | 53 |
| Particulate Matter ($PM_{10}$) | 17 | 17 | 17 |
| Volatile Organic Compounds | 12.5 | 12.5 | 12.5 |
| Lead (Pb)(5) | 7.08E-02 | 6.6E-02 | 5.96E-02 |
| Asbestos | N/A | N/A | N/A |
| Beryllium (Be)(5) | 4.03E-04 | 3.79-04 | 3.39E-04 |
| Mercury (Hg)(5) | 1.11E-03 | 1.05E-03 | 9.35E-04 |
| Vinyl Chloride | N/A | N/A | N/A |
| Total Fluorides (Fl) (6) | 1.29 | 1.22 | 1.09 |
| Sulfuric Acid Mist ($H_2SO_4$)(4) | 7 | 6 | 6 |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Total Reduced Sulfur | N/A | N/A | N/A |
| **STACK PARAMETERS** | | | |
| Stack Height (ft) (AGL) | 200 | 200 | 200 |
| Stack Diameter (ft) | 16.5 | 16.5 | 16.5 |
| Stack Gas Temperature (°F) | 176 | 181 | 188 |
| Stack Gas Exit Velocity (ft/sec) | 50 | 51 | 48 |

(1) Emission estimates based on manufacturer's data (GE, 1996).
(2) The heat input rate is based on the lower heating value of the fuel.
(3) Based on FBN content of 0.015% or less. Maximum FBN content = 0.03% = an additional 12ppmvd $NO_x$ above 42 ppmvd.
(4) Sulfur dioxide and sulfuric acid mist based on 0.05% sulfur by weight in fuel (future Number 2 fuel oil supply); 95% S conversion to $SO_2$, 5% conversion to $H_2SO_4$.
(5) Emission estimates from U.S. EPA (1993).
(6) Emission based on City of Tallahassee oil analysis

AGL = Above ground level
N/A = No emission factor available or no emissions expected.

Source: Foster Wheeler Environmental, 1997

combustion turbine performance and emissions/exhaust characteristics. It should be recognized, however, that the combustion turbine may operate at temperatures outside this range for short periods of time during a given year. The 59° F temperature case (the ISO standard temperature) is a conservative representation of annual average temperature conditions for the site (which is about 67°F). The 50 percent, 75 percent, and 100 percent loads represent the range of loads over which the Unit is likely to be operated on both fuels.

A review of the combustion turbine design information in Tables 2-1 through 2-6 indicates that highest criteria air pollutant emission rates occur when burning Number 2 (0.05% S) diesel fuel oil. Combustion of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil result in similar exhaust gas flow rates and stack exit temperatures, which directly influence plume rise.

Natural gas is supplied to the site by Florida Gas Transmission Company. Currently Number 2 (0.4% S) diesel fuel oil is obtained from various suppliers and is stored in an on-site tank. Future Number 2 diesel fuel oil purchases for the Purdom Station will be of the very low sulfur (0.05%) type required by the Clean Air Act Amendments of 1990 for transportation fuel. This fuel will be utilized as the secondary fuel for the new Unit 8 and the existing combustion turbines and will be stored in the existing tank. Typical fuel analyses for natural gas and for Number 2 (0.05% S) diesel fuel oil are presented in Tables 2-7 and 2-8, respectively.

The proposed Project will also include a cooling tower. The cooling tower will primarily utilize St. Marks River water for makeup and will emit some "drift" water droplets containing the same dissolved and suspended solids which exist in the make-up water, concentrated approximately 5 times. The drift droplets begin to evaporate as soon as they leave the cooling tower and some of the smaller droplets will evaporate completely before they hit the ground, leaving a very small particle (consisting of the dissolved and suspended solids from the makeup water). These particulates can be dispersed by the wind and are considered among the particulate matter emissions from the Project.

Based on the water quality of the makeup water and the originally planned drift rate of the cooling tower (0.005 percent of the circulating water flow), the amount of dissolved and suspended solids leaving the tower in the drift droplets has been estimated to be 12 tons per year (RE&C, 1996). However, there is a wide range of drift droplet sizes leaving the tower and the larger ones will fall to the ground in the immediate vicinity of the tower. A drift droplet size distribution is presented as Figure 2-2. Since the very large droplets (i.e., those larger than about 200 microns (μm) in diameter) will fall to the ground very quickly (i.e., before the water has had a chance to evaporate), they have been eliminated from consideration as producing particulate emissions which can be dispersed by the winds. Therefore, we have reduced the contribution from the cooling tower to particulate emissions by 1.5 tons per year, resulting in a remaining total of 10.5 tons per year. Even this figure is considered to be quite conservative as the relatively humid conditions at St. Marks will often cause many of the droplets smaller than 200 μm in diameter to be deposited on the ground prior to water evaporation. Very recently, the cooling tower design drift rate has been changed to 0.002 percent of the circulating water flow. This will further reduce the particulate matter emissions from the cooling tower. As these values are conservative, revisions to the estimated cooling tower particulate matter emissions and the $PM_{10}$ air quality impacts analysis were unnecessary.

**TABLE 2-7**
**TYPICAL NATURAL GAS ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur[2] | 0 - 0.34 |
| Ash | 0.0 |
| Proximate Analysis | |
| Volatile Matter | 99.65 - 100.0 |
| Fixed Carbon | 0.0 |
| Moisture | 0.0 - 0.00138 |
| Ash | 0.0 |

(1) Heating value (HHV): 964 - 1129 Btu/ft$^3$
(2) Total sulfur (maximum): 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

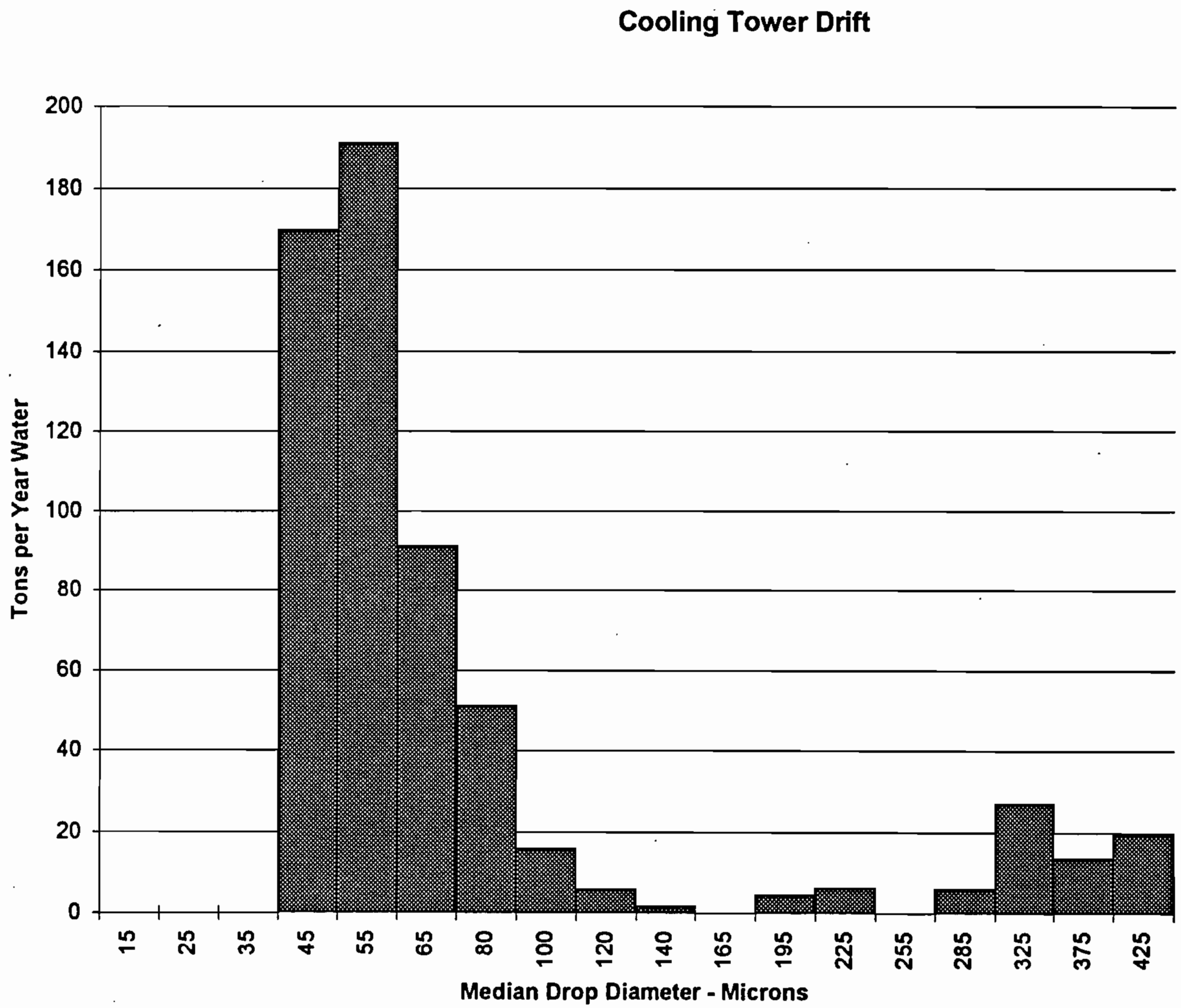
**TABLE 2-8**
**TYPICAL FUEL OIL ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 86.1 - 88.2 |
| Hydrogen | 11.8 - 13.9 |
| Oxygen | 0.0 |
| Nitrogen | 0.0 - 0.1 |
| Sulfur[2] | 0.0 - 0.05 |
| Ash | 0.0 - 0.05 |
| Proximate Analysis | |
| Volatile Matter | 99.05 - 99.5 |
| Fixed Carbon | 0.25 - 1.0 |
| Moisture | 0.0 - 0.1 |
| Ash | 0.0 - 0.05 |

(1) Heating value (HHV): 19,170 - 19,750 Btu/lb
(2) Total sulfur (maximum) 0.05%

Source: Babcock & Wilcox, 1972 and RE&C, 1997

PLOT DATE FEB 26, 1997 C:\15840002\----\00000-25.DWG




SOURCE: RE&C, 1996

CITY OF TALLAHASSEE

COOLING TOWER DRIFT
DROPLET SIZE DISTRIBUTION

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 2-2

## 2.3 SITE LAYOUT AND STRUCTURES

Figure 2-3 contains the site layout of the proposed Unit 8. Figure 2-4 depicts the profile of the proposed Unit 8.

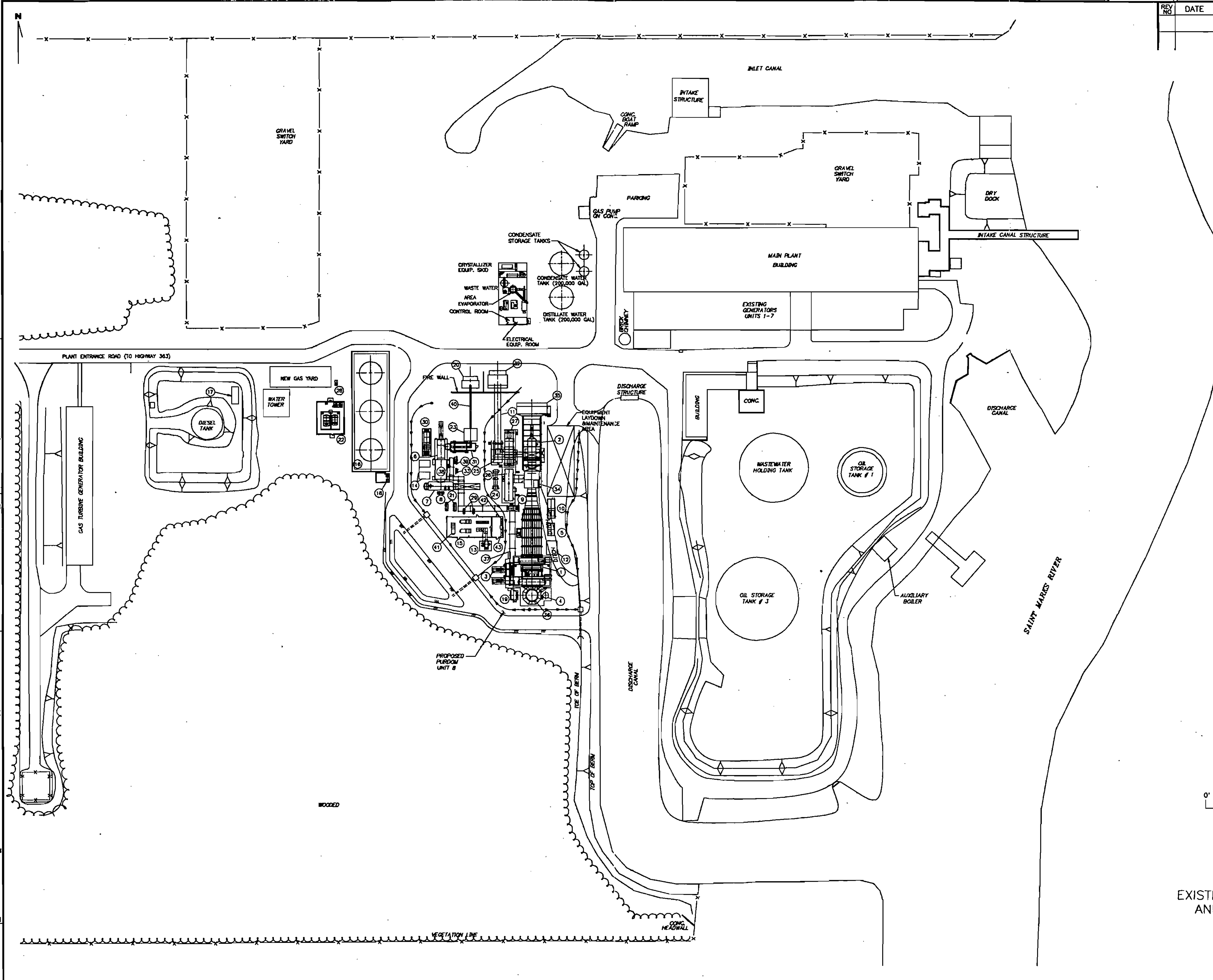
## 2.4 PROPOSED PROJECT EMISSIONS

The proposed Project includes the reduction of annual emissions from existing units as well as the addition of Unit 8. This section provides a summary of the Project annual emissions increases and decreases for the various PSD regulated pollutants. A discussion of the "facility-wide caps" for annual emissions of $SO_2$ and $NO_x$ is also provided. Of course, short-term emission rates from existing units which will remain in operation will remain the same as they are now, except for $SO_2$ emissions from the existing combustion turbines (GT1 and GT2). Those will decline due to the use of the same lower sulfur Number 2 diesel fuel oil which will be the secondary fuel for Unit 8. The short-term emission rates for Unit 8 are based on BACT, as described in Section 4.

### 2.4.1 Current Plant Permits and Emissions

The Purdom Station currently has three valid FDEP air permits. Operation Permit No. A065-24827 establishes operating, testing, recordkeeping, and reporting requirements for the existing combustion turbines (GT1 and GT2), and limits maximum annual hours of operation for each. This permit does not establish any specific limitations on allowable emission rates, but it does so indirectly through a sulfur content limitation on the fuel which may be used. Permit No. AO65-242831 establishes operating, testing, recordkeeping and reporting requirements for Units 5, 6 and 7; establishes allowable emission rates for particulate matter and $SO_2$; and provides for continuous operation of the boilers. The emission rate for particulate matter is not to exceed 0.1 lb/mmBtu heat input during normal operation and 0.3 lb/mmBtu during certain operating conditions (soot blowing) when firing Number 6 fuel oil. The maximum allowable emission rate for $SO_2$ is 1.87 lb/mmBtu. The initial Title V Operating Permit Application requested an $SO_2$ emission limit of 1.3 lb/mmBtu for Units 5 and 6 when applied to the liquid fuel oil portion of total heat input. Permit No. 1290001-002-AC establishes operating, testing, recordkeeping and reporting requirements for the auxiliary boiler. It limits the boiler to operation when the existing Units 5, 6, and 7 are not operating and further limits annual operations to 2,000 hours. The NSPS recordkeeping and reporting requirements of 40 CFR 60, Subpart Dc apply to the auxiliary boiler.

Table 2-9 presents the permitted (allowable) emission rates in tons per year for Units 5 through 7 in accordance with the particulate matter and $SO_2$ limitations contained in the respective operating permits. This table also presents past actual annual emissions of particulate matter, $SO_2$, $NO_x$, CO, VOC, and Pb, which are known as the "criteria" pollutants, as well as the other pollutants covered by the PSD regulations (Rule 62-212.400 F.A.C.). The table includes emissions generated by the three boilers and two combustion turbines based on actual operation and fuel usage data averaged over the last two years.




| REV NO | DATE | REVISION | DR | CH | APPROVED |
|---|---|---|---|---|---|
| | | | | | |

**LEGEND:**

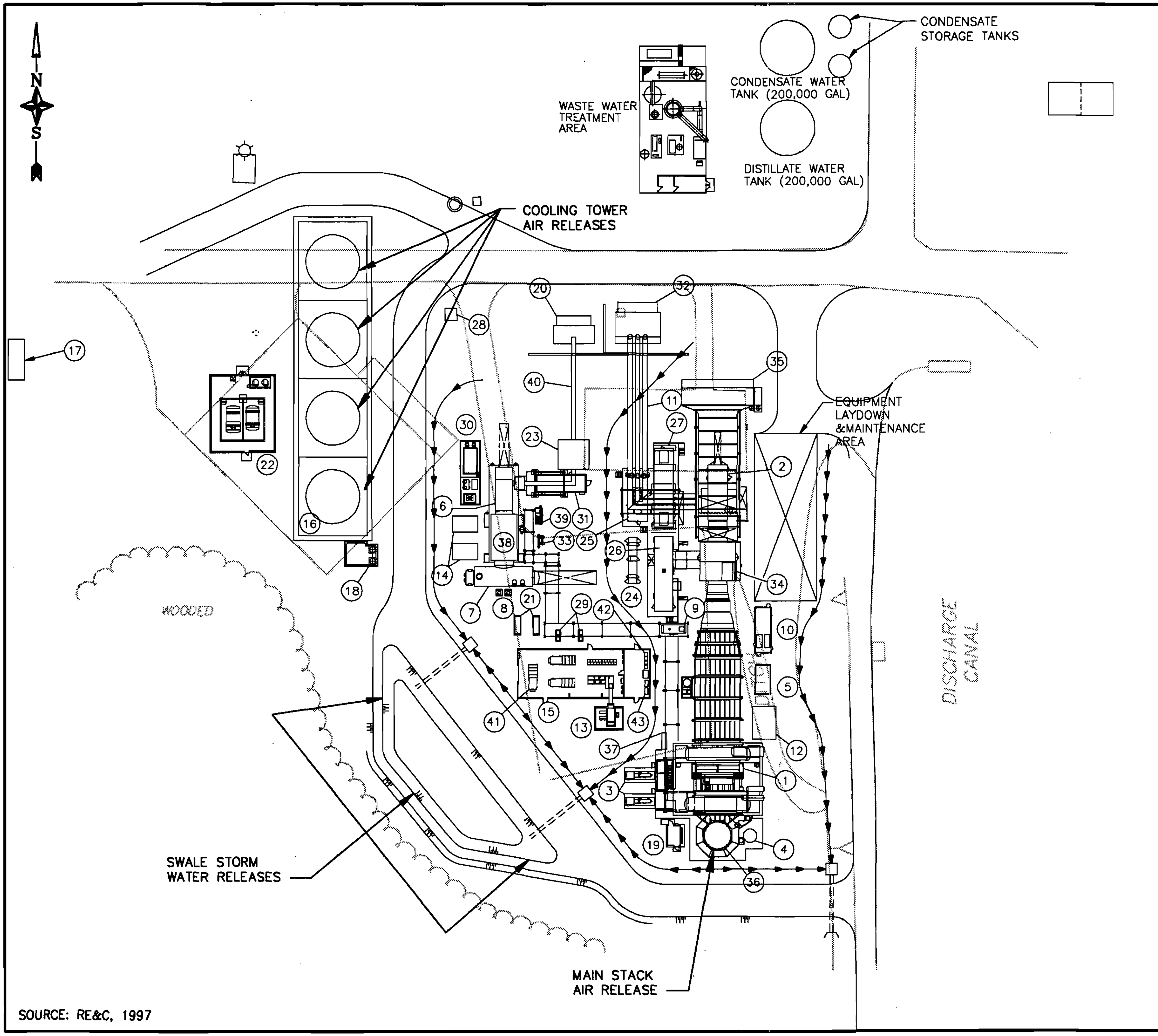
1. HEAT RECOVERY STEAM GENERATOR
2. COMBUSTION TURBINE GENERATOR
3. FEEDWATER PUMPS
4. BLOWDOWN TANK
5. WATER WASH SKID
6. STEAM TURBINE GENERATOR
7. CONDENSER
8. CONDENSATE PUMPS
9. CO2 FIRE PROTECTION SKID
10. WATER INJECTION SKID
11. ISO PHASE BUS DUCT
12. HRSG CHEMICAL FEED SYSTEM
13. AUXILIARY TRANSFORMER
14. AIR EJECTER
15. SWITCHGEAR BUILDING
16. COOLING TOWER
17. FUEL OIL TRANSFER PUMPS
18. CIRCULATING WATER PUMPS
19. CEMS
20. CLOSED COOLING WATER HEAT EXCHANGERS
21. CLOSED COOLING WATER PUMPS
22. COOLING TOWER CHEMICAL FEED SYSTEM
23. GENERATOR BREAKER
24. STATIC START SKID
25. CTG BUS ACCESSORY COMPARTMENT
26. ACCESSORY MODULE
27. PEECC
28. NATURAL GAS FILTER/SCRUBBER
29. CLOSED COOLING WATER HEAD TANK
30. STG LUBE OIL SKID
31. STG BUS ACCESSORY COMPARTMENT
32. MAIN TRANSFORMER
33. GLAND STEAM CONDENSER
34. COMBUSTION TURBINE
35. INLET FILTER
36. STACK
37. SAMPLE PANEL
38. STEAM TURBINE
39. GLAND STEAM CONTROL VALVE SKID
40. NON SEGREGATED BUS DUCT
41. COOLING TOWER LOAD CENTER

0' 100' 200'

SCALE

**FIGURE 1-2**

EXISTING PURDOM STATION
AND PURDOM UNIT 8
PLOT PLAN




SOURCE: RE&C, 1997

## LEGEND:

1. HEAT RECOVERY STEAM GENERATOR
2. COMBUSTION TURBINE GENERATOR
3. FEEDWATER PUMPS
4. BLOWDOWN TANK
5. WATER WASH SKID
6. STEAM TURBINE GENERATOR
7. CONDENSER
8. CONDENSATE PUMPS
9. CO2 FIRE PROTECTION SKID
10. WATER INJECTION SKID
11. ISO PHASE BUS DUCT
12. HRSG CHEMICAL FEED SYSTEM
13. AUXILIARY TRANSFORMER
14. VACUUM PUMPS
15. SWITCHGEAR BUILDING
16. COOLING TOWER
17. FUEL OIL TRANSFER PUMPS
18. CIRCULATING WATER PUMPS
19. CONTINUOUS EMISSIONS MONITORING SYSTEM
20. STEAM TURBINE GENERATOR MAIN STEPUP TRANSFORMER
21. CLOSED COOLING WATER HEAT EXCHANGERS
22. COOLING TOWER CHEMICAL FEED SYSTEM
23. GENERATOR BREAKER
24. STATIC START SKID
25. COMBUSTION TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
26. ACCESSORY MODULE
27. PACKAGED ELECTRICAL ELECTRONIC CONTROL CABINET
28. NATURAL GAS FILTER/SCRUBBER
29. CLOSED COOLING WATER PUMPS
30. STEAM TURBINE GENERATOR LUBE OIL SKID
31. STEAM TURBINE GENERATOR BUS ACCESSORY COMPARTMENT
32. COMBUSTION TURBINE GENERATOR MAIN STEPUP TRANSFORMER
33. GLAND STEAM CONDENSER
34. COMBUSTION TURBINE
35. INLET FILTER
36. STACK
37. SAMPLE PANEL
38. STEAM TURBINE
39. GLAND STEAM CONTROL VALVE SKID
40. NON SEGREGATED BUS DUCT
41. COOLING TOWER LOAD CENTER
42. BAILEY CONTROL CABINETS
43. STEAM TURBINE GENERATOR CONTROL CABINETS

60 0 60 120

SCALE IN FEET

FOOTPRINT OF THE
COMBINED CYCLE UNIT

PURDOM UNIT 8 PROJECT – ST MARKS, FLORIDA

CITY OF TALLAHASSEE

Figure
2-3

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# Purdom Unit 8

TABLE 2-9
Recent Air Pollutant Emissions (Allowables and Actuals)(14) (tons/year)

| Pollutant | UNIT 5 Actual Fuel Oil | UNIT 5 Actual Nat. Gas | UNIT 5 Actual Totals | UNIT 5 Allowable Totals(1) | UNIT 6 Actual Fuel Oil | UNIT 6 Actual Nat. Gas | UNIT 6 Actual Totals | UNIT 6 Allowable Totals(1) | UNIT 7 Actual Fuel Oil | UNIT 7 Actual Nat. Gas | UNIT 7 Actual Totals | UNIT 7 Allowable Totals(1) | GT1 & GT2(16, 17) Actual Fuel Oil | GT1 & GT2(16, 17) Actual Nat. Gas | GT1 & GT2(16, 17) Actual Totals | GT1 & GT2(16, 17) Allowable Totals(1) | UNITS 5, 6, 7 & GTs Actual Totals | UNITS 5, 6, 7 & GTs Allowable Totals(1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Particulate Matter (TSP)(2)(3) | 0.01 | 1.24 | 1.25 | 164.30 | 0.17 | 1.22 | 1.39 | 164.30 | 2.30 | 5.28 | 7.58 | 340.00 | 0.04 | 0.39 | 0.43 | NR | 10.65 | 668.60(18) |
| $PM_{10}$ | 0.01 | 1.24 | 1.25 | 164.30 | 0.17 | 1.22 | 1.39 | 164.30 | 2.30 | 5.28 | 7.58 | 340.00 | 0.04 | 0.39 | 0.43 | NR | 10.65 | 668.60(18) |
| Sulfur Dioxide (5) | 0.30 | 0.22 | 0.52 | 1710.00(4) | 3.53 | 0.22 | 3.75 | 1710.00(4) | 74.60 | 0.93 | 75.53 | 5100.00 | 0.23 | 0.01 | 0.24 | 687.61 | 80 | 9207.61 |
| Nitrogen Oxides(6) | 0.05 | 68.08 | 68.13 | NR | 1.44 | 139.22 | 140.66 | NR | (15) | (15) | 251.24 | NR | 0.50 | 5.96 | 6.46 | NR | 467 | NR |
| Carbon Monoxide(7) | 0.01 | 9.90 | 9.91 | NR | 0.11 | 10.13 | 10.24 | NR | 2.24 | 42.24 | 44.48 | NR | 0.04 | 1.49 | 1.53 | NR | 56 | NR |
| Volatile Organic Compounds(8) | 0.00 | 0.29 | 0.29 | NR | 0.02 | 0.30 | 0.32 | NR | 0.34 | 1.49 | 1.83 | NR | 0.01 | 0.32 | 0.33 | NR | 2.77 | NR |
| Lead(9) | 3.3E-5 | NA | 3.3E-5 | NR | 0.001 | NA | 0.001 | NR | 0.01 | NA | 0.01 | NR | 0.00 | N/A | 0.00 | NR | 0.011 | NR |
| Asbestos | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | N/A | N/A | N/A | NR | NA | NR |
| Beryllium(10) | 0.00 | NA | 0.00 | NR | 0.00 | NA | 0.00 | NR | 0.0003 | NA | 0.0003 | NR | 0.00 | N/A | 0.00 | NR | 0.0003 | NR |
| Mercury(11) | 5.4E-6 | 1.9E-7 | 5.6E-6 | NR | 1.0E-4 | 2.0E-7 | 1.0E-4 | NR | 0.002 | 8.2E-7 | 0.002 | NR | 6.59E-07 | 1.2-E-08 | 6.66E-07 | NR | 0.002 | NR |
| Vinyl Chloride | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Fluorides(12) | 1.8E-4 | NA | 1.8E-4 | NR | 0.003 | NA | 0.003 | NR | 0.072 | NA | 0.072 | NR | 0.00 | 0.00 | NA | NR | 0.08 | NR |
| Sulfuric Acid Mist(13) | 0.01 | 0.03 | 0.04 | NR | 0.13 | 0.03 | 0.16 | NR | 2.71 | 0.11 | 2.82 | NR | NA | NA | NA | NR | 3.02 | NR |
| Hydrogen Sulfide | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Total Reduced Sulfur | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Reduced Sulfur Compounds | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |

Period of Record: August 1994-July 1996. All actual fuel usage data for Units 5 and 6 and data through March 1995 for Unit 7 is obtained from monthly generation reports. Fuel usage data for Unit 7 after March 1995 is based on the continuous emissions monitoring system (CEMS).

NR - No restrictions NA - No emissions information available or no emissions expected.

(1) Allowable totals based on emissions limitations contained in State of Florida Permit Numbers A065-242831 and A065-242827

(2) It is assumed that all PM emissions are that of $PM_{10}$.

(3) Actual PM emissions from the boilers for fuel oil are based on the most recent PM test results during both normal and sootblowing operations and actual fuel usage. PM emissions from the boilers for natural gas are based on an AP-42 factor and actual fuel usage.

(4) Allowable $SO_2$ emissions based on requested $SO_2$ emissions limitation of 1.3 lb/mmBtu.

(5) Actual $SO_2$ emissions for fuel oil are based on an AP-42 formula, percent sulfur in the fuel oil (as-burned analyses for the boilers) and actual fuel usage. $SO_2$ emissions for natural gas are based on the sulfur content (FGT data) and the actual natural gas usage.

(6) Actual $NO_x$ emissions for fuel oil and natural gas for Units 5 and 6 are based on an AP-42 factor and actual fuel usage. $NO_x$ emissions for Unit 7 are based on CEMS lb/mmBtu data and total actual fuel usage.

(7) Actual CO emissions are based on AP-42 factors and actual fuel usage.

(8) Actual VOC emissions are based on AP-42 factors and actual fuel usage.

(9) Actual lead emissions are based on AP-42 factors and actual fuel usage.

(10) Actual beryllium emissions are based on AP-42 factors and actual fuel usage.

(11) Actual mercury emissions for fuel oil are based on AP-42 factors and actual fuel usage. Actual mercury emissions for natural gas are based on an EPRI (1994) factor (no AP-42 factor available) and actual fuel usage.

(12) Actual fluoride emissions for boilers are based on an analysis of a fuel sample (no AP-42 factor available) for fluoride and actual fuel usage.

(13) Actual sulfuric acid mist emissions for boilers on fuel oil are based on the AP-42 factor for sulfur trioxide and actual fuel usage; actual sulfuric acid mist emission for boilers on natural gas are based on ten percent of sulfur dioxide and actual fuel usage.

(14) Actual emissions are based on current estimates and emission factors.

(15) The CEMS data on which actual $NO_x$ emissions are based does not distinguish between oil and natural gas consumption.

(16) Actual fuel oil and natural gas emission rate values reflect the sum of emissions from both combustion turbines.

(17) Actual emissions are based on AP-42 factors and actual fuel usage

(18) Allowable totals shown do not include the particulate emissions from the two combustion turbines since Permit A065-242827 has no limit for particulates.

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Rev. 0

ATTACHMENT 1 - REV 2 OF TABLE 1-1

TABLE 1-1
Recent Air Pollutant Emissions (Allowables and Actuals)[14]
(tons/year)

| | UNIT 5 | | | | UNIT 6 | | | | UNIT 7 | | | | GT1 & GT2[16,17] | | | | UNITS 5, 6, 7 & GTs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Actual Fuel Oil | Actual Nat Gas | Actual Totals | Allowable Totals[1] | Actual Fuel Oil | Actual Nat Gas | Actual Totals | Allowable Totals[1] | Actual Fuel Oil | Actual Nat Gas | Actual Totals | Allowable Totals[1] | Actual Fuel Oil | Actual Nat Gas | Actual Totals | Allowable Totals[1] | Actual Totals | Allowable Totals[1] |
| Particulate Matter[2][3] | 0.01 | 1.24 | 1.25 | 164.30 | 0.17 | 1.22 | 1.39 | 164.30 | 2.30 | 5.28 | 7.58 | 340.00 | 0.04 | 0.46 | 0.50 | NR | 10.72 | 668.60[18] |
| $PM_{10}$ | 0.01 | 1.24 | 1.25 | 164.30 | 0.17 | 1.22 | 1.39 | 164.30 | 2.30 | 5.28 | 7.58 | 340.00 | 0.04 | 0.46 | 0.50 | NR | 10.72 | 668.60[18] |
| Sulfur Dioxide[5] | 0.30 | 0.22 | 0.52 | 1710.00[4] | 3.53 | 0.22 | 3.75 | 1710.00[4] | 74.60 | 0.93 | 75.53 | 5100.00 | 0.23 | 0.01 | 0.24 | 687.61 | 80.04 | 9207.61 |
| Nitrogen Oxides[6] | 0.05 | 68.08 | 68.13 | NR | 1.44 | 139.22 | 140.66 | NR | [15] | [15] | 251.24 | NR | 0.50 | 6.86 | 7.36 | NR | 467.39 | NR |
| Carbon Monoxide[7] | 0.01 | 9.90 | 9.91 | NR | 0.11 | 10.13 | 10.24 | NR | 2.24 | 42.24 | 44.48 | NR | 0.03 | 1.71 | 1.74 | NR | 66.37 | NR |
| Volatile Organic Compounds[8] | 0.00 | 0.29 | 0.29 | NR | 0.02 | 0.30 | 0.32 | NR | 0.34 | 1.49 | 1.83 | NR | 0.01 | 0.37 | 0.38 | NR | 2.82 | NR |
| Lead[9] | 3.3E-5 | NA | 3.3E-5 | NR | 0.001 | NA | 0.001 | NR | 0.01 | NA | 0.01 | NR | 0.00 | N/A | 0.00 | NR | 0.011 | NR |
| Asbestos | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | N/A | N/A | N/A | NR | NA | NR |
| Beryllium[10] | 0.00 | NA | 0.00 | NR | 0.00 | NA | 0.00 | NR | 0.0003 | NA | 0.0003 | NR | 0.00 | N/A | 0.00 | NR | 0.0003 | NR |
| Mercury[11] | 5.4E-6 | 1.9E-7 | 5.6E-6 | NR | 1.0E-4 | 2.0E-7 | 1.0E-4 | NR | 0.002 | 8.2E-7 | 0.002 | NR | 6.59E-07 | 1.2-E-08 | 6.66E-07 | NR | 0.002 | NR |
| Vinyl Chloride | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Fluorides[12] | 0.001 | NA | 0.001 | NR | 0.02 | NA | 0.02 | NR | 0.38 | NA | 0.38 | NR | NA | NA | NA | NR | 0.40 | NR |
| Sulfuric Acid Mist[13] | 0.01 | 0.03 | 0.04 | NR | 0.13 | 0.03 | 0.16 | NR | 2.71 | 0.11 | 2.82 | NR | NA | NA | NA | NR | 3.02 | NR |
| Hydrogen Sulfide | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Total Reduced Sulfur | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |
| Reduced Sulfur Compounds | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NA | NA | NR | NA | NR |

Period of Record: August 1994-July 1996. All actual fuel usage data for Units 5 and 6 and data through March 1995 for Unit 7 is obtained from monthly generation reports. Fuel usage data for Unit 7 after March 1995 is based on CEMS.

NR - No restrictions

NA - No emissions information available or no emissions expected.

(1) Allowable totals based on emissions limitations contained in State of Florida Permit Number A065-242831 and A065-242827

(2) It is assumed that all PM emissions are that of $PM_{10}$.

(3) Actual PM emissions from the boilers for fuel oil are based on the most recent PM test results during both normal and sootblowing operations and actual fuel usage. PM emission from the boilers for natural gas are based on an AP-42 factor and actual fuel usage.

(4) Allowable $SO_2$ emissions based on requested $SO_2$ emissions limitation of 1.3 lb/mmBtu.

(5) Actual $SO_2$ emissions for fuel oil are based on an AP-42 formula, percent sulfur in the fuel oil (as-burned analyses for the boilers) and actual fuel usage. $SO_2$ emissions for natural gas are based on the sulfur content (FGT data) and the actual natural gas usage.

(6) Actual $NO_x$ emissions for fuel oil and natural gas for Units 5 and 6 are based on an AP-42 factor and actual fuel usage. $NO_x$ emissions for Unit 7 are based on CEMS lb/mmBtu data and total actual fuel usage.

(7) Actual CO emissions are based on AP-42 factors and actual fuel usage.

(8) Actual VOC emissions are based on AP-42 factors and actual fuel usage.

(9) Actual lead emissions are based on AP-42 factors and actual fuel usage.

(10) Actual beryllium emissions are based on AP-42 factors and actual fuel usage.

(11) Actual mercury emissions for fuel oil are based on AP-42 factors and actual fuel usage. Actual mercury emissions for natural gas are based on an EPRI factor (no AP-42 factor available) and actual fuel usage.

(12) Actual fluoride emissions for boilers are based on available FCG factors (no AP-42 factor available) for hydrogen fluoride and actual fuel usage.

(13) Actual sulfuric acid mist emissions for boilers on fuel oil are based on the AP-42 factor for sulfur trioxide and actual fuel usage; actual sulfuric acid mist emission for boilers on natural gas are based on ten percent of sulfur dioxide and actual fuel usage.

(14) Actual emissions are based on current estimates and emission factors which are subject to change.

(15) The CEMS data on which actual $NO_x$ emissions are based does not distinguish between oil and natural gas consumption.

(16) Actual fuel oil and natural gas emission rate values reflect the sum of emissions from both combustion turbines.

(17) Actual emissions are based on AP-42 factors and actual fuel usage

(18) Allowable totals shown do not include the particulate emissions from the two combustion turbines since Permit A065-242827 has no limit for particulates.

### 2.4.2 Proposed Project Emissions

As indicated in Section 1.0, the Project includes the reduction of emissions from the existing units to offset the emissions of some of the pollutants associated with Unit 8. As part of the Project, Units 5 and 6 will be permanently shut down early and their emissions will cease. In addition, federally enforceable emission caps for $SO_2$ and $NO_x$ covering the proposed Unit 8, existing Unit 7, the existing combustion turbines (GT1 and GT2), and the new auxiliary boiler are being requested. These "facility-wide caps" will require annual emissions of $SO_2$ and $NO_x$ to remain at or below recent levels of those pollutants from Units 5, 6 and 7, and from the existing combustion turbines (GT1 and GT2).

In order to determine the "worst case" annual emissions from the Project under the proposed facility-wide caps, eleven potential operating scenarios were identified. These scenarios, while not intended to represent limits on the facility, are believed to bracket the expected operating ranges of the individual units at the site. In all these scenarios, the two existing combustion turbines (GT1 and GT2) were assumed to operate at the same level as they have in recent years (based on operating 100 hours each per year). Thus, their pollutant emissions have been assumed to be constant, except for $SO_2$ (where a decrease is expected as a result of a change from 0.4% S to 0.05% S fuel). The new auxiliary boiler was conservatively assumed to operate at its permitted limit of 2,000 hours per year and the cooling tower was conservatively assumed to operate at full capacity. The variables in these scenarios were fuel type and operating hours of Units 7 and 8. The hours of operation will be limited by the proposed facility-wide caps for $SO_2$ and $NO_x$. A brief description and summary of operating hours for each Unit on each fuel are presented in Table 2-10. This table also indicates which pollutant ($SO_2$ or $NO_x$) is the limiting or controlling pollutant with respect to the facility-wide caps.

The scenarios evaluated resulted in various estimates of annual emissions for the site, with no one scenario producing the highest emissions for all PSD regulated pollutants (see Appendix I for the calculations). A worst case (highest) emission scenario was selected for each pollutant to represent the estimated maximum future annual emissions from the site. A summary of these emissions are presented in Table 2-11. The scenario which produced the worst case emissions for each pollutant is also identified in the table. Finally, the net emissions increase for each pollutant (versus the current actual emissions identified in Table 2-9) is provided. Please note that net emission increases provided in Table 2-11 differ slightly from those provided to FDEP and others in earlier correspondence. The differences reflect final adjustments in calculations and a change in the emission factor used for fluorides from a Florida Electric Power Coordinating Group (FCG) factor to one based on an actual fuel analysis.

Project emissions were also estimated for the non-PSD regulated air pollutants which are listed as the draft Florida Ambient Reference Concentrations (FARCs) (FDEP, 1995), and for which emission factors were available. The anticipated maximum annual emissions of these hazardous air pollutants are presented in Table 2-12.

**TABLE 2-10**
**FUTURE POTENTIAL OPERATING SCENARIOS UNDER THE FACILITY-WIDE CAPS**

| Scenario | Hours of Operation | | | | Controlling Pollutant[1] |
|---|---|---|---|---|---|
| | Unit 7 | | Unit 8 | | |
| | Fuel Oil | Natural Gas | Fuel Oil | Natural Gas | |
| 1 | 126 | 0 | 0 | 8,760 | $SO_2$ |
| 2 | 0 | 0 | 1,735 | 0 | $SO_2$ |
| 3 | 137 | 0 | 0 | 0 | $SO_2$ |
| 4 | 219 | 0 | 0 | 8,760 | $SO_2$ |
| 5 | 0 | 2,852 | 0 | 8,760 | $NO_x$ |
| 6 | 239 | 0 | 0 | 0 | $SO_2$ |
| 7 | 0 | 6,409 | 0 | 0 | $NO_x$ |
| 8 | 151 | 0 | 500 | 8,260 | $SO_2$ |
| 9 | 0 | 1,928 | 500 | 8,260 | $NO_x$ |
| 10 | 164 | 0 | 425 | 7,021 | $SO_2$ |
| 11 | 0 | 2,600 | 425 | 7,021 | $NO_x$ |

(1) Controlling pollutant is that pollutant whose emissions would reach the facility-wide caps under this scenario.
(2) Hours are estimated at full load operation.

Source: Foster Wheeler Environmental, 1997

| | |
|---|---|
| Scenario 1 | Unit 8 as controlling unit, operating 8,760 hours on natural gas/Unit 7 firing No. 6 oil $SO_2$ limit 1.87 lb/mmBtu (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 2 | Unit 8 as controlling unit, operating max hours on No. 2 fuel oil/no operation of Unit 7 (Unit 8 hours limited by $SO_2$ cap) |
| Scenario 3 | Unit 7 as controlling unit, max hours on No. 6 fuel oil 1.87 lb/mmBtu/no operation of Unit 8 (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 4 | Unit 8 as controlling unit, operating 8,760 hours on natural gas/Unit 7 operating on No. 6 oil assume typical S content (approx 0.95 lb/mmBtu) (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 5 | Unit 8 as controlling unit, operating 8,760 hours on natural gas/Unit 7 operation on natural gas (Unit 7 hours limited by $NO_x$ cap) |
| Scenario 6 | Unit 7 as controlling unit, max hours on No. 6 fuel oil assume typical S content (approx 0.95 lb/mmBtu)/ no operation of Unit 8 (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 7 | Unit 7 as controlling unit, max hours on natural gas/ no operation of Unit 8 (Unit 7 hours limited by $NO_x$ cap) |
| Scenario 8 | Unit 8 as controlling unit, operating 8,260 hours on natural gas & 500 hr on No. 2 Oil/Unit 7 on No. 6 oil typical S content 1% (approx 0.95 lb/mmBtu) (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 9 | Unit 8 as controlling unit, operating 8,260 hours on natural gas & 500 hr on No. 2 oil/Unit 7 on natural gas (Unit 7 hours limited by $NO_x$ cap) |
| Scenario 10 | Unit 8 as controlling unit, operating 7,021 hrs on natural gas & 425 hr on No. 2 oil/Unit 7 on No. 6 oil assume typical S content 1% (approx 0.95 lb/mmBtu) (Unit 7 hours limited by $SO_2$ cap) |
| Scenario 11 | Unit 8 as controlling unit (85% cap.) operating 7,021 hours on natural gas & 425 hr on No. 2 oil/Unit 7 on natural gas (Unit 7 hours limited by $NO_x$ cap) |

**TABLE 2-11**
**MAXIMUM (WORST CASE) EMISSIONS AND NET EMISSIONS INCREASES FROM PROJECT**

| Pollutant | Annual Emissions (tons/year) | Scenario | Net Emissions Increase (tons/yr) |
|---|---|---|---|
| Carbon Monoxide (CO) | 193 | 9 | 127 |
| Nitrogen Oxides ($NO_x$) | 467 | 7 | 0.0 |
| Sulfur Dioxide ($SO_2$) | 80 | 6 | 0.0 |
| Ozone (VOCs) | 14.7 | 9 | 11.9 |
| Particulate Matter (TSP) | 59.0 | 4 | 48.3 |
| Particulate Matter ($PM_{10}$) | 59.0 | 4 | 48.3 |
| Total Reduced Sulfur | N/A | N/A | N/A |
| Reduced Sulfur Compounds | N/A | N/A | N/A |
| Sulfuric Acid Mist ($H_2SO_4$) | 8.7 | 2 | 5.6 |
| Fluorides (Fl) | 1.64 | 2 | 1.56 |
| Vinyl Chloride | NA | N/A | N/A |
| Lead (Pb) | 0.091 | 2 | 0.08 |
| Mercury (Hg) | 0.0024 | 2 | 0.0004 |
| Asbestos | NA | N/A | N/A |
| Beryllium (Be) | 0.00052 | 2 | 0.00022 |

N/A - No emissions information available or no emissions expected.

Source: Foster Wheeler Environmental 1997

**TABLE 2-12**
**MAXIMUM (WORST CASE) EMISSIONS OF HAZARDOUS AIR POLLUTANTS (UNIT 7, UNIT 8, GT1, GT2, COOLING TOWER AND AUX BOILER)**

| Pollutant | Maximum Estimated Emissions (tons/yr) |
|---|---|
| Arsenic (As) | 8.59E-03 |
| Cadmium (Cd) | 3.53E-03 |
| Chromium (Cr) | 7.36E-02 |
| Manganese (Mn) | 5.17E-01 |
| Nickel (Ni) | 1.88E-00 |
| Cobalt (Co) | 1.43E-02 |
| Antimony (Sb) | 3.45E-02 |
| Vanadium (V) | 1.32E-01 |
| Polycyclic Organic Material (POM) | 3.76E-02 |
| Benzo (a) pyrene (BaP) | 6.36E-06 |
| Benzene | 6.21E-03 |
| Toluene | 2.01E-02 |
| Selenium (Se) | 8.30E-03 |
| Hydrochloric Acid (HCl) | 1.18E+01 |
| Dioxin (2,378 TCDD) | 1.39E-08 |
| Formaldehyde (HCOH) | 2.61E-01 |

Source: Foster Wheeler Environmental, 1997

# 3. AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

The following discussion pertains to the federal and state air regulatory requirements and their applicability to the Project. These regulations must be satisfied before the proposed facility can be constructed and begin operation.

## 3.1 NATIONAL AND FLORIDA AMBIENT AIR QUALITY STANDARDS (NAAQS/FAAQS)

The applicable federal (NAAQS) and Florida (FAAQS) ambient air quality standards are presented in Table 3-1. (PSD increments are also presented in Table 3-1, but discussed in Section 3.2.2.) These ambient air quality standards have been promulgated for six pollutants, known as the "criteria" pollutants: $NO_2$, CO, $SO_2$, $PM_{10}$, $O_3$, and Pb. The primary NAAQS/FAAQS were promulgated to protect the public health, and the secondary NAAQS/FAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Wakulla County is an "attainment" area for all criteria pollutants, meaning that existing concentrations are below the primary and secondary standards.

## 3.2 PSD REVIEW REQUIREMENTS

### 3.2.1 General Requirements

Under the EPA and FDEP PSD permit review requirements, all major new or modified existing sources of air pollutants located in attainment areas and regulated under the Clean Air Act (CAA) must be reviewed and approved. A "major stationary source" is defined as any one of 28 specified source categories which has the potential to emit 100 tons per year (TPY) or more, or any other stationary source which has the potential to emit 250 TPY or more of any air pollutant regulated under the CAA. Fossil fuel-fired steam electric plants of more than 250 mmBtu/hr of heat input comprise one of the 28 specified source categories. Thus, the existing Purdom steam units meet the 100 TPY threshold criterion. The term "potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. The potential emissions from the existing units exceed the 100 TPY criteria. Therefore, the Purdom Station is considered a major stationary source. Modifications to major sources are considered "major modifications" if they will increase the potential to emit by more than the PSD significant emission rates listed in Table 212.400-2 of Rule 62-212.400, F.A.C., or by any amount if the source is located within 10 km of a Class I area and the impact would be greater than 1 $\mu g/m^3$ (24-hour average) in the Class I area (Rule 62-212.400(2)(d)4a(ii), F.A.C.). These PSD significance levels are summarized in Table 3-2. The net changes in emissions from the proposed Project will exceed the PSD significant emission thresholds for some pollutants (CO, $PM_{10}$, and TSP), and thus subject the Project to PSD review for these pollutants. Nevertheless, a PSD analysis is being done for all pollutants expected to be emitted.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified source located in an attainment area. The PSD regulations are contained in

**TABLE 3-1**
**AMBIENT AIR QUALITY STANDARDS**
**AND PSD INCREMENTS**

| Pollutant | Averaging Time | Federal NAAQS ($\mu g/m^3$) | Florida FAAQS ($\mu g/m^3$) | Class I PSD Increment ($\mu g/m^3$) | Class II PSD Increment ($\mu g/m^3$) |
|---|---|---|---|---|---|
| Carbon Monoxide (CO) | 1-hour | 40,000 | 40,000 | N/A | N/A |
| | 8-hour | 10,000 | 10,000 | N/A | N/A |
| Nitrogen Dioxide ($NO_2$) | Annual | 100 | 100 | 2.5 | 25 |
| Sulfur Dioxide ($SO_2$) | 3-hour | 1,300 | 1,300 | 25 | 512 |
| | 24-hour | 365 | 260 | 5 | 91 |
| | Annual | 80 | 60 | 2 | 20 |
| Particulate Matter ($PM_{10}$) | 24-hour | 150 | 150 | 8 | 30 |
| | Annual | 50 | 50 | 4 | 17 |
| Ozone ($O_3$) | 1-hour | 235 | 235 | N/A | N/A |
| Lead (Pb) | Calendar Quarter | 1.5 | 1.5 | N/A | N/A |

(1) Ozone values are associated with emissions of VOCs and $NO_x$.

Note: Short-term standards and increments (i.e., those with averaging times less than quarterly) can be exceeded once per year and still be in compliance.

N/A = No PSD increments exist for these pollutants.
$\mu g/m^3$ = micrograms per cubic meter

Sources: 40 CFR 50; Rule 62-204.260, F.A.C.; Rule 62-204.240, F.A.C.

**TABLE 3-2**
**PSD SIGNIFICANT EMISSION RATES**

| Pollutant | Annual Significant Emission Rate (TPY) per Table 212.400-2 | Applicable Significant Emission Rate for Proposed Purdom Project [(1)] (TPY) |
|---|---|---|
| Carbon Monoxide (CO) | 100 | 0 |
| Oxides of Nitrogen ($NO_x$) | 40 | 40 |
| Sulfur Dioxide ($SO_2$) | 40 | 40 |
| Particulate Matter ($PM_{10}$) | 15 | 15 |
| Total Suspended Particulates (TSP) | 25 | 25 |
| Volatile Organic Compounds (VOC) | 40 | 40 |
| Lead (Pb) | 0.6 | 0.6 |
| Asbestos | 0.007 | 0.007 |
| Beryllium (Be) | 0.0004 | 0.0004 |
| Mercury (Hg) | 0.1 | 0.1 |
| Vinyl Chloride | 1 | 1 |
| Total Fluorides (Fl) | 3 | 3 |
| Sulfuric Acid Mist ($H_2SO_4$) | 7 | 7 |
| Reduced Sulfur Compounds (Including $H_2S$) | 10 | 10 |
| Total Reduced Sulfur (Including $H_2S$) | 10 | 10 |

TPY = tons per year

(1) Due to the proximity to the Class I area, any increase in emissions is considered significant for these pollutants with a maximum projected 24-hour average impact of 1.0 microgram per cubic meter or more in the Class I area, as per Rule 62-212.400(2)(f)(1), F.A.C.

Source: Rule 62-212.400, F.A.C. Table 212.400-2

Rule 62-212.400, F.A.C. Major sources and modifications are required to undergo the following analyses under PSD review for each air pollutant emitted in significant quantities:

- A control technology analysis;
- An air quality impacts analysis; and
- An additional impacts analysis.

In addition to these analyses, a new source must also be reviewed with respect to Good Engineering Practice (GEP) stack height regulations (EPA, 1985a) adopted by FDEP (Rule 62-210.550, F.A.C.), New Source Performance Standards (NSPS), and any state emission standards.

### 3.2.2 PSD Increments/Classifications

In promulgating the 1977 Clean Air Act (CAA) Amendments, Public Law 95-95, Congress specified that certain increases above an air quality "baseline concentration" level for $SO_2$ and TSP concentrations would constitute "significant deterioration." The magnitudes of the allowable increases, or "increments," depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications were designated based on criteria established in the CAA Amendments of 1977. Initially, Congress designated PSD areas as Class I (international parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would allow greater deterioration than Class II areas, were designated. EPA subsequently incorporated the requirements for classifications and area designations into the PSD regulations.

On October 17, 1988, the EPA promulgated regulations to prevent significant deterioration due to $NO_x$ emissions and established PSD increments for $NO_2$ concentrations. On June 3, 1993, EPA promulgated regulations which revised the PSD increments for particulate matter from TSP to $PM_{10}$. This change became effective on June 3, 1994. The allowable PSD increments for $SO_2$, $PM_{10}$, and $NO_2$ are presented in Table 3-1. The FDEP has adopted the EPA PSD classification system and the allowable PSD increments for $SO_2$, $PM_{10}$, and $NO_2$.

The term "baseline concentration" is derived from federal and state PSD regulations and denotes a concentration level corresponding to a specified baseline date and contributions from certain additional baseline sources. The Florida air regulations (Rule 62-210.200, F.A.C.) define "baseline concentration" as the ambient concentration level which is predicted to exist in the baseline area at the time of the applicable minor source baseline date. Emission increases after the baseline date consume PSD increments. A baseline concentration is determined for each pollutant for which PSD increments are promulgated and a baseline date is established. The baseline concentration includes:

1. The actual emissions representative of sources in existence on the applicable minor source baseline date; and
2. The allowable emissions of major stationary sources which commenced construction before January 6, 1975, for $SO_2$ and TSP (now $PM_{10}$) concentrations, or before February 8, 1988, for $NO_2$ concentrations, but which were not in operation by the applicable minor source baseline date.

The applicable minor source baseline dates for Wakulla County are December 27, 1977 for $SO_2$ and $PM_{10}$, and March 28, 1988 for $NO_2$ (Rule 62-204.360, F.A.C.).

### 3.2.3 Control Technology Review

The control technology review requirements of the PSD regulations require that all applicable federal and state emission limiting standards be met and that best available control technology (BACT) be applied to control emissions from the source. The BACT requirements apply to all applicable regulated air pollutants for which the increase in emissions from the source or modification exceeds the PSD significant emission rates in Table 3-2.

The requirements for BACT were incorporated within the PSD framework in the 1977 CAA Amendments. One of the purposes of BACT is to minimize consumption of PSD increments and thereby increase the potential for future economic growth without significantly degrading air quality. Guidelines for the evaluation of BACT can be found in the draft New Source Review Workshop Manual (EPA, 1990a) and the draft Top-Down BACT Guidance Document (EPA, 1990c). These guidelines were issued by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. BACT is determined on a case-by-case basis, and BACT for a source in one area may not be the same for an identical source located in another area. BACT analyses for the same types of emissions units and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors.

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the proposed facility. BACT must, at a minimum, demonstrate compliance with the applicable NSPS. An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy penalties, and economic costs associated with the proposed and alternative control systems; as well as the environmental benefits derived from these systems. A determination of BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts.

### 3.2.4 Ambient Air Quality Monitoring Requirements

In accordance with the requirements of Rule 62 -212.400(5)(f), F.A.C., applications for a PSD permit generally must contain an analysis of continuous ambient air quality monitoring data in the area affected by the proposed major stationary source or major modification.

According to FDEP's rules and EPA's Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA, 1987), ambient air monitoring for a period of up to one year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of four months of data are generally required. Existing data from the vicinity of the proposed source may be utilized if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered.

The PSD regulations include an exemption in Rule 62-212.400(3)(e), F.A.C., which states that the Department will exempt a proposed major stationary source or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the source or modification would cause air quality impacts less than the de minimis air quality impact levels presented in Table 3-3.

### 3.2.5 Source Impact Analysis

A source impact analysis must be performed for a proposed major source or modification subject to PSD for each pollutant for which the increase in emissions exceeds the PSD significant emission rate. The PSD regulations specifically require the use of atmospheric dispersion models in performing air quality impact analyses, estimating baseline and future air quality levels, and determining compliance with NAAQS/FAAQS and allowable PSD increments. Reference EPA models must normally be used in performing the impact analysis. Use of nonreference EPA models requires regulatory agency consultation and prior approval. Guidance for the regulatory application of dispersion models is presented in the U.S. EPA Guideline on Air Quality Models (Revised) (EPA, 1993a), which has been incorporated in federal regulations as Appendix W of 40 CFR 51.

### 3.2.6 Additional Impacts Analysis

In addition to air quality impact analyses, the PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source or modification. These analyses are generally focused primarily on nearby PSD Class I areas but should cover nearby Class II areas as well. Impacts on air quality due to general commercial, residential, industrial, and other growth related activities associated with the source must also be addressed. These analyses are required for each pollutant emitted in significant quantities.

## 3.3 OTHER REQUIREMENTS

In addition to the requirements of the PSD program, any new or modified source of air pollution must be reviewed with respect to the Good Engineering Practice (GEP) stack height regulations (Rule 62-210.550, F.A.C.), the federal NSPS requirements, and any state-specific emission standards.

### 3.3.1 Good Engineering Practice (GEP) Stack Height

The 1977 CAA Amendments require under Section 123 that the degree of emission limitation required for control of any air pollutant not be affected by a stack height that exceeds GEP, or any other dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (EPA, 1985a). FDEP has incorporated these rules into Rule 62 -210.550, F.A.C.

| TABLE 3-3<br>PSD *DE MINIMIS* AMBIENT AIR QUALITY<br>IMPACT LEVELS | |
|---|---|
| **Pollutant** | **Air Quality Impact *De Minimis* Level ($\mu g/m^3$) and Averaging Time [(1)]** |
| Carbon Monoxide (CO) | 575 (8-hour) |
| Nitrogen Dioxide ($NO_2$) | 14 (Annual) |
| Sulfur Dioxide ($SO_2$) | 13 (24-hour) |
| Particulate Matter ($PM_{10}$) | 10 (24-hour) |
| Volatile Organic Compounds (Ozone) | (2) |
| Lead (Pb) | 0.1 (3-month) |
| Beryllium (Be) | 0.001 (24-hour) |
| Mercury (Hg) | 0.25 (24-hour) |
| Vinyl Chloride | 15 (24-hour) |
| Total Fluorides (Fl) | 0.25 (24-hour) |
| Hydrogen Sulfide ($H_2S$) | 0.2 (1-hour) |

(1) Ambient air quality monitoring requirements for applicable pollutants are exempted if the impact of the net increase in emissions is below the applicable air quality impact *de minimis* levels.

(2) No specific air quality impact *de minimis* level is prescribed for ozone. Exemptions are granted when a proposed source's VOC emissions are less than 100 tons/year.

Source: Rule 62-212.400, F.A.C Table 212.400-3

The EPA's final stack height regulations define GEP stack height for stacks constructed after January 12, 1979, as the greater of:

(1) 65 meters, measured from the ground-level elevation at the base of the stack; or

(2) $H_g = H + 1.5\ L$

where:

$H_g$ = GEP stack height, measured from the ground-level elevation at the base of the stack;

$H$ = Height of nearby structure(s) measured from the ground-level elevation at the base of the stack; and

$L$ = Lesser dimension, height or projected width of nearby structure(s).

The term "nearby" is defined by the GEP stack height regulations as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 km. Although GEP stack height regulations require that the stack height credit used in modelling for determining compliance with NAAQS/FAAQS and PSD increments not exceed the greater of the calculated or default GEP stack height, the actual stack height may be greater. In this case the proposed stack for the proposed Unit 8 is 200 feet (60.97 meters) above ground level. GEP stack height as determined by the BPIP program (EPA, 1995b) is estimated at 197 feet (60.0 meters). Thus, the proposed stack height is above the calculated GEP stack height and within the default stack height of 65 meters.

### 3.3.2 New Source Performance Standards (NSPS)

The CAA required the U.S. EPA to adopt standards of performance for new or modified stationary sources of air pollution. To date, the U.S. EPA has adopted regulations for approximately 60 stationary source categories. These regulations are contained in 40 CFR Part 60, and incorporated by reference in Rule 62-204.800(7), F.A.C. The Purdom Unit 8 combustion turbine is subject to a specific NSPS (Subpart GG). Any source subject to a specific NSPS is also subject to the general provisions of 40 CFR 60 Subpart A.

#### *3.3.2.1 General Provisions*

The general provisions of the NSPS regulations are found in 40 CFR 60 Subpart A. The general provisions specify the notification and recordkeeping requirements (40 CFR 60.7), compliance with standards and maintenance requirements (40 CFR 60.8 and 60.11), and the monitoring requirements (40 CFR 60.13) for each affected source.

#### *3.3.2.2 Combustion Turbine Units*

In general, combustion turbine units are covered in 40 CFR 60, Subpart GG - Standards of Performance for Stationary Gas Turbines, which establishes emission limitations on both $NO_x$ and $SO_2$. The $NO_x$ emission limitation is set by the following equation:

$$STD = 0.0075\ \frac{(14.4)}{Y} + F$$

where:

*STD*= allowable $NO_x$ emissions (percent by volume at 15 percent oxygen and on a dry basis).

*Y* = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility. The value of Y shall not exceed 14.4 kilojoules per watt hour.

*F* = $NO_x$ emission allowance for fuel-bound nitrogen as defined below:

| Fuel-Bound Nitrogen (percent by weight) | F ($NO_x$ percent by volume) |
|---|---|
| N<0.015 | 0 |
| 0.015<N<0.1 | 0.04(N) |
| 0.1<N<0.25 | 0.004 + 0.0067(N-0.1) |
| N>0.25 | 0.005 |

where:

N = the nitrogen content of the fuel (percent by weight).

Use of the equation results in emission limitations of 97 parts per million on a dry volume basis (ppmvd) at 15 percent oxygen for the proposed unit when fired on natural gas. For example, if fired on fuel oil with a fuel-bound nitrogen percent of 0.03 percent, the applicable emission limitation is 98 ppmvd. The $SO_2$ emission limitations are set at 150 ppmvd corrected to 15 percent oxygen in the exhaust stream for a fuel sulfur content less than or equal to 0.8 percent by weight.

#### *3.3.2.3 Excess Emissions*

The EPA has adopted general and specific recordkeeping and reporting requirements relating to excess emissions in 40 CFR 60.7(b) and 40 CFR 60.334(c). The EPA requirements specify maintaining records and submittal of a semi-annual report (calendar year) on excess emissions associated with start-ups, shutdowns, malfunctions, low water-to-fuel ratio, and fuel sulfur content greater than 0.8% by weight. The reporting requirement includes submittal of the semi-annual report even when no excess emissions occur. EPA has not adopted any specific limits on the number of hours excess emissions are allowed during start-up, shut down or malfunctions from combustion turbine units regulated under 40 CFR Part 60 Subpart GG.

### 3.3.3 Acid Rain Regulations

The Acid Rain Regulations adopted pursuant to Title IV of the 1990 CAA amendments establish requirements on units emitting $SO_2$ and $NO_x$. These provisions include allowances, permits, reporting, monitoring, and record keeping and are found in 40 CFR Parts 72, 73, and 75. The proposed Unit 8 will be a "new unit" under the Phase II requirements of the Acid Rain Program. The City has sufficient $SO_2$ allowances to cover the $SO_2$ emissions from Unit 8.

### 3.3.4 State-Specific and General Emission Standards

In addition to federal requirements, FDEP has adopted specific and general emission limiting and performance standards. These standards may be found in Rule 62-296, F.A.C. The requirements of these standards must be met along with any federal PSD or NSPS limitation or requirement.

#### *3.3.4.1 General Emission Standards*

The FDEP has adopted general particulate matter emission limits, as well as general pollutant emission limits (Rule 62-296.320, F.A.C.). These limits apply when no specific emission standard is applicable. For the combustion turbine, a general opacity limit of not greater than or equal to 20 percent opacity applies as well as a prohibition on emitting air pollutants that cause or contribute to an objectionable odor.

#### *3.3.4.2 Combustion Turbine Units*

The FDEP has not adopted any state-specific emission standards in Chapter 62-296, F.A.C. relating to the operation of a combustion turbine unit. The FDEP has adopted the NSPS requirements of Subparts A and GG by reference in Rule 62-204.800(7), F.A.C. Based on the current FDEP rules, the combustion turbine unit must meet the NSPS requirements as discussed in Section 3.3.2.2.

#### *3.3.4.3 Excess Emissions*

The FDEP has adopted standards relating to excess emissions in Rule 62-210.700, F.A.C. The rule allows excess emissions resulting from startup, shutdown, or malfunction of any source as long as best operational practices are applied and the excess emissions do not exceed two hours in any 24-hour period unless authorized by FDEP. The FDEP can authorize different excess emission limits from other sources on a case-by-case basis.

## 3.4 SOURCE APPLICABILITY

### 3.4.1 Nonattainment Applicability

The PSD new source review regulations of Rule 62-212.400, F.A.C. rather than the nonattainment preconstruction review regulations of Rule 62-212.500, F.A.C. apply to the proposed Project due to the attainment status for Wakulla County with respect to all criteria air pollutants. Further, the Project site is not within 50 km of any designated nonattainment areas and is therefore not within the "area of influence" of any nonattainment area. Therefore, no nonattainment area rules apply to the proposed Project.

### 3.4.2 PSD Classification

Most of Wakulla County and the surrounding counties are designated as PSD Class II areas for $SO_2$, $PM_{10}$, and $NO_2$. The Purdom Station is located approximately 0.6 km north of the nearest boundary of the St. Marks National Wilderness Area and 28.6 km east of the nearest boundary of the Bradwell Bay National Wilderness Area, the nearest PSD Class I areas. The National Wilderness Areas are those portions of the St. Marks National Wildlife Refuge and Apalachicola

National Forest which have been officially designated as wilderness. The location of the Purdom Station with respect to these two Class I areas is depicted on Figure 3-1.

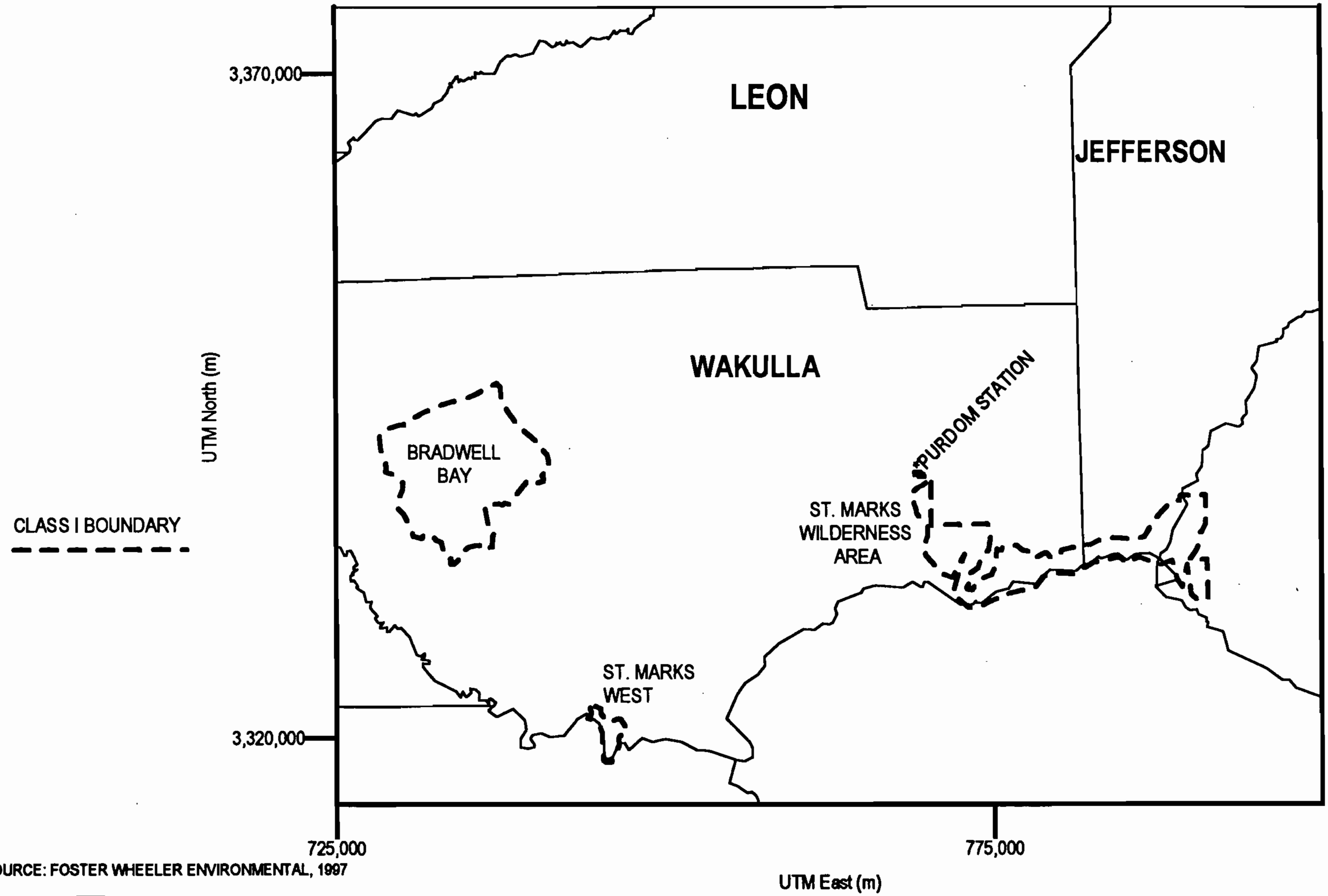
### 3.4.3 Pollutant Applicability

Pollutant applicability for the proposed Project is addressed in Sections 2.0 and 4.0, and briefly summarized here. The proposed Project is considered to be a major modification of a major existing source under the PSD regulations. PSD review is required for any regulated pollutant for which the net increase in emissions exceeds the appropriate PSD significant emission rates presented in Table 3-2. As shown in Table 3-4, the potential emissions for the proposed facilities will exceed the PSD significant emission rates for the following regulated pollutants: particulate matter (TSP and $PM_{10}$) and CO. The proposed Project is subject to PSD review for only these pollutants. Nevertheless, a PSD review for all regulated air pollutants has been performed and is included in this PSD report.

### 3.4.4 Ambient Air Quality Monitoring

Based upon the net increase in emissions from the proposed facility (presented in Table 3-4), a PSD preconstruction ambient air monitoring analysis may be required as part of the air quality impact analysis, for CO and particulate matter (TSP and $PM_{10}$). However, if the net increase in a source's impact of a pollutant is less than the *de minimis* air quality impact level, as shown in Table 3-3, then an exemption from the preconstruction ambient air quality monitoring requirement is granted for that pollutant. In addition, if an acceptable ambient air monitoring method for the pollutant has not been established by EPA, monitoring is not required.

Preliminary modelling was conducted to indicate those pollutants which could be exempted from the monitoring requirement. As verified by the revised modelling analysis described in Sections 6.0 and 7.0, the increases in air quality impacts for CO and $PM_{10}$ resulting from the proposed Project are predicted to fall below the *de minimis* impact levels presented in Table 3-3. There is no longer a *de minimis* impact level for particulate matter (TSP) in Table 212.400-3 of Rule 62-212.400 F.A.C. Therefore, monitoring is not required for any of the pollutants for which PSD review applies (CO and particulate matter (TSP and $PM_{10}$)). It may be noted that predicted impacts for the other pollutants in Table 3-3 for which emissions data were available were all below the *de minimis* levels in Table 3-3. Thus, monitoring would not be appropriate for those additional pollutants either.




SOURCE: FOSTER WHEELER ENVIRONMENTAL, 1997

CITY OF TALLAHASSEE

PURDOM UNIT 8
CLASS I AREAS - LOCATION MAP
PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

Figure 3-1

**TABLE 3-4**
**MAXIMUM ANNUAL NET CHANGE IN EMISSIONS AND PSD SIGNIFICANCE VALUES**

| Pollutant | Net Increase In Emissions[1] (TPY) | PSD Significance Criterion (TPY) | PSD Review Required (Yes/No) |
|---|---|---|---|
| Carbon Monoxide (CO) | 127 | 0[2] | Yes |
| Nitrogen Oxides ($NO_x$) | 0.0 | 0[2] | No |
| Sulfur Dioxide ($SO_2$) | 0.0 | 0[2] | No |
| Particulate Matter ($PM_{10}$) | 48.3 | 15 | Yes |
| Particulate Matter (TSP) | 48.3 | 25 | Yes |
| Volatile Organic Compounds (VOCs) | 11.9 | 40 | No |
| Lead (Pb) | 0.080 | 0.6 | No |
| Asbestos | N/A | 0.007 | No |
| Beryllium (Be) | 0.00022 | 0.0004 | No |
| Mercury (Hg) | 0.00040 | 0.1 | No |
| Vinyl Chloride | N/A | 1 | No |
| Total Fluorides (Fl) | 1.6 | 3 | No |
| Sulfuric Acid Mist ($H_2SO_4$) | 5.6 | 7 | No |
| Total Reduced Sulfur | N/A | 10 | No |
| Reduced Sulfur Compounds | N/A | 10 | No |

(1) Based on worst case scenarios.
(2) Due to the proximity to the Class I area, lower criteria apply for those pollutants with a minimum projected 24-hour average impact of 1.0 mg/m$^3$ or more in the Class I area.

NA = No emissions information available or no emissions expected.
TPY = Tons per year

Source: Foster Wheeler Environmental, 1997

# 4. BEST AVAILABLE CONTROL TECHNOLOGY

## 4.1 INTRODUCTION

Under both federal and state PSD programs, PSD review is triggered for a modification to an existing major facility that results in a significant net emissions increase. As part of the proposed Project, federally enforceable facility-wide caps on the annual emissions of sulfur dioxide ($SO_2$) and oxides of nitrogen ($NO_x$) are being proposed to hold the facility's future emissions of these pollutants to their current actual levels. Because of this commitment, the Project will net out of PSD review for these pollutants. To determine the worst-case emissions of other pollutants from the Project under the proposed facility-wide caps, eleven potential operating scenarios were identified. These scenarios, while not intended to represent limits on the facility, bracket the expected operating ranges of the individual units within the facility. Based on the proposed $SO_2$ and $NO_x$ caps and the various pollutant-specific worst-case operating scenarios within those caps, the Project will also net out of PSD review for volatile organic compounds (VOCs), sulfuric acid mist ($H_2SO_4$), lead (Pb), mercury (Hg), beryllium (Be), and total fluorides (Fl). PSD review was triggered for only carbon monoxide (CO) and particulate matter (TSP & $PM_{10}$). The PSD applicability analysis is summarized in Table 3-4, and the supporting calculations for the current actual emissions and future allowable emissions are contained in Appendices B and C.

Because PSD was triggered for CO and particulate matter (TSP & $PM_{10}$), the Best Available Control Technology (BACT) requirements of Rule 62-213.400(6), F.A.C., will apply to new and modified emission units for which a net emissions increase of these pollutants is expected to occur. This BACT analysis therefore addresses control strategies for CO and particulate matter (TSP & $PM_{10}$) emissions from the Unit 8 combustion turbine, and for particulate matter (TSP & $PM_{10}$) emissions from the cooling tower. In addition, the BACT analysis includes an evaluation for all PSD pollutants emitted from the combustion turbine to ensure that the proposed Project incorporates the most appropriate control strategies, regardless of the applicability of the BACT requirements.

## 4.2 BACT PROCEDURES

The Florida PSD regulations require, among other things, that a proposed new facility or major modification: (a) comply with all applicable emission limitations contained in Chapter 62-296, F.A.C., and Title 40 of the Code of Federal Regulations Parts 60 and 61 (40 CFR Parts 60 and 61); and (b) apply BACT for each pollutant subject to PSD review. As defined in Rule 62-210.200(40), F.A.C., BACT is:

> "An emission limitation, including a visible emissions standard, based on the maximum degree of reduction of each pollutant emitted which the 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 (including cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant."

In order to ensure consistent BACT determinations, and provide guidance to state and local regulatory programs as well as the regulated community, the EPA published guidance for conducting BACT determinations. The guidance includes the following documents:

- *Draft Top-Down BACT Summary* (EPA, 1990c)
- *Draft New Source Review Manual* (EPA, 1990a)
- *OAQPS Control Cost Manual, Fourth Edition* (EPA, 1990d)

Currently the FDEP requires applicants to follow the EPA's draft "top-down" procedures when conducting BACT evaluations, which are done on a case-by-case basis. These draft procedures have recently been formally proposed by EPA as part of the New Source Review Reform Package (61 Federal Register (FR) 38250, 7/23/96).

The "top-down" process requires initial consideration of the most stringent control technologies available, which may then be eliminated based on unacceptable source-specific energy, environmental, or economic impacts. This analysis includes technology transfers when applicable. For combustion turbines, the technical feasibility and economic impacts associated with the most stringent control technologies are typically the determinative factors. For the proposed Project, the economic impact analyses followed the procedures outlined in the above references.

### 4.2.1 Most Stringent Control Technologies

The "top-down" process begins with the identification of various control technologies and strategies available to reduce emission levels of the pollutants subject to PSD review. The following sources were reviewed for identification of control technologies available for the proposed Project:

- California BACT Clearinghouse
- EPA BACT/LAER Clearinghouse
- Recent FDEP BACT Determinations
- EPA's Alternative Controls Techniques Document -- "Emissions from Stationary Gas Turbines" (EPA, 1993b)

These sources provide the best information related to available control technologies and the most stringent emission limitations. The EPA BACT/LAER Clearinghouse data was downloaded from EPA's electronic bulletin board and a query was run on "internal combustion." A separate query was run for the cooling tower. The results of the combustion turbine query are contained in Appendix D. Table 4-1 lists the most stringent control technologies and emission limitations identified by the review for the various PSD pollutants.

The most stringent control technologies and strategies identified are as follows:

- Fuel Quality
- Good Combustion Practices

**TABLE 4-1**
**MOST STRINGENT CONTROL TECHNOLOGIES AND EMISSION LIMITATIONS IDENTIFIED IN EPA BACT/LAER CLEARING-HOUSE**

| Pollutant | Control Technology | Emission Limitations |
|---|---|---|
| ***Carbon Monoxide (CO)***[(1)] | Oxidation Catalyst | Natural Gas - 1.8 ppmvw<br>Fuel Oil - 2.6 ppmvw |
| ***Particulate Matter (TSP)***[(2)] | Combustion Air Filtration, Good Combustion Practices & Fuel Quality | Natural Gas - 0.0048 lb/mmBtu<br>Fuel Oil - 0.0089 lb/mmBtu |
| ***$PM_{10}$***[(2)] | Combustion Air Filtration, Good Combustion Practices & Fuel Quality | Natural Gas - 0.0048 lb/mmBtu<br>Fuel Oil - 0.0089 lb/mmBtu |
| Sulfur Dioxide ($SO_2$)[(3)] | Fuel Quality | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight |
| Nitrogen Oxides ($NO_x$)[(4)] | Select Catalytic Reduction | Natural Gas - 3.5 ppmvd<br>Fuel Oil - 10 ppmvd |
| Volatile Organic Compounds (VOC)[(5)] | Good Combustion Practices | Natural Gas - 1.5 ppmvw<br>Fuel Oil - 3 ppmvw |
| Benzene | Good Combustion Practices | No Limitations |
| Sulfuric Acid Mist ($H_2SO_4$) | Fuel Quality | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight |
| Trace Metals<br>Lead<br>Beryllium<br>Mercury<br>Arsenic | Fuel Quality | No Limitations |
| Total Fluorides (Fl) | Fuel Quality | No Limitations |
| ***Cooling Tower (TSP & $PM_{10}$)***[(6)] | Drift Eliminator | 0.002 Percent of Recirculation Water |

***Notes: Pollutants presented in bold and italics are subject to BACT.***

(1) EPA BACT/LAER (NJ-0017) - LAER Determination
(2) EPA BACT/LAER (NC-0059) - BACT Determination (Includes TSP and $PM_{10}$)
(3) EPA BACT/LAER (GA-0063) - BACT Determination
(4) EPA BACT/LAER (NY-0044) - LAER Determination
(5) EPA BACT/LAER (NJ-0013) - LAER Determination
(6) EPA BACT/LAER (NY-0005) - BACT Determination

gr/scf - grains per standard cubic foot
ppmvw - parts per million volume on a wet basis
ppmvd - parts per million volume on a dry basis corrected to 15 percent oxygen
BACT - Best Available Control Technology
LAER - Lowest Achievable Emission Rate

Source: Foster Wheeler Environmental, 1997

- Combustion Techniques
- Add-On Air Pollution Control Systems

The "top-down" evaluation included a review of each control technology and strategy including combinations, technology transfers, and the associated emission limitations.

### 4.2.2 *Most Stringent Emission Limitations*

Associated with each most stringent control technology is an emission limitation. These emission limitations form the basis of the BACT evaluation. For the proposed Unit 8 combustion turbine, the General Electric (GE) operating and emissions data are contained within Appendix A. These data represent the base case for the BACT evaluation. Table 4-2 provides a comparison between the emission levels of the Unit 8 combustion turbine and the cooling tower, and those of the most stringent control technologies for all PSD pollutants.

## 4.3 REQUIREMENTS AND ASSUMPTIONS

Under the requirements of the "top-down" process, the City has evaluated the technological feasibility, economic impacts, energy impacts, and environmental impacts of each of the various control technologies and strategies. These impacts were used to determine the overall feasibility of a control strategy.

For the pollutants requiring an economic impact evaluation, annual emissions from the Unit 8 combustion turbine were estimated based on 8,760 hours of operation and reasonably expected future operations of the unit. Because the short-term emission rates for the unit vary based on fuel type, load, and ambient temperature, certain assumptions were made. For CO and VOCs, the short-term emission rates increase with decreasing load; for all other pollutants, the short-term emission rates remain unchanged or increase with load. The short-term rates generally increase with lower ambient temperatures. An ambient temperature of 59° F was used, which is conservative since the average annual ambient temperature at the site is about 67° F. For the economic analyses that were required, base-case annual emissions from the Unit 8 combustion turbine were based on GE emissions data (Appendix A) and the following reasonable assumptions:

> For CO and VOCs, the unit was assumed to operate for 8,260 hours on clean pipeline quality natural gas and 500 hours on Number 2 (0.05% S) diesel fuel oil. Based on future expected operations, the unit was conservatively assumed to operate at 50 percent load for 19 percent of those hours, and at 100 percent load for the remainder of the hours. At these emission levels, the unit can operate within the proposed facility-wide $SO_2$ and $NO_x$ caps.
>
> For $NO_x$, the unit was assumed to operate at 100 percent load for 8,260 hours on clean pipeline quality natural gas and 500 hours on Number 2 (0.05% S) diesel fuel oil.

**TABLE 4-2**
**PROJECT EMISSION LEVELS**
**VERSUS MOST STRINGENT EMISSION LIMITATIONS**

| Pollutant | Potential Project Emission Levels | Most Stringent Emission Limitations |
|---|---|---|
| ***Carbon Monoxide***[(1)] | Natural Gas -9 ppmvw<br>Fuel Oil - 30 ppmvw | Natural Gas - 1.8 ppmvw<br>Fuel Oil - 2.6 ppmvw |
| ***Particulate Matter (TSP)***[(2)] | Natural; Gas - 0.0058 lb/mmBtu<br>Fuel Oil - 0.0096 lb/mmBtu | Natural Gas - 0.0048 lb/mmBtu<br>Fuel Oil - 0.0089 lb/mmBtu |
| ***$PM_{10}$***[(2)] | Natural; Gas - 0.0058 lb/mmBtu<br>Fuel Oil - 0.0096 lb/mmBtu | Natural Gas - 0.0048 lb/mmBtu<br>Fuel Oil - 0.0089 lb/mmBtu |
| Sulfur Dioxide | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight |
| Sulfuric Acid Mist | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight | Natural Gas - 10 gr/100 scf<br>Fuel Oil - 0.05% Sulfur by Weight |
| Nitrogen Oxides | Natural Gas - 9 ppmvd<br>Fuel Oil - 42 ppmvd + | Natural Gas - 3.5 ppmvd<br>Fuel Oil - 10 ppmvd |
| Volatile Organic Compounds[(3)] | Natural Gas - 1.4 ppmvw<br>Fuel Oil -3.5 ppmvw | Natural Gas - 1.5 ppmvw<br>Fuel Oil - 3 ppmvw |
| ***Cooling Tower (TSP & $PM_{10}$)*** | 0.002 % - Recirculation Water | 0.002 % - Recirculation Water |

***Notes: Pollutants presented in bold and italics are subject to BACT.***

(1) CO emissions vary with load and an allowance is requested.
(2) BACT levels are equal to most stringent limits of 9 lb/hr for natural gas and 17 lb/hr for No. 2 fuel oil
(3) VOC emissions vary with load and an allowance is requested.

FBN - Fuel Bound Nitrogen
gr/scf - grains per standard cubic foot
ppmvw - parts per million volume on a wet basis
ppmvd - parts per million volume on a dry basis corrected to 15 % oxygen

Source: Foster Wheeler Environmental, 1997

The calculations used to estimate the base-case annual emissions of CO, VOCs, and $NO_x$ are contained in Appendix E.

The cooling tower's conceptual design incorporates drift eliminators, allows for operation at eight cycles of concentration, and reduces drift losses to 0.002 percent of the cooling tower water recirculation rate. Annual emissions of particulate matter (TSP and $PM_{10}$) were based on continuous 100 percent load operation and the conceptual design.

## 4.4 CARBON MONOXIDE EMISSIONS

CO is formed within a combustion turbine through the incomplete combustion of liquid and gaseous fuels. High temperatures, adequate excess air, and good fuel/air mixing during combustion minimize CO emissions. CO formation is therefore a function of the unit's overall combustion efficiency, which is a measure of the percentage of carbon and hydrogen within a fuel that is converted to carbon dioxide and water. Complete or 100 percent conversions are only theoretical, so that products of incomplete combustion, including CO, are formed. The Unit 8 combustion turbine, as proposed, includes advanced GE dry-low $NO_x$ combustor technology that maximizes $NO_x$ reductions while minimizing CO and VOC emissions by varying the parameters which impact combustion efficiency. For the BACT analysis, the base-case CO emissions were estimated at 167 tons per year from the combustion turbine.

The combined use of good combustion practices and an oxidation catalyst was identified as the most stringent control technology currently available to control CO emissions. Combustion turbines equipped with an oxidation catalyst have had CO emissions limited to levels of about 2 and 3 ppm while firing natural gas and Number 2 fuel oil, respectively. For the proposed Unit 8 combustion turbine, this control equipment is known to be technologically feasible, but has been shown to have unacceptable economic, energy, and environmental impacts. "Good combustion practices" are typically determined to be the appropriate control technology for projects not required to meet the most stringent control technology's "Lowest Achievable Emission Rate" (LAER) limits that apply in nonattainment areas. The impacts of the control strategies are discussed in the following subsections.

### 4.4.1 Summary of Technologies Evaluated

The following control technologies were evaluated based on their control effectiveness:

- Oxidation Catalyst to reduce CO emissions by 90 percent; and
- Combustion controls to ensure good combustion.

Combustion controls represent the base case. Table 4-3 presents the emission levels associated with the base case and the 90 percent control level.

**TABLE 4-3**
**CARBON MONOXIDE EMISSIONS**

| Emission Basis | Emission Levels | | | | | |
|---|---|---|---|---|---|---|
| | 100% Load | | | 50% Load | | |
| | ppmvw | lb/hr | tons/yr | ppmvw | lb/hr | tons/yr |
| CO - Base Case | | | | | | |
| Natural Gas Firing | 9 | 29 | 97.01 | 25 | 53 | 41.59 |
| No. 2 Fuel Oil Firing | 30 | 96 | 19.44 | 90 | 189 | 8.98 |
| CO - Option 1 (90% Control) | | | | | | |
| Natural Gas Firing | NA | 2.9 | 9.70 | NA | 5.3 | 4.16 |
| No. 2 Fuel Oil Firing | NA | 9.6 | 1.94 | NA | 18.9 | 0.90 |
| Ambient Temperature (°F) | 59 | 59 | 59 | 59 | 59 | 59 |
| Load (%) | 100 | 100 | 100 | 50 | 50 | 50 |
| Natural Gas Firing (hours) | 6,690.6 | 6,690.6 | 6,690.6 | 1,569.4 | 1,569.4 | 1,569.4 |
| No. 2 Fuel Oil Firing (hours) | 405 | 405 | 405 | 95 | 95 | 95 |

Net Reductions (TPY)

CO Option 1 - 150.32 Tons per Year

NA - Not Available

Source: Foster Wheeler Environmental, 1997

### 4.4.2 Energy Impacts

An oxidation catalyst will result in a reduction in a combined cycle combustion turbine's overall performance and output capacity. The main loss is also associated with the additional pressure drop across the catalyst bed. This pressure drop can range from 1 to 2 inches of water and can also reduce the unit's overall output by as much as 0.5 percent (1.25 MW). Although the energy impact may be measurable, it is not, by itself, considered significant enough to reject the control technology. Costs associated with the energy loss are included within the economic analysis.

### 4.4.3 Environmental Impacts

The environmental impacts resulting from the use of an oxidation catalyst can include increases of sulfur trioxide ($SO_3$) emissions and waste disposal. Increased $SO_3$ emissions are a result of the conversion of $SO_2$ to $SO_3$ in the presence of the oxidation catalyst. Water vapor within the exhaust gases can react with this additional $SO_3$ to form $H_2SO_4$. In addition, the disposal of the spent catalyst every two years also would place additional burdens on available landfill space. These potential environmental impacts alone were not considered significant enough to reject the control technology.

### 4.4.4 Economic Impacts

The economic impacts were based on the costs of an oxidation catalyst in accordance with the procedures outlined in the EPA's "*Cost Control Manual*" (EPA, 1990d) and the draft '*New Source Review Workshop Manual*" (EPA, 1990a). Tables 4-4 and 4-5 contain the capital and operating cost factors used in the oxidation catalyst and later selective catalytic reduction (SCR) analyses.

Engelhard provided an estimated oxidation catalyst system cost of $830,000 for the 90 percent reduction of CO emissions, with a warranty period of two years. (Appendix F). Seventy-five percent of this system's cost was reported to be associated with the catalyst, including replacement. The design criteria were based on firing Number 2 (0.05 % Sulfur) diesel fuel oil at 50 percent load and meeting the 2 and 3 ppm LAER limits for gas and oil firing.

The economic analysis reduces capital and operating costs to annualized values based on a twenty-year economic life of the Project and a 7.25 percent return. On this basis, an oxidation system would add approximately $1.5 million to the capital cost of the Project.

The total levelized annual costs for the Project would increase by about $1.2 million per year, resulting in an incremental removal cost of approximately $7,720 per ton. Table 4-6 summarizes the economic analysis for the oxidation catalyst, and Appendix G contains the economic calculations. The cost per ton for controlling CO emissions through the use of an oxidation catalyst is prohibitively expensive. This result is consistent with other recent BACT determinations by FDEP where good combustion practices were determined to be BACT. The use of good combustion practices to minimize CO emissions is therefore proposed as BACT for the Unit 8 combustion turbine.

**TABLE 4-4**
**BACT EVALUATION CAPITAL COST FACTORS**

| Cost Item | Cost Factor | Reference |
|---|---|---|
| *Direct Costs (DC)* | | |
| Purchased Equipment Costs (PEC) | | |
| Catalyst System | As Estimated, A | Vendor Quote |
| Instrumentation | 0.05 X A | (EPA, 1990d) |
| State Sales Taxes | 0.06 X A | State Sales Tax |
| Freight | 0.05 X A | (EPA, 1990d) |
| PEC Subtotal | 1.16 X A = B | |
| Direct Installation Costs (DIC) | | |
| Foundations & Supports | 0.08 X B | (Ulrich, 1984) |
| Labor | 0.14 X B | (EPA, 1990d) |
| Electrical | 0.04 X B | (EPA, 1990d) |
| Piping | NA | Vendor Quote |
| Insulation | NA | Vendor Quote |
| Painting | 0.01 X B | EPA, 1990d) |
| DIC Subtotal | 0.27 X B | (EPA, 1990d) |
| Site Preparation | NA | - |
| Buildings | NA | - |
| Total DC | 1.27 X B | - |
| *Indirect Costs (IDC)* | | |
| Engineering | 0.10 X B | (EPA, 1990d) |
| Construction Overhead | 0.05 X B | (EPA, 1990d) |
| Contractor Fees | 0.10 X B | (EPA, 1990d) |
| Contingencies | 0.03 X B | (EPA, 1990d) |
| Start-Up | 0.02 X B | (EPA, 1990d) |
| Performance Testing | 0.01 X B | (EPA, 1990d) |
| Total IDC | 0.53 X B | - |
| Total Capital Investment (TCI) | 1.84 X B | |

References:
EPA, 1990d: "OAQPS Control Cost Manual" 4th Edition
Ulrich, 1984: "A Guide to Chemical Engineering Process Design and Economics"

Source: Foster Wheeler, 1997

**TABLE 4-5**
**BACT EVALUATION OPERATING COST FACTORS**

| Direct Annual Costs, $/Yr | Factor | Reference |
|---|---|---|
| Operating Labor | (1) | (COT & EPA, 1993b) |
| Supervisory Labor | 15 % Of Operating Labor | (EPA, 1993b) |
| Maintenance Labor And Materials | (2) | (EPA, 1993b) |
| Catalyst Replacement (CR) | (3) | Vendor Estimates |
| Catalyst Disposal | $15/CF | (EPA, 1993b) |
| Aqueous Ammonia | $360/Ton | (EPA, 1993b) |
| Dilution System | NA | (EPA, 1993b) |
| Electricity | NA | (EPA, 1993b) |
| Performance Loss | (4) | (EPA, 1993b) |
| Blower | NA | (EPA, 1993b) |
| Production Loss | NA | (EPA, 1993b) |
| ***Indirect Annual Costs, $/Yr*** | | |
| Overhead | 60% of all labor main. | (EPA, 1990d) |
| Insurance & Administration | costs | (EPA, 1990d) |
| Capital Recovery | 2.5% of TCI | NA |
| | CRF x (TCI - CR) | |

***Chemical Engineering Plant Cost Indices***
1990 - 357.9
1993 - 359.2
Sept. 1996 - 383.9
***Capital Recovery Factor (CRF)@ I=7.25%,n = 20: 0.0962***

(1) Operating labor was estimated based on $27.82 per hour with 0.5 and 1 hours per shift for the CO and SCR, respectively.
(2) Maintenance labor and materials were estimated at 2 times the operating labor for CO and the formula: 1,250 (MW) + 25,800 for SCR.
(3) The Oxidation catalyst replacement cost was estimated at 75 percent of the total price quote while the SCR catalyst replacement cost was estimated between $300,000 and $350,000 per year.
(4) The performance loss was based on 0.5 percent of the unit's output and $0.06 per kilowatt.

Source: References as indicated

**TABLE 4-6**
**CO BACT ECONOMIC SUMMARY**

| Cost Item | Cost Factor | Reference | Cost ($1996) |
|---|---|---|---|
| ***Direct Costs (DC)*** | | | |
| Purchased Equipment Costs (PEC) | | | |
| **Ox Cat. & Auxiliary Equipment** | **As Estimated, A** | **Vendor Quote** | **$830,000.00** |
| Instrumentation | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| State Sales Taxes | 0.06 X A | State Sales Tax | $49,800.00 |
| Freight | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| PEC Subtotal | 1.16 X A = B | | **$962,800.00** |
| Direct Installation Costs (DIC) | | | |
| Foundations & Supports | 0.08 X B | (Ulrich, 1984) | $77,024.00 |
| Labor | 0.14 X B | (EPA, 1990d) | $134,792.00 |
| Electrical | 0.04 X B | (EPA, 1990d) | $38,512.00 |
| Piping | NA | | |
| Insulation | NA | | |
| Painting | 0.01 X B | (EPA, 1990d) | $9,629.00 |
| DIC Subtotal | 0.27 X B | | **$259,956.00** |
| Site Preparation | NA | NA | NA |
| Buildings | NA | NA | NA |
| Total DC | 1.27 X B | | **$1,222,756.00** |
| ***Indirect Costs (IDC)*** | | | |
| Engineering | 0.10 X B | (EPA, 1990d) | $96,280.00 |
| Construction Overhead | 0.05 X B | (EPA, 1990d) | $48,140.00 |
| Contractor Fees | 0.10 X B | (EPA, 1990d) | $96,280.00 |
| Contingencies | 0.03 X B | (EPA, 1990d) | $28,884.00 |
| Start-Up | 0.02 X B | (EPA, 1990d) | $19,256.00 |
| Performance Testing | 0.01 X B | (EPA, 1990d) | $9,628.00 |
| Total IDC | 0.53 X B | - | **$298,468.00** |
| Total Capital Investment (TCI) | 1.84 X B | | **$1,521,224.00** |

**TABLE 4-6**
**CO BACT ECONOMIC SUMMARY**

| Cost Item | Cost Factor | Reference | Cost ($1996) |
|---|---|---|---|
| **Operating Cost Factors For Oxidation Catalyst** | | | |
| ***Chemical Engineering Plant*** | | | |
| ***Cost Index*** | | | |
| 1990 357.6 | | | |
| 1993 359.2 | | | |
| Sept. '96 383.9 | | | |
| ***Capital Recovery Factor (CRF) @ I=7.25%,N=20:*** 0.0962 | | | |
| ***Direct Annual Costs, $/Yr*** | **Factor** | **Reference** | **Costs, $/Yr** |
| Operating Labor | $27.82/Hr @ .5hr/12hr-Shift | (COT &EPA, 1990d) | $10,154 |
| Supervisory Labor | 15 % Of Operating Labor | (EPA, 1990d) | $1,523 |
| Maintenance Labor And Materials | 2 X $25.60/Hr @ 0.5hr/12hr-Shift | (EPA, 1990d) | $20,309 |
| Catalyst Replacement (CR) | 9 X 0.75 X A X CRF | Vendor | $539,156 |
| Catalyst Disposal | $15/CF | (EPA, 1993b) | $172,309 |
| Electricity | NA | | NA |
| Performance Loss | 0.50% | (EPA, 1990d) | $272,462 |
| | | | **$1,015,912** |
| ***Indirect Annual Costs, $/Yr*** | | | |
| Overhead | 60% Of All Labor Main. Costs | (EPA, 1990d) | $19,192 |
| Insurance & Administration | 2.5%Of TCI | (EPA, 1990d) | $38,031 |
| Capital Recovery | CRF X (TCI - CR) | NA | $86,489 |
| | | | **$143,711** |
| ***Total Annual Costs, $/Yr*** | | | **$1,159,623** |
| ***Total Net Reductions (TPY)*** | **Factor** | | |
| Carbon Monoxide | 90 % Reduction | | 150.32 |
| ***Incremental Cost Effectiveness, $/Ton*** | | | **$7,714** |

COT - City of Talahassee
EPA, 1990a - OAQPS Control Cost Manual
NA - Not Applicable
Source: Foster Wheeler Environmental, 1997

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## 4.5 PARTICULATE MATTER (TSP) AND $PM_{10}$

### 4.5.1 Combustion Turbine

Emissions of particulate matter (TSP and $PM_{10}$) result from inert materials within the fuel, products of incomplete combustion, and inert materials within the combustion turbine inlet air. The New Source Performance Standards (NSPS) for combustion turbines, 40 CFR 60 Subpart GG do not establish emission limits for particulate matter. All of the particulates emitted from the combustion turbine are expected to be less than 10 microns in diameter. Thus, the emissions of TSP equal the emissions of $PM_{10}$ and further discussion of particulate matter will refer to $PM_{10}$.

The combustion turbine has $PM_{10}$ emissions levels of 9 lb/hr (0.0058 lb/mmBtu) while firing clean pipeline quality natural gas and 17 lb/hr (0.0096 lb/mmBtu), while firing Number 2 (0.05 % S) diesel fuel oil, exclusive of background concentrations per the GE data sheets. These factors are based more on the uncertainties in $PM_{10}$ stack testing methods than on the expectation of large quantities of inert materials within the combustion turbine inlet air or the fuel (GE, 1996a). Since inert materials can cause turbine damage resulting in additional downtime and maintenance, combustion turbines are normally fired with clean fuels such as natural gas and Number 2 fuel oil. Air filtration systems are also employed to avoid the introduction of inert materials into the combustion turbine through the inlet air. In addition, good combustion practices are followed for both environmental and economic reasons.

As noted in Table 4-1, the most stringent control technology associated with combustion turbines for $PM_{10}$ is a combination of fuel quality, good combustion practices, and combustion turbine inlet air filtration. Add-on air pollution control strategies such as baghouses, scrubbers, and electrostatic precipitators (ESPs) have not been used on combustion turbines and their use as a transfer technology has been neither deemed technically nor economically feasible for combustion turbines due to anticipated back pressure problems. The emission levels associated with the most stringent controls were based on a North Carolina BACT determination of 9 lb/hr and 17 lb/hr when firing natural gas and Number 2 fuel oil, respectively. The Unit 8 combustion turbine has $PM_{10}$ emission levels equal to those associated with the most stringent technology. Therefore, no further energy, environmental, or economic analysis was required. For the combustion turbine, BACT for the $PM_{10}$ emissions is proposed as combustion turbine inlet air filtration, good combustion practices, and the use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil.

### 4.5.2 Cooling Tower

Emissions of particulate matter (TSP and $PM_{10}$) result from the direct contact between the cooling water and the air passing through it. As the air and water make contact, some water may become entrained within the air stream and carried out of the tower as "drift" droplets, which is known as drift loss. The cooling water, and consequently the drift droplets, typically contain dissolved and suspended solids. These solids constitute the particulate matter within the droplet and are considered in calculating the total $PM_{10}$ emissions. The amount of drift loss depends on the number and size of the droplets produced within the cooling tower and is related to the overall design of the cooling tower. Typically, larger droplets will fall to the ground near the tower while smaller droplets may evaporate, leaving the solids suspended within the atmosphere. The amount of particulate emissions including TSP and $PM_{10}$ depends on the amount of drift loss and the concentration of solids within the cooling tower water.

To reduce drift losses from cooling towers, and therefore indirectly lower particulate emissions, drift eliminators can be incorporated into the tower design. A single BACT determination for a cooling tower was identified in the control technology review, establishing drift eliminators as BACT, with an emission limitation of 0.002 percent of the recirculating water flow. The proposed cooling tower for the Purdom Station will incorporate drift eliminators, operate at 8 cycles of concentration, and reduce drift losses to 0.002 percent of the cooling tower recirculation rate. BACT for particulate matter emissions from the cooling tower is therefore proposed as the use of drift eliminators.

## 4.6 OTHER POLLUTANTS

In addition to the pollutants subject to BACT, evaluations of the Unit 8 combustion turbine's emissions of other PSD pollutants was also conducted, although not required by the applicable regulations. These other pollutants included $SO_2$, $H_2SO_4$, $NO_x$, VOC, Fl, and trace metals. The findings regarding each of these pollutants are discussed in the following sections.

### 4.6.1 Sulfur Dioxide and Sulfuric Acid Mist

Sulfur dioxide emissions are a direct result of the oxidation of the various sulfur compounds contained within the fuel stream. Both natural gas and Number 2 fuel oil contain some sulfur compounds. In either case, the oxidation process follows the general chemical reaction:

$$S + O_2 \Rightarrow SO_2$$

Sulfuric acid mist is the result of the oxidation of $SO_2$ to $SO_3$ and the subsequent reaction with moisture to form $H_2SO_4$. This process follows the following general chemical reactions:

$$2SO_2 + O_2 \Rightarrow 2SO_3$$

$$SO_3 + H_2O \Rightarrow H_2SO_4$$

Combustion of both clean pipeline quality natural gas and the Number 2 (0.05% Sulfur) diesel fuel oil will result in emissions of $SO_2$ and $H_2SO_4$. Because $SO_2$ and $H_2SO_4$ emissions are directly proportional to the sulfur content of the fuel, they can be controlled through fuel quality. The most stringent $SO_2$ and $H_2SO_4$ emission standards for combustion turbines are related to fuel quality. The $SO_2$ and $H_2SO_4$ emissions from the Unit 8 combustion turbine are based on GE data which project that 95 percent of the sulfur in the fuel would be emitted as $SO_2$ and the remaining 5 percent emitted as $H_2SO_4$.

The Unit 8 combustion turbine will fire clean pipeline quality natural gas as the primary fuel with Number 2 (0.05% Sulfur) diesel fuel oil as the secondary fuel, which meets the most stringent emission levels reported. In addition, the use of the Number 2 fuel oil with a sulfur content of 0.05 percent by weight is well within the NSPS requirements of Subpart GG, which specifies a maximum sulfur content of 0.8 percent by weight.

### 4.6.2 Oxides of Nitrogen

Emissions of $NO_x$ from combustion turbines are generated by two primary mechanisms known as "fuel $NO_x$" and "thermal $NO_x$." Fuel $NO_x$ is related to the nitrogen content of the fuels fired in the combustion turbine. Most solid and liquid fuels contain some quantities of nitrogen within their chemical structure, known as fuel bound nitrogen (FBN), which when burned can produce $NO_x$ emissions or "fuel $NO_x$." Within combustion turbines, FBN is only a concern when firing fuel oils, since clean pipeline quality natural gas typically contains little or no FBN. The production of fuel $NO_x$ can follow the generalized chemical reaction:

$$C_xH_yN + zO_2 \Rightarrow xCO_2 + (y/2)H_2O + NO_x$$

Fuel $NO_x$ represents a relatively small but measurable portion of the overall $NO_x$ emissions generated by a combustion turbine. For combustion turbines, NSPS Subpart GG establishes a base $NO_x$ emissions standard of 75 parts per million by volume on a dry basis (ppmvd) corrected to 15 percent oxygen at ISO ambient conditions. This standard includes additional allowances for the heat rate and for FBN. The FBN allowances are presented in Table 4-7.

**TABLE 4-7**
**FUEL BOUND NITROGEN ALLOWANCES**

| FBN (% wt) | Allowance ($NO_x$ percent by Volume) |
|---|---|
| FBN ≤ 0.015 | 0 |
| 0.015 ≤ FBN ≤ 0.1 | 0.04(FBN) |
| 0.1 ≤ FBN ≤ 0.25 | 0.004+0.0067(FBN-0.1) |
| FBN > 0.25 | 0.005 |

Source: 40 CFR 60 Subpart GG - New Source Performance Standards for Stationary Gas Turbines

The second mechanism by which $NO_x$ emissions are formed within a combustion turbine is known as "thermal NOx" and is a result of the dissociation of nitrogen ($N_2$) and Oxygen ($O_2$) in the combustion air and the subsequent reactions to form $NO_x$. The Zeldovich mechanism has been proposed for this reaction and is based on the following general equations:

**Dissociation**

$$N_2 \Leftrightarrow 2N\bullet$$
$$O_2 \Leftrightarrow 2O\bullet$$

**Reaction**

$$N_2 + 3O\bullet \Leftrightarrow 2NO + O\bullet$$
$$O_2 + N\bullet \Leftrightarrow NO + O\bullet$$
$$N\bullet + O\bullet \Leftrightarrow NO$$

The dissociation reactions, which produce elemental nitrogen and oxygen, are favored under conditions of high temperatures and pressures. Combustion controls focus on reducing thermal $NO_x$ production by reducing the peak flame temperatures within the combustion zone. Peak flame temperatures are controlled by either wet injection systems or by varying the stoicheometric ratio of the combustion air and fuels within the combustion zones. Wet injection systems involve the injection of either water or steam into the combustion zone to act as a heat sink and lower flame temperatures. Varying the stoicheometric ratios through staged combustion reduces flame temperatures and the nitrogen concentrations within the combustion zone. This later technique forms the basis of the dry low-$NO_x$ combustors offered by various manufacturers. Appendix A contains information provided by General Electric on its dry-low NOx development program, a technical paper on dry-low NOx technology, and the emissions data sheets for the proposed Unit.

For Unit 8, $NO_x$ emission levels of 9 ppmvd (0.037 lb/mmBtu) while firing clean pipeline quality natural gas and 42 ppmvd (0.181 lb/mmBtu) while firing Number 2 (0.05% S) diesel fuel oil have been guaranteed up to a maximum of 0.015 percent FBN. Thermal $NO_x$ emissions will be controlled by the use of an advanced dry low-$NO_x$ combustor while firing clean pipeline quality natural gas and water injection while firing Number 2 (0.05% Sulfur) diesel fuel oil, respectively. The proposed emission limits are well below those of 40 CFR 60 Subpart GG and also below those considered BACT in recent FDEP determinations. However, the proposed combustion turbine's $NO_x$ levels are above those associated with the most stringent emission limitations (3.5 ppmvd - national gas & 10 ppmvd - fuel oil) placed on projects located within non-attainment areas. As such, the costs associated with the installation of an add-on air pollution control technology were examined.

Add-on air pollution control systems for reducing emissions of $NO_x$ from combustion sources include selective catalytic reduction (SCR) and selective noncatalytic reduction (SNCR). Currently, SCR in combination with either wet injection or dry low-$NO_x$ technologies is the most efficient control technology employed to control $NO_x$ emissions from combustion turbines. Combustion turbines equipped with SCR systems have demonstrated compliance with emission limits as low as 3.5 ppmvd and 10 ppmvd, corrected to 15 percent $O_2$, while firing natural gas and Number 2 fuel oil, respectively. Because of the current temperature limitations of the available SNCR systems, their use on combustion turbines is not considered to be technologically feasible. Therefore, the evaluation addressed only SCR as an available add-on control technology for $NO_x$.

As part of the evaluation, the economic impact of an SCR system was considered. The economic impact analysis followed EPA's suggested procedures. A vendor quote was received for an SCR system, with a three-year catalyst warranty. (Appendix H). The quote estimated the initial capital cost for an SCR system to be $1,676,000. In addition to this initial cost, the vendor estimated additional costs of $300,000 to $350,000 per year for catalyst replacement. The SCR design criteria was based on meeting the 3.5 and 10 ppmvd LAER limits for all gas and oil firing.

The economic impacts analysis reduced capital and operating costs to annualized values based on a twenty-year economic life of the Project and a 7.25 percent return. The analysis indicated that an SCR system would add approximately $3.1 million to the overall capital cost of the Project. The total levelized annual costs for the Project would increase by about $1.5 million per year, resulting in an incremental removal cost of approximately $7,225 per ton. (The economic calculations are provided in Appendix G). Based on the economics impacts alone, it was determined that controlling $NO_x$ emissions through an SCR system would be prohibitively expensive, consistent with other recent BACT deteriminations by FDEP.

In addition to the economic impacts, the use of an SCR system would result in a reduction in the combined cycle combustion turbine's performance and output capacity. The main loss is associated with the additional pressure drop across the ammonia injection grid and the catalyst bed. This pressure drop can range from 2 to 5 inches of water and can reduce the overall unit output by as much as 0.5 percent. In addition, energy losses are associated with the pumps and instrumentation used to control and operate the ammonia injection system. Although these energy impacts may be measurable, they were not by themselves considered significant enough to reject the control technology. Costs associated with the energy loss have been included within the economic analysis.

Environmental impacts resulting from the use of an SCR system include emission increases of sulfur trioxide ($SO_3$) and $PM_{10}$ emissions, waste disposal, increased water usage, and the storage, handling, and emissions of ammonia and ammonia products. Increased $SO_3$ emissions are a result of the catalytic oxidation of $SO_2$ to $SO_3$ in the presence of the SCR catalyst. As discussed previously, $SO_3$ can be expected to form $H_2SO_4$ in the presence of water vapor within the exhaust gases. $SO_3$ can also be expected to react with ammonia to form either ammonium bisulfate or ammonium sulfate, which will be reflected as increased $PM_{10}$ emissions and which could potentially cause fouling in the HRSG. In addition to the increases in $SO_3$ and $PM_{10}$ emissions, the SCR system could also introduce ammonia emissions into the environment. Disposal of the spent catalyst every three years will place additional burdens on available landfill space. Water usage would increase by about 136,500 gallons per year through the use of the aqueous ammonia solution. The handling, storage, and use of aqueous ammonia does pose less of an environmental threat than that of anhydrous ammonia from the standpoint of an accidental air release. However, because of the Purdom Generating Station's location along the banks of the St. Marks River, the potential handling and storage of an aqueous ammonia solution would have to be addressed from an accidental spill and release perspective.

Based on the various impact analyses, BACT for $NO_x$ emissions from the combustion turbine is proposed to be the use of clean pipeline quality natural gas as the primary fuel and Number 2 (0.05% S) diesel fuel oil as the secondary fuel, in combination with good combustion practices and the use of dry-Low-$NO_x$ combustors and a water injection system when firing clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil, respectively.

### 4.6.3 Volatile Organic Compounds

Within a combustion process, emissions of VOCs are related to the combustion efficiency of the unit. Combustion control strategies for VOCs are similar to those for CO which target high temperatures, long residence times, and adequate excess air. For combustion turbines, NSPS Subpart GG does not establish emission limits for VOC emissions.

The Unit 8 combustion turbine will have VOC levels of 2 parts per million volume on a wet basis (ppmvw) (0.0018 lb/mmBtu) and 5 ppmvw (0.0042 lb/mmBtu), while firing clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil, respectively, for loads above 75 percent. These values are representative of BACT for these loads. For loads below 75 percent, the VOC levels are higher, as reported in the GE data sheets. Table 4-1 presented the most stringent control technology for VOCs, which reported emission levels of 1.5 and 3 ppmvw for natural gas and (0.05% S) diesel fuel oil firing, respectively.

For combustion turbines, add-on air pollution control strategies for VOCs include oxidation catalysts. The use of an oxidation catalyst for the reduction of CO emissions was evaluated for the Unit 8 combustion turbine. Since VOC emissions were not subject to BACT review, a separate cost analysis for an oxidation catalyst to reduce VOCs was not conducted. However, by assuming a 30 percent reduction of VOC emissions across the CO oxidation catalyst, and by adding the additional reduction in VOC emissions to those of CO, the additional benefit of a lower incremental cost of the system was identified. This lower incremental cost was estimated at $7,510 per ton of CO and VOC removed. Although the combination of VOC and CO reductions is slightly higher, making the incremental removal cost lower, the economic cost of an oxidation catalyst was still considered to be unreasonably expensive.

### 4.6.4 Trace Metals

Emissions of trace metals result from inert materials within the fuel and combustion turbine inlet air. Clean pipeline quality natural gas contains little, if any, noncombustible inert materials; trace metal emissions are considered negligible. For mercury, an emission factor of 0.078 lb/$10^{12}$ Btu has been used for this analysis (EPRI, 1994). Number 2 fuel oil has a reported ash content of less than 0.01 percent by weight (Perry, 1973). Emissions of trace metals from the use of Number 2 (0.05% S) diesel fuel oil are therefore expected to be higher when compared to clean pipeline quality natural gas, but are still relatively low. For the Unit 8 combustion turbine on Number 2 (0.05% S) fuel oil, emissions of trace metals have been estimated based on AP-42 emission factors (EPA, 1995) for lead (194 lb/$10^{12}$ Btu), beryllium (4.2 lb/$10^{12}$ Btu), and mercury (32 lb/$10^{12}$ Btu).

As discussed under the section regarding $PM_{10}$ emissions, BACT for trace metal emissions from combustion turbines has been determined to be fuel quality, good combustion practices, and combustion turbine inlet air filtration. NSPS Subpart GG does not contain any emission standards for trace metals nor did any of the reported BACT determinations. Consistent with other recent FDEP determinations of BACT for trace metal emissions from combustion turbines, the use of clean pipeline quality natural gas as the primary fuel with Number 2 (0.05% S) diesel fuel oil as the secondary fuel, good combustion practices, and combustion turbine inlet air filtration are proposed as BACT for Unit 8.

### 4.6.5 Total Fluorides

The review of the most stringent control technologies did not identify any emission limitations associated with fluoride emissions from combustion turbines. Fluoride emissions are associated with the use of fuel oil. Fuel quality is therefore proposed as BACT for fluoride emissions from the Unit 8 combustion turbine, with clean pipeline quality natural gas as the primary fuel and Number 2 (0.05% S) diesel fuel oil as the secondary fuel.

## 4.7 BACT SUMMARY

The BACT evaluations examined the available fuels, combustion technologies, and add-on air pollution control systems. Based on the evaluations, BACT for the Project includes the following:

- For the primary control of CO and VOC emissions from the combustion turbine, good combustion practices, which maximize $NO_x$ reductions while minimizing CO, VOCs, and $PM_{10}$ emissions are proposed as BACT. For CO, the evaluation is based on the economic impacts of an oxidation catalyst, which represents the most stringent control technology.
- For the primary control of particulate matter, $PM_{10}$, trace metals, and total fluorides emissions from the combustion turbine, inlet air filtration coupled with good combustion practices and fuel quality are proposed as BACT. The use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil is the most stringent control technology available.
- For the primary control of $NO_x$, combustion controls including dry-low $NO_x$ combustors and wet injection techniques coupled with fuel quality are representative of BACT. The evaluation is based on the economic impacts associated with an SCR system, which represents the most stringent control technology available.
- For the primary control of $SO_2$ and $H_2SO_4$, and the secondary control of $NO_x$ and $PM_{10}$, the use of clean pipeline quality natural gas and Number 2 (0.05% S) diesel fuel oil is the most stringent control technology available.
- For the primary control of particualte matter and $PM_{10}$ from the cooling towers, drift eliminators which reduce drift losses are proposed as BACT and are the most stringent control technology available.

Table 4-8 presents a summary of the control technologies proposed as BACT for the combustion turbine and cooling tower.

**TABLE 4-8**
**SUMMARY OF PROPOSED BEST AVAILABLE CONTROL TECHNOLOGY**

| Pollutant | Proposed BACT |
|---|---|
| ***Carbon Monoxide (CO)*** | Good Combustion Practices |
| ***Particulate Matter (TSP)*** | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil, Good Combustion Practices, and Combustion Inlet Air Filtration |
| ***$PM_{10}$*** | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil, Good Combustion Practices, and Combustion Inlet Air Filtration |
| Sulfur Dioxide ($SO_2$) | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil. |
| Sulfuric Acid Mist ($H_2SO_4$) | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil. |
| Nitrogen Oxides ($NO_x$) | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil and Good Combustion Practices including Dry-Low NOx Combustors and Water Injection |
| Volatile Organic Compounds (Including Benzene) | Good Combustion Practices |
| Trace Metals<br>Lead (Pb)<br>Beryllium (Be)<br>Mercury (Hg)<br>Arsenic (As) | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil and Combustion Inlet Air Filtration |
| Total Fluorides (Fl) | Fuel Quality (Clean Pipeline Quality natural gas and No. 2 (0.05% S) diesel fuel oil. |
| ***Cooling Tower (TSP & $PM_{10}$)*** | Drift Eliminators (0.002 percent - Recirculation Water) |

***Note: Pollutants presented in bold and italics are subject to BACT by rule.***

Source: Foster Wheeler Environmental, 1997

# APPENDIX A

# GENERAL ELECTRIC INFORMATION

## APPENDIX A

The attached performance data for the Unit 8 combustion turbine have been developed by General Electric (GE) based on analyses and laboratory testing as noted in the attached letter from GE Power Generation Engineering. The letter reports that GE's Dry Low-NOx (DLN) program achieved its 9 ppm $NO_x$ (corrected to 15% $O_2$) goal at base load in March of 1996. The tested unit had a Frame 7FA configuration and a firing temperature of 2350 °F. The unit proposed for this project is a Frame 7FA with a higher firing temperature of 2400 F. GE reports that testing and commissioning of the first 2400 °F system is scheduled for this summer. The attached technical paper describes DLN operation.

GE Power Generation
Engineering

February 24, 1997

Mr. Frank C. Michel
Project Manager
Raytheon Engineers & Constructors, Inc.
145 Technology Park
Norcross, GA 30092

Subject: City of Tallahassee
S.O. Purdom Generating Station Unit No. 8
DLN Combustor Status

The following provide responses to your questions presented by your letter of Feb. 14, received on Feb. 18, 1997:

1) DLN-2.6 Time Line: The DLN-2.6 development program was initiated in late 1994 with the goal of reaching 9 ppm NOx (corrected to 15% O2) emissions at base load. Analyses and laboratory testing were performed during 1995, followed by manufacture of the first set of production hardware. The first unit reached base load in March of 1996 with emissions of less than 9 ppm in a 7FA configuration with a firing temperature of 2350 F. Improvements were made to the end cover and cap for increased durability in December 1996. Re-commissioning was performed and base load NOx levels were measured at less than 9 ppm.
2) The first 7FA DLN2.6 combustor firing at 2400 F is planned to be in commercial operation this summer. The combustion hardware configuration is unchanged from the 2350 F firing temperature system. Base load NOx levels are expected to remain below 9 ppm based upon analytical predictions. The increase in firing temperature is a result of improvements to the turbine and compressor sections. Combustion reaction zone temperature is relatively un-affected by the up-grade.
3) The DLN-2.6 combustion system has demonstrated less than 9 ppm NOx levels at base load. Therefore, no emissions extensions will be necessary for the Purdom Generating Station Unit No. 8.
4) Commissioning and field testing of the first 2400 F system will be performed this summer. For this application, the contract calls for less than 15 ppm NOx. The system is designed to achieve less than 9 ppm NOx at base load with continued testing.

Sincerely,

Christian Vandervort
Technical Leader (Acting), DLN2.6 Product

# DRY LOW $NO_x$ COMBUSTION SYSTEMS FOR GE HEAVY-DUTY GAS TURBINES

L.B. Davis
GE Power Systems
Schenectady, NY

## ABSTRACT

State-of-the-art emissions control technology for heavy-duty gas turbines is reviewed with emphasis on the operating characteristics and field experience of Dry Low $NO_x$ (DLN) combustors for E- and F- technology machines. The lean premixed DLN systems for gas fuel have demonstrated their ability to meet the ever-lower emission levels required today. Lean premixed technology has also been demonstrated on oil fuel and is also discussed.

## INTRODUCTION

The regulatory requirements for low emissions from gas turbine power plants have increased during the past 10 years. Environmental agencies throughout the world are now requiring even lower rates of emissions of $NO_x$ and other pullutants from both new and existing gas turbines. Traditional methods of reducing $NO_x$ emissions from combustion turbines (water and steam injection) are limited in their ability to reach the extremely low levels required in many localities. GE's involvement in the development of both the traditional methods (References 1 through6) and the newer Dry Low $NO_x$ (DLN) technology (References 7 and 8) has been well-documented. This paper focuses on DLN.

Since the commercial introduction of GE's DLN combustion systems for natural-gas-fired heavy-duty gas turbines in 1991, systems have been installed in more than 145 machines, from the most modern F technology (firing temperature class of 2400 F/1316 C) to field retrofits of older machines. As of August 1996, these machines have operated more than one million hours with DLN; more than 290,000 hours have been in the F technology. To meet marketplace demands, GE has developed DLN products broadly classified as either DLN-1, which was developed for E-technology (2000 F/1093 C firing temperature class) machines, or DLN-2, which was developed specifically for the F technology machines and is also being applied to the EC, G and H machines.

Development of these products has required an intensive engineering effort involving both GE Power Systems and GE Corporate Research and Development. This collaboration will continue as DLN is applied to the G and H machines and combustor development for Dry Low $NO_x$ on oil ("dry oil") continues.

This paper presents the current status of DLN-1 technology and experience, including dry oil, and of DLN-2 technology and experience. Background information about gas turbine emissions and emissions control is contained in the Appendix.

## DRY LOW $NO_X$ SYSTEMS

### Dry Low $NO_x$ Product Plan

Figure 1 shows GE's Dry Low $NO_x$ product offerings for its new and existing machines in three major groupings. The first group includes the MS3000, MS5000 and MS6001B products. The 6B DLN-1 is the technology flagship product for this group and, as can be noted, is available to meet 9 ppm $NO_x$ requirements. Such low $NO_x$ emissions are generally not attainable on lower firing temperature machines such as the MS3000s and MS5000s because carbon monoxide (CO) would be excessive.

The second major group includes the MS7000B/E, MS7001EA and MS9001E machines with the 9 ppm 7EA DLN-1 as the flagship product. The dry oil program focuses initially on this group.

The third group combines all of the DLN-2 products and includes the FA, EC, G and H machines, with the 7FA product as the flagship.

As shown in Figures 2 and 3, most of these products are capable of power augmentation and of peak firing with increased $NO_x$ emissions. With gas fuel, power augmentation with steam is in the premixed mode for both DLN-1 and DLN-2 systems. Power augmentation with water is in the lean-lean mode for DLN-1 and in the premixed mode for DLN-2.

The GE DLN systems integrate a staged pre-

| Turbine Model | Gas NO$_x$ (ppmvd) | Gas CO (ppmvd) | Gas Diluent | Distillate NO$_x$ (ppmvd) | Distillate CO (ppmvd) | Distillate Diluent |
|---|---|---|---|---|---|---|
| MS3002 (J) - RC | 33 | 25 | Dry | Not Available | | |
| MS3002 (J) - SC | 42 | 50 | Dry | | | |
| MS5001P | 42 | 50 | Dry | 65 | 20 | Water |
| MS5001R | 42 | 50 | Dry | 65 | 20 | Water |
| MS5002C | 42 | 50 | Dry | 65 | 20 | Water |
| MS6001 B | 25 | 15 | Dry | 42 | 20 | Water |
| | 9 | 25 | Dry | 42 | 30 | Water/Steam |
| MS6001 FA | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| MS7001 B/E Conv | 25 | 25 | Dry | 42 | 30 | Water |
| MS7001 EA | 25 | 15 | Dry | 42 | 20 | Water |
| | 15 | 25 | Dry | 42 | 30 | Water/Steam |
| | 9 | 25 | Dry | 42 | 30 | Water/Steam |
| MS7001 EC | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| MS7001 FA | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| | 9 | 9 | Dry | 42/65 | 30 | Water/Steam |
| MS9001 E | 35 | 15 | Dry | 42 | 20 | Water |
| | 25 | 25 | Dry | 42 | 20 | Water |
| | 25 | 25 | Dry | 90 | 20 | Dry |
| MS7001 H | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| | 9 | 9 | Dry | 42/65 | 30 | Water/Steam |
| MS9001 EC | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| MS9001 FA | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |
| MS9001 H | 25 | 15 | Dry | 42/65 | 20 | Water/Steam |

Notes: 1. NO$_x$ levels are at 15% oxygen. Ambient range 30 F/-1 C to 100 F/38 C

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**Figure 1. Dry Low NO$_x$ product plan**

mixed combustor, the gas turbine's SPEEDTRONIC™ controls and the fuel and associated systems. There are two principal measures of performance. The first is meeting the emission levels required at base load on both gas and oil fuel and controlling the variation of these levels across the load range of the gas turbine.

The second measure is system operability, with emphasis placed on the smoothness and reliability of combustor mode changes, ability to load and unload the machine without restriction, capability to switch from one fuel to another and back again, and system response to rapid transients (e.g., generator breaker open events or rapid swings in load). GE's design goal is to make the DLN system operate so the gas turbine operator does not know whether a DLN or conventional combustion system is installed (i.e., its operation is "transparent to the user"). As of August 1996, a significant portion of the DLN design and development effort has focused on system operability.

Design of a successful DLN combustor for a heavy-duty gas turbine also requires the designer to develop hardware features and operational

| Turbine Model | NOx @15% O$_2$ (ppmvd) | Operating Mode | Diluent | Maximum Diluent/Fuel | NO$_x$ at Max D/F (ppmvd) | CO Max D/F (ppmvd) |
|---|---|---|---|---|---|---|
| MS6001(B) | 9 | Premix | Steam | 2.5/1 | 9 | 25 |
| | | Lean-Lean | Steam | 2.5/1 | 25 | 15 |
| | 25 | Premix | Steam | 2.5/1 | 25 | 15 |
| | | Lean-Lean | Water | 1.5/1 | 25 | 15 |
| | | Lean-Lean | Steam | 2.5/1 | 25 | 15 |
| MS7001(EA) | 9 | Premix | Steam | 2.5/1 | 9 | 25 |
| | | Lean-Lean | Water | 1.5/1 | 25 | 15 |
| | | Lean-Lean | Steam | 2.5/1 | 25 | 15 |
| | 25 | Premix | Steam | 2.5/1 | 25 | 15 |
| | | Lean-Lean | Water | 1.5/1 | 25 | 15 |
| | | Lean-Lean | Steam | 2.5/1 | 25 | 15 |
| MS7001(FA) | 25 | Premix | Steam | 2.1/1 | 25 | 15 |

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**Figure 2. DLN power augmentation summary — gas fuel**

| | $NO_x$-Base (ppmvd) | $NO_x$-Peak (ppmvd) | CO-Base (ppmvd) | CO-Peak (ppmvd) |
|---|---|---|---|---|
| MS6001(B) | 9<br>25 | 18<br>50 | 25<br>15 | 6<br>4 |
| MS7001(EA) | 9<br>25 | 18<br>50 | 25<br>15 | 6<br>4 |
| MS7001(FA) | 25 | 35 | 15 | 6 |
| MS9001(E) | 25 | 40 | 15 | 6 |

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**Figure 3. DLN peak firing summary — gas fuel**

methods that simultaneously allow the equivalence ratio and residence time in the flame zone to be low enough to achieve low $NO_x$, but with acceptable levels of combustion noise (dynamics), stability at part load operation and sufficient residence time for CO burn-out, hence the designation of DLN combustion design as "four-sided box" (Figure 4).

A scientific and engineering development program by GE's Corporate Research and Development Center, Power Systems business and Aircraft Engine business has focused on understanding and controlling dynamics in lean premixed flows. The objectives have been to:

- Gather and analyze machine and laboratory data to create a comprehensive dynamics data base
- Create analytical models of gas turbine combustion systems that can be used to understand dynamics behavior
- Use the analytical models and experimental methods to develop methods to control dynamics

As of August 1996, these efforts have resulted in a large number of hardware and control features that limit dynamics, plus analytical tools that are used to predict system behavior. The latter are particularly useful in correlating laboratory test data from full scale combustors with actual gas turbine data.

## DLN-1 System

DLN-1 development began in the 1970s with the goal of producing a dry oil system to meet the United States Environmental Protection Agency's New Source Performance Standards of 75 ppmvd $NO_x$ at 15% $O_2$. As noted in Reference 7, this system was tested on both oil and gas fuel at Houston Lighting & Power in

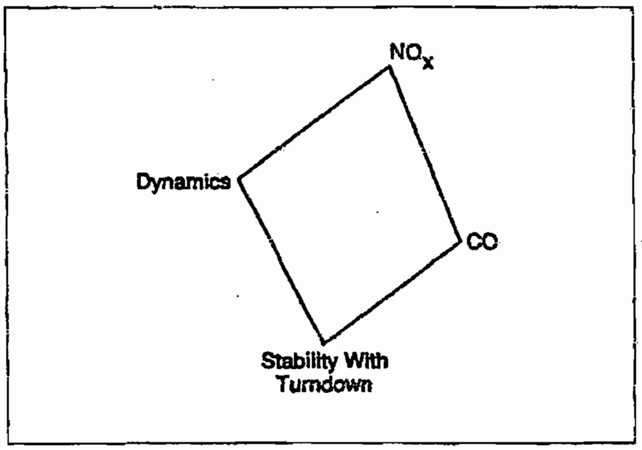


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**Figure 4. DLN technology — a four-sided box**

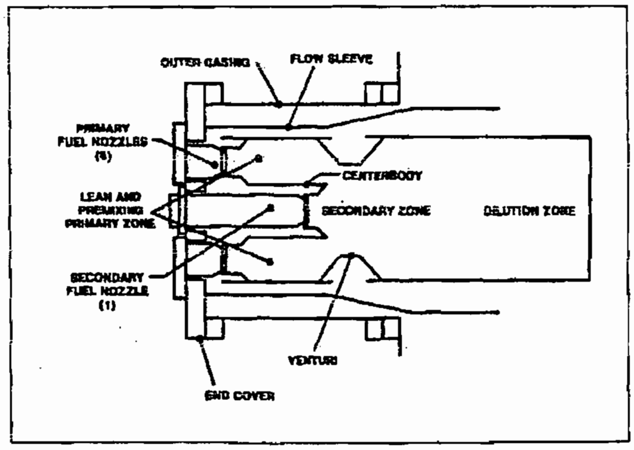


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**Figure 5. DLN-1 combustor schematic**

1980 and met its emission goals. Subsequent to this, DLN program goals changed in response to stricter environmental regulations and the pace of the program accelerated in the late 1980s.

## DLN-1 Combustor

The GE DLN-1 combustor (shown in cross section in Figure 5 and described in Reference 8) is a two-stage premixed combustor designed for use with natural gas fuel and capable of operation on liquid fuel. As shown, the combustion system includes four major components: fuel injection system, liner, venturi and cap/centerbody assembly.

These components form two stages in the combustor. In the premixed mode, the first stage thoroughly mixes the fuel and air and delivers a uniform, lean, unburned fuel-air mixture to the second stage.

The GE DLN-1 combustion system operates in four distinct modes, illustrated in Figure 6, during pre-mixed natural gas or oil fuel operation:

| Mode | Operating Range |
|---|---|
| Primary | Fuel only to the primary nozzles. Flame is in the primary stage only. This mode of operation is used to ignite, accelerate and operate the machine over low- to mid-loads, up to a preselected combustion reference temperature. |
| Lean-Lean | Fuel to both the primary and secondary nozzles. Flame is in both the primary and secondary stages. This mode of operation is used for intermediate loads between two pre-selected combustion reference temperatures. |
| Secondary | Fuel to the secondary nozzle only. Flame is in the secondary zone only. This mode is a transition state between lean-lean and premix modes. This mode is necessary to extinguish the flame in the primary zone, before fuel is reintroduced into what becomes the primary premixing zone. |
| Premix | Fuel to both primary and secondary nozzles. Flame is in the secondary stage only. This mode of operation is achieved at and near the combustion reference temperature design point. Optimum emissions are generated in premix mode. |

The load range associated with these modes varies with the degree of inlet guide vane modulation and, to a smaller extent, with the ambient temperature. At ISO ambient, the premix operating range is 50% to 100% load with IGV modulation down to 42°, and 75% to 100% load with IGV modulation down to 57°. The 42° IGV minimum requires an inlet bleed heat system.

If required, both the primary and secondary fuel nozzles can be dual-fuel nozzles, thus allowing automatic transfer from gas to oil throughout the load range. When burning either natural gas or distillate oil, the system can operate to full load in the lean-lean mode (Figure 6) and in the pre-mixed. Power augmentation with water is the most common reason.

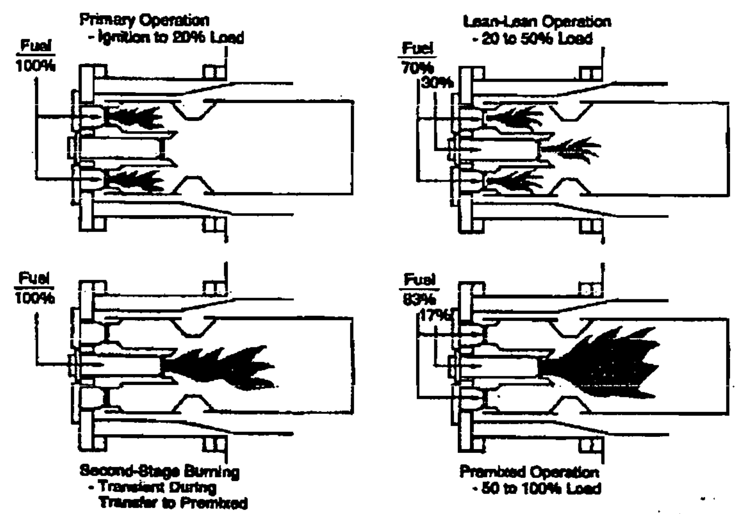


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**Figure 6. Fuel-staged Dry Low $NO_x$ operating modes**

The spark plug and flame detector arrangements in a DLN-1 combustor are different from those used in a conventional combustor. Since the first stage must be re-ignited at high load in order to transfer from the premixed mode back to lean-lean operation, the spark plugs do not retract. One plug is mounted in a primary zone cup in each of two combustors. The system uses flame detectors to view the primary stage of selected chambers (similar to conventional systems), and secondary flame detectors that look through the centerbody and into the second stage.

The primary fuel injection system is used during ignition and part load operation. The system also injects most of the fuel during premixed operation and must be capable of stabilizing the flame. For this reason, the DLN-1 primary fuel nozzle is similar to GE's MS7001EA multi-nozzle combustor with multiple swirl-stabilized fuel injectors. The GE DLN-1 system uses five primary fuel nozzles for the MS6001B and smaller machines and six primary fuel nozzles for the larger machines. This design is capable of providing a well-stabilized diffusion flame that burns efficiently at ignition and during part load operation.

In addition, the multi-nozzle fuel injection system provides a satisfactory spatial distribution of fuel flow entering the first-stage mixer. The primary fuel-air mixing section is bound by the combustor first-stage wall, the cap/centerbody and the forward cone of the venturi. This volume serves as a combustion zone when the combustor operates in the primary and lean-lean modes. Since ignition occurs in this stage, crossfire tubes are installed to propagate flame and to balance pressures between adjacent chambers. Film slots on the liner walls provide cooling, as they do in a standard combustor.

In order to achieve good emissions performance in premixed operation, the fuel-air equivalence ratio of the mixture exiting the first-stage mixer must be very lean. Efficient and stable burning in the second stage is achieved by providing continuous ignition sources at both the inner and outer surfaces of this flow. The three elements of this stage comprise a piloting flame, an associated aerodynamic device to force interaction between the pilot flame and the inner surface of the main stage flow, and an aerodynamic device to create a stable flame zone on the outer surface of the main stage flow exiting the first stage.

The piloting flame is generated by the secondary fuel nozzle, which premixes a portion of the natural gas fuel and air (nominally, 17% at full-load operation) and injects the mixture through a swirler into a cup where it is burned. This flame is stabilized by burning an even smaller amount of fuel (less than 2% of the total fuel flow) as a diffusion flame in the cup. The secondary nozzle, which is mounted in the cap centerbody, is simple and highly effective for creating a stable flame.

A swirler mounted on the downstream end of the cap/centerbody surrounds the secondary nozzle. This creates a swirling flow that stirs the interface region between the piloting flame and the main-stage flow and ensures that the flame is continuously propagated from the pilot to the inner surface of the fuel-air mixture exiting the first stage. Operation on oil fuel is similar except that all of the secondary oil is burned in a diffusion flame in the current dry oil design.

The sudden expansion at the throat of the venturi creates a toroidal recirculation zone over the downstream conical surface of the venturi. This zone, which entrains a portion of the venturi cooling air, is a stable burning zone that acts as an ignition source for the main stage fuel-air mixture. The cone angle and axial location of the venturi cooling air dump have significant effects on the efficacy of this ignition source. Finally, the dilution zone (the region of the combustor immediately downstream from the flame zone in the secondary) provides a region for CO burnout and for shaping the gas temperature profile exiting the combustion system.

## DLN-1 Controls and Accessories

The gas turbine accessories and control systems are configured so that operation on a DLN-equipped turbine is essentially identical to that of a turbine equipped with a conventional combustor. This is accomplished by controlling the turbines in identical fashions, with the exhaust temperature, speed and compressor discharge pressure establishing the fuel flow and compressor inlet guide vane position.

A turbine with a conventional diffusion combustor that uses diluent injection for $NO_X$ control will use an underlying algorithm to control steam or water injection. This algorithm will use top level control variables (exhaust temperature, speed, etc.) to establish a steam-to-fuel or water-to-fuel ratio to control $NO_X$.

In a similar fashion, the same variables are used to divide the total turbine fuel flow between the primary and secondary stages of a DLN combustor. The fuel division is accom-

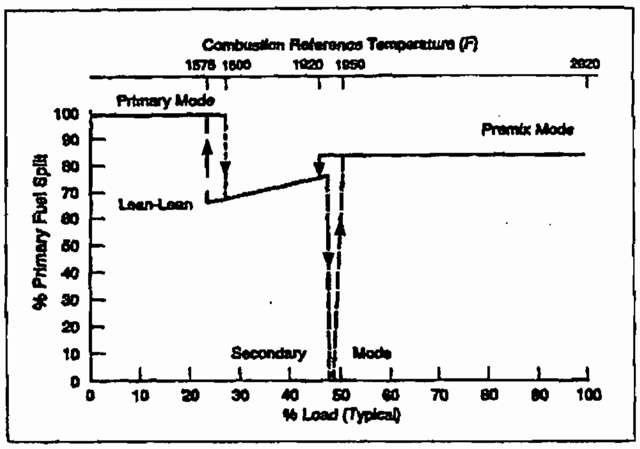


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**Figure 7. Typical Dry Low NO$_x$ fuel gas split schedule**

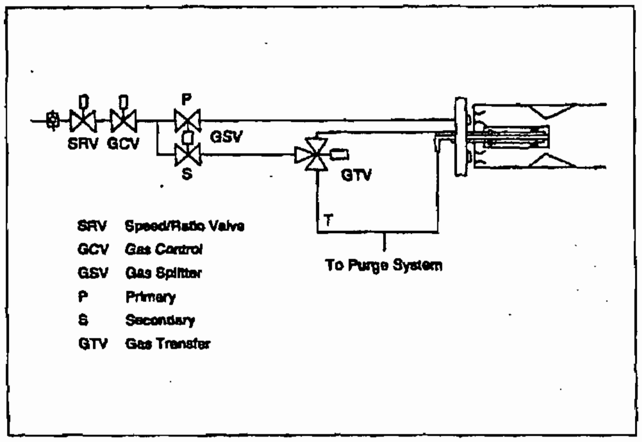


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**Figure 8. DLN-1 gas fuel system**

plished by commanding a calibrated splitter valve to move to a set position based on the calculated combustion reference temperature (Figure 7). Figure 8 shows aschematic of the gas fuel system for a DLN-equipped turbine.

The only special control sequences required are concerned protection of the turbine during a generator breaker-open trip, or flashback, from the second stage to the first stage during premixed operation. When either the breaker opens at load or flashback is sensed by ultraviolet flame detectors looking into the first stage, the splitter valve is commanded to move to a pre-determined position. In the case of a flashback, the control system can execute an automatic sequence to return to premixed, full-load operation.

## DLN-1 Emissions

The emissions performance of the GE DLN system can be illustrated as a function of load for a given ambient temperature and turbine configuration. Figures 9 and 10 show the NO$_x$ and CO emissions from typical MS7001EA and MS6001B DLN systems designed for 9 ppmvd NO$_x$ and 25 ppm CO when operated on natural gas fuel. Note that in premixed operation, NO$_x$ is generally highest at higher loads and CO only approaches 25 ppm at lower premixed loads.

Figures 11 and 12 show NO$_x$ and CO emissions for the same systems operated on oil fuel with water injection for NO$_x$ control, rather than premixed oil. These figures are for units equipped with inlet bleed heat and extended IGV modulation. NO$_x$ and CO emissions from the DLN combustor at loads less than 20% of base load are similar to those from standard combustion systems. This result is expected because both systems are operating as diffusion flame combustors in this range. Between 20% and 50% load, the DLN system is operated in the lean-lean mode, and the flow split between the primary fuel nozzles and secondary nozzle is varied to give the decreasing NO$_x$ characteristic shown.

From 50% to 100% load, the DLN system operates as a lean premixed combustor. As shown in

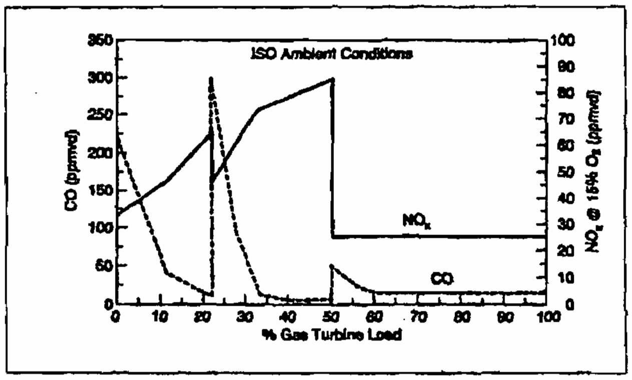


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**Figure 9. MS7001EA/MS9001E DLN-1 combustion system performance on natural gas fuel**

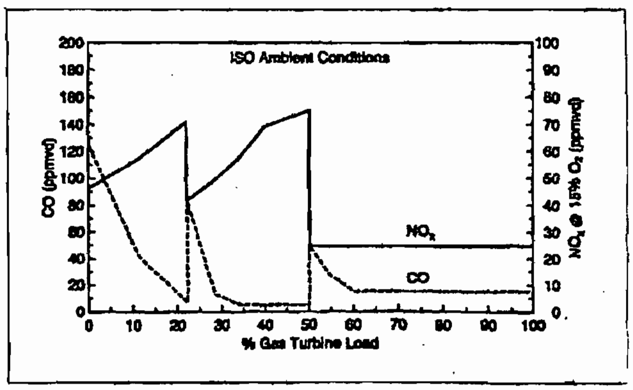


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**Figure 10. MS6001B DLN-1 emissions performance on natural gas fuel**

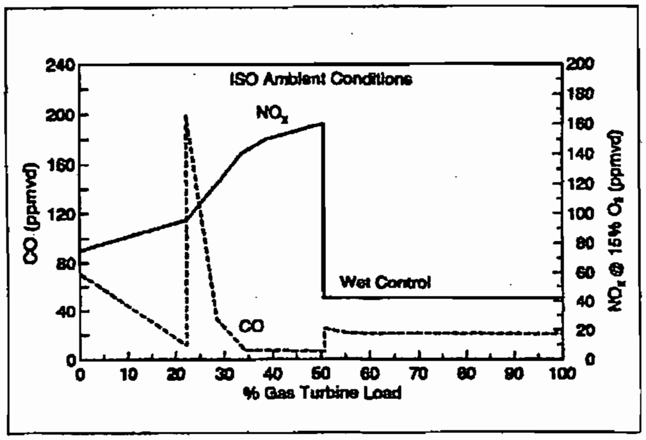


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**Figure 11. MS7001EA/MS9001E DLN-1 combustion system performance on distillate oil**

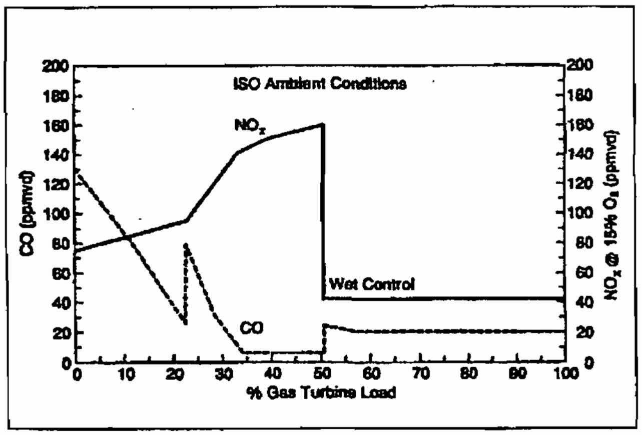


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**Figure 12. MS6001B DLN-1 emissions performance on distillate oil fuel**

Figures 9 through 12, $NO_x$ emissions are significantly reduced, while CO emissions are comparable to those from the standard system.

## DLN-1 Experience

GE's first DLN-1 system was tested at Houston Lighting & Power in 1980 (Reference 7). A prototype DLN system using the combustor design discussed above was tested on an MS9001E at the Electricity Supply Board's (ESB) Northwall Station in Dublin, Ireland, between October 1989 and July 1990. A comprehensive engineering test of the prototype DLN combustor, controls and associated systems was conducted with $NO_x$ levels of 32 ppmvd (at 15% $O_2$) obtained at base load. The results were incorporated into the design of prototype systems for the MS7001E and MS6001B.

The 7E DLN-1 prototype was tested at Anchorage Municipal Light and Power (AMLP) in early 1991 and entered commercial service shortly afterward. Since then, development of advanced combustor configurations have been carried out at AMLP. These results have been incorporated into production hardware.

The MS6001B prototype system was first operated at Jersey Central Power & Light's Forked River Station in early 1991. A series of additional tests culminated in the demonstration of a 9 ppm combustor at Jersey Central in November 1993.

As of August 1996, 28 MS6001B machines are equipped with DLN-1 systems. In total, they have accumulated more than 370,000 hours of operation. There are, in addition, four MS7001E, eight MS7001B-E, 26 MS7001EA, 18 MS9001E, one MS5001P and three MS3002J DLN-1 machines that have collectively operated for more than 350,000 hours. Excellent emission results have been obtained in all cases, with single-digit $NO_x$ and CO achieved on several MS7001EAs. Several MS7001E/EA machines have the capability to power augment with either massive water or steam injection.

Starting in early 1992, eight MS7001F machines equipped with GE DLN systems were placed in service at Korea Electric Power Company's Seoinchon site. These F technology machines have achieved better than 55% (gross) efficiency in combined-cycle operation, and the DLN systems are currently operating between 30 and 40 ppmvd $NO_x$ on gas fuel (the guarantee level is 50 ppmvd). These units have operated for more than 150,000 hours. Four additional F technology DLN-1 systems have been commissioned at Scottish Hydro's Keadby site and at National Power's Little Barford site. These 9F machines have operated more than 20,000 hours at less than 60 ppm $NO_x$.

The combustion laboratory testing and field operation have shown that the DLN-1 system can achieve single digit $NO_x$ and CO levels on E technology machines operating on gas fuel. Current DLN-1 development activity focuses on four goals:

- Application of single-digit technology to the MS6001B, MS7001EA and MS9001E
- Application of DLN-1 technology for retrofitting existing field machines (including MS3002s and MS5000s, some of which will require upgrade before DLN retrofit)
- Completing the development of steam and water power augmentation as needed by the market
- Completing the development of dry oil DLN-1 products.

# DLN-2 SYSTEM

As F-technology gas turbines became available in the late 1980s, studies were conducted to establish what type of DLN combustor would be needed for these new higher firing temperature machines. Studies concluded that that air usage in the combustor (e.g., for cooling) other than for mixing with fuel would have to be strictly limited. A team of engineers from GE Power Generation, GE Corporate Research and Development and GE Aircraft Engine proposed a design that repackaged DLN-1 premixing technology but eliminated the venturi and centerbody assemblies that require cooling air.

The resulting combustor is called DLN-2, which is the standard system for the 6FA, 7FA, 9FA, 9EC, 7G, 7H, 9G and 9H machines. Fourteen combustors are installed in the 7FA and 9EC, 18 in the 9FA, and six in the 6FA. These combustors, for all but the 7FA, are not scaled, but are full-size 9FA combustors; the 7FA is slightly smaller.

## DLN-2 Combustion System

The DLN-2 combustion system shown in Figure 13 is a single-stage dual-mode combustor that can operate on both gaseous and liquid fuel. On gas, the combustor operates in a diffusion mode at low loads (< 50% load), and a premixed mode at high loads (> 50% load). While the combustor can operate in the diffusion mode across the load range, diluent injection would be required for $NO_x$ abatement. Oil operation on this combustor is in the diffusion mode across the entire load range, with diluent injection used for $NO_x$ control.

Each DLN-2 combustor system has a single burning zone formed by the combustor liner and the face of the cap. In low emissions operation, 90% of the gas fuel is injected through radial gas injection spokes in the premixer, and combustion air is mixed with the fuel in tubes surrounding each of the five fuel nozzles. The premixer tubes are part of the cap assembly. The fuel and air are thoroughly mixed, flow out of the five tubes at high velocity and enter the burning zone where lean, low-$NO_x$ combustion occurs. The vortex breakdown from the swirling flow exiting the premixers, along with the sudden expansion in the liner, are mechanisms for flame stabilization. The DLN-2 fuel nozzle/premixer tube arrangement is similar in design and technology to the secondary nozzle/centerbody of a DLN-1. Five nozzle/premixer tube assemblies are located on the head end of the combustor. A quaternary fuel manifold is located on the circumference of the combustion casing to bring the remaining fuel flow to casing injection pegs located radially around the casing.

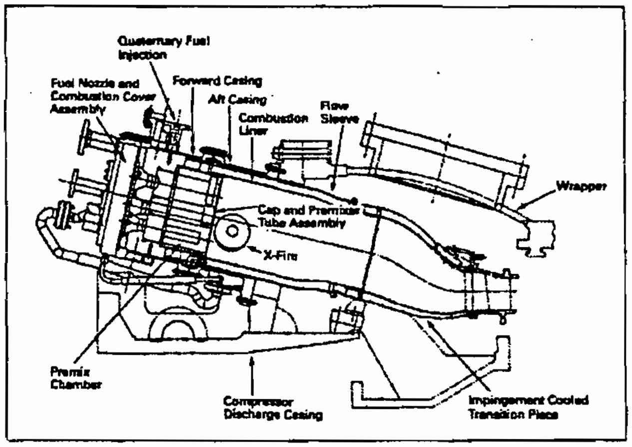


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**Figure 13. DLN-2 combustion system**

Figure 14 shows a cross-section of a DLN-2 fuel nozzle. As noted, the nozzle has passages for diffusion gas, premixed gas, oil and water. When mounted on the end cover, as shown in Figure 15, the diffusion passages of four of the fuel nozzles is fed from a common manifold, called the primary, that is built into the end cover. The premixed passage of the same four nozzles are fed from another internal manifold called the secondary. The premixed passages of the remaining nozzle are supplied by the tertiary fuel system; the diffusion passage of that nozzle is always purged with compressor discharge air and passes no fuel.

Figure 15 shows the fuel nozzles installed on the combustion chamber end cover and the

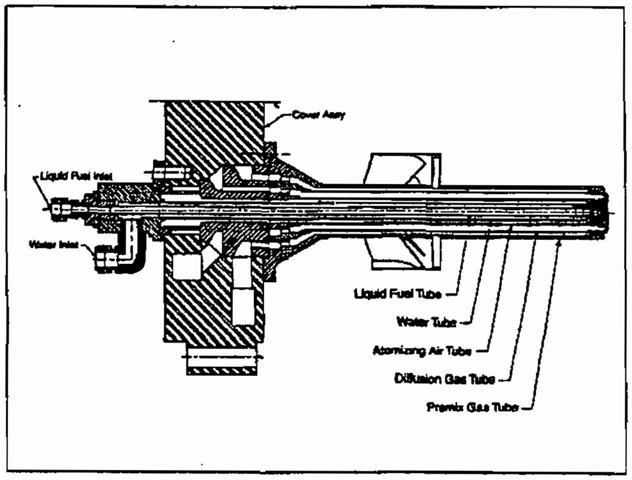


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**Figure 14. Cross-section of a DLN-2 fuel nozzle**

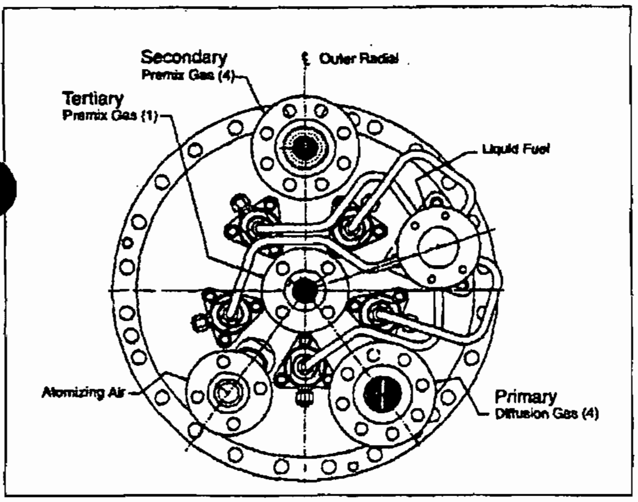


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**Figure 15. External view of DLN-2 fuel nozzles mounted**

connections for the primary, secondary and tertiary fuel systems. DLN-2 fuel streams are:

- Primary fuel — fuel gas entering through the diffusion gas holes in the swirler assembly of each of the outboard four fuel nozzles
- Secondary fuel — premix fuel gas entering through the gas metering holes in the fuel gas injector spokes of each of the outboard four fuel nozzles
- Tertiary fuel — premix fuel gas delivered by the metering holes in the fuel gas injector spokes of the inboard fuel nozzle
- The quaternary system — injects a small amount of fuel into the airstream just upstream from the fuel nozzle swirlers

The DLN-2 combustion system can operate in several different modes.

**Primary**

Fuel only to the primary side of the four fuel nozzles; diffusion flame. Primary mode is used from ignition to 81% corrected speed.

**Lean-Lean**

Fuel to the primary (diffusion) fuel nozzles and single tertiary (premixing) fuel nozzle. This mode is used from 81% corrected speed to a preselected combustion reference temperature. The percentage of primary fuel flow is modulated throughout the range of operation as a function of combustion reference temperature. If necessary, lean-lean mode can be operated throughout the entire load range of the turbine. Selecting "lean-lean base on" locks out premix operation and enables the machine to be taken to base load in lean-lean.

**Premix Transfer**

Transition state between lean-lean and premix modes. Throughout this mode, the primary and secondary gas control valves modulate to their final position for the next mode. The premix splitter valve is also modulated to hold a constant tertiary flow split.

**Piloted Premix**

Fuel is directed to the primary, secondary and tertiary fuel nozzles. This mode exists while operating with temperature control off as an intermediate mode between lean-lean and premix mode. This mode also exists as a default mode out of premix mode and, in the event that premix operating is not desired, piloted premix can be selected and operated to base load. Primary, secondary and tertiary fuel split are constant during this mode of operation.

**Premix**

Fuel is directed to the secondary, tertiary and quaternary fuel passages and premixed flame exists in the combustor. The minimum load for premixed operation is set by the combustion reference temperature and IGV position. It typically ranges from 50% with inlet bleed heat on to 65% with inlet bleed heat off. Mode transition from premix to piloted premix or piloted premix to premix, can occur whenever the combustion reference temperature is greater than 2200 F/1204 C. Optimum emissions are generated in premix mode.

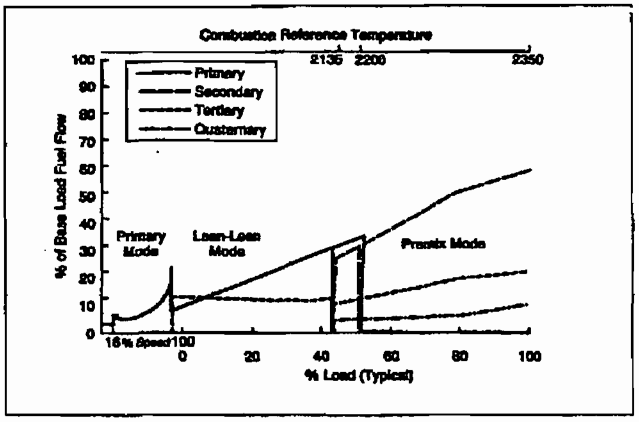
**Tertiary Full Speed No Load (FSNL)**

Initiated upon a breaker open event from any load greater than 12.5%. Fuel is directed to the tertiary nozzle only and the unit operates in secondary FSNL mode for a minimum of 20 seconds, then transfers to lean-lean mode.

Figure 16 illustrates the fuel flow scheduling associated with DLN-2 operation. Fuel staging depends on combustion reference temperature and IGV temperature control operation mode.

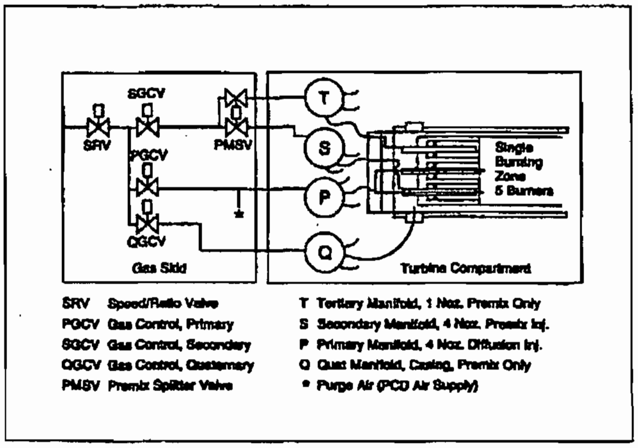
## DLN-2 Controls and Accessories

The DLN-2 control system regulates the fuel distribution to the primary, secondary, tertiary and quaternary fuel system. The fuel flow distribution to each combustion fuel system is a function of combustion reference temperature and IGV temperature control mode. Diffusion, piloted premix and premix flame are established by changing the distribution of fuel flow in the combustor. The gas fuel system (Figure 17) consists of the gas fuel stop/ratio valve, primary gas




GT24671

**Figure 16. Fuel flow scheduling associated with DLN-2 operation**




GT24553

**Figure 17. DLN-2 gas fuel system**

control valve, secondary gas control valve premix splitter valve and quaternary gas control valve. The stop/ratio valve is designed to maintain a predetermined pressure at the control valve inlet.

The primary, secondary and quaternary gas control valves regulate the desired gas fuel flow delivered to the turbine in response to the fuel command from the SPEEDTRONIC™ controls.

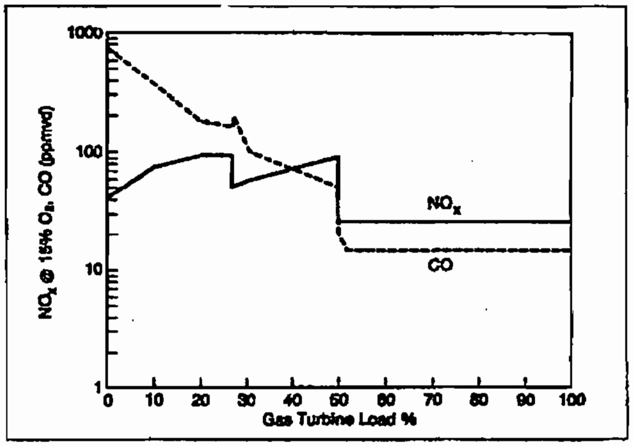
The premix splitter valve controls the fuel flow split between the secondary and tertiary fuel system.

## DLN-2 Emissions Performance

Figures 18 and 19 show the emissions performance for a DLN-2 equipped 7FA/9FA for gas fuel and for oil fuel with water injection.

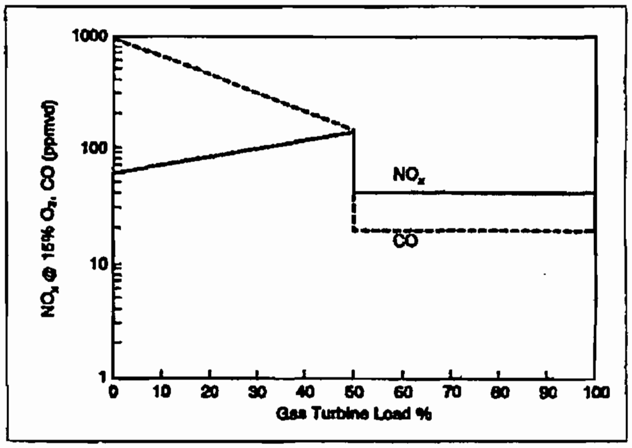
## DLN-2 Experience

The first DLN-2 systems were placed in service at Florida Power and Light's Martin Station with commissioning beginning in September 1993, and the first two (of four) 7FA units entering commercial service in February 1994. During commissioning, quaternary fuel was added and other combustor modifications were made to control dynamic pressure oscillations in the combustor.




GT24554

**Figure 18. Emissions performance for DLN-2-equipped 7FA/9FA for gas fuel**




GT24555

**Figure 19. Emissions performance for DLN-2-equipped 7FA/9FA for oil fuel with water injection**

As of August 1996, 23 DLN-2 7FA and 17 9FA units are in commercial service. They have accumulated more than 150,000 hours of operation. Of these units, 11 are dual-fuel units, and the remainder are gas-only.

# CONCLUSION

GE's Dry Low $NO_x$ Program continues to focus on the development of systems capable of the extremely low $NO_x$ levels required to meet today's regulations and to prepare for more stringent requirements in the future. New unit production needs and the requirements of existing machines, are being addressed. GE DLN systems are operating on more than 145 machines and have accumulated more than one million service hours. More than 200 DLN systems have been either put into service, shipped or placed on order. GE is the only manufacturer with F technology machines operating below 25 ppmvd.

# APPENDIX

## Gas Turbine Combustion Systems

A gas turbine combustor mixes large quantities of fuel and air and burns the resulting mixture. In concept the combustor is comprised of a fuel injector and a wall to contain the flame. There are three fundamental factors and practical concerns that complicate the design of the combustor: equivalence ratio, flame stability, and ability to operate from ignition through full load.

**Equivalence ratio**

A flame burns best when there is just enough fuel to react with the available oxygen. With this stoichiometric mixture (equivalence ratio of 1.0) the flame temperature is the highest and the chemical reactions are the fastest, compared to cases where there is either more oxygen ("fuel lean," < 1.0) or less oxygen ("fuel rich," > 1.0) for the amount of fuel present.

In a gas turbine, the maximum temperature of the hot gases exiting the combustor is limited by the tolerance of the turbine nozzles and buckets. This temperature corresponds to an equivalence ratio of 0.4 to 0.5 (40 to 50% of the stoichiometric fuel flow). In the combustors used on modern gas turbines, this fuel-air mixture would be too lean for stable and efficient burning. Therefore, only a portion of the compressor discharge air is introduced directly into the combustor reaction zone (flame zone) to be mixed with the fuel and burned. The balance of the airflow either quenches the flame prior to the combustor discharge entering the turbine or to cool the wall of the combustor.

**Flame stability**

Even with only part of the air being introduced into the reaction zone, flow velocities in the zone are higher than the turbulent flame speed at which a flame propagates through the fuel-air mixture. Special mechanical or aerodynamic devices must be used to stabilize the flame by providing a low velocity region. Modern combustors employ a combination of swirlers and jets to achieve a good mix and to stabilize the flame.

**Operational Stability**

The combustor must be able to ignite and to support acceleration and operation of the gas turbine over the entire load range of the machine. For a single-shaft generator-drive machine, speed is constant under load and, therefore, so is the airflow for a fixed ambient temperature. There will be a five- or six-to-one turndown in fuel flow over the load range, and a combustor whose reaction zone equivalence ratio is optimized for full load operation will be very lean at the lower loads. Nevertheless, the flame must be stable and the combustion process must be efficient at all loads.

GE uses multiple-combustion chamber assemblies in its heavy-duty gas turbines to achieve reliable and efficient turbine operation. As shown in Figure A-1, each combustion chamber assembly comprises a cylindrical combustor, a fuel injection system and a transition piece that guides the flow of the hot gas from the combustor to the inlet of the turbine. Figure A-2 illustrates the multiple-combustor concept.

There are several reasons for using the multiple-chamber arrangement instead of large silo-type combustors:

- The configuration permits the entire turbine to be factory assembled, tested and shipped without interim disassembly
- The turbine inlet temperature can be better controlled, thus providing for longer turbine life with reduced turbine cooling air requirements
- Smaller parts can be handled more easily during routine maintenance
- Smaller transition pieces are less susceptible to damage from dynamic forces generated in the combustor; furthermore, the shorter combustion system length ensures that acoustic natural frequencies are higher and less likely to couple with the pressure oscillations in the flame
- Smaller combustors generate less $NO_X$ because of much better mixing and shorter residence time
- As turbine inlet temperatures have increased to improve efficiency, the size of the combustors has decreased to minimize cooling

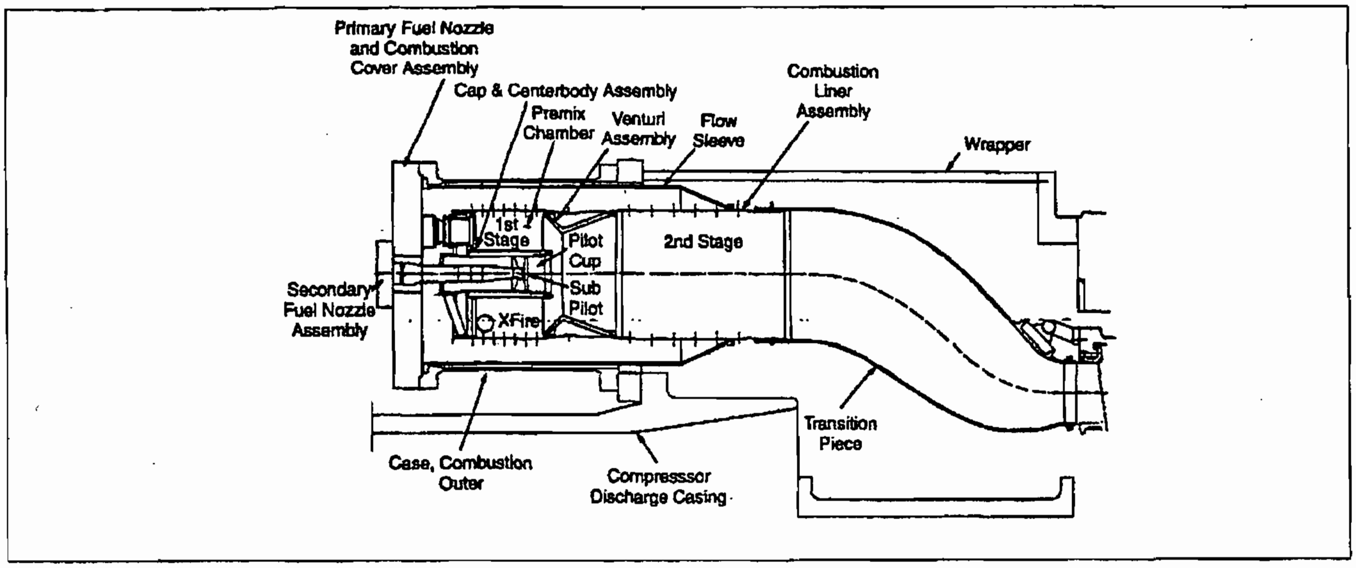



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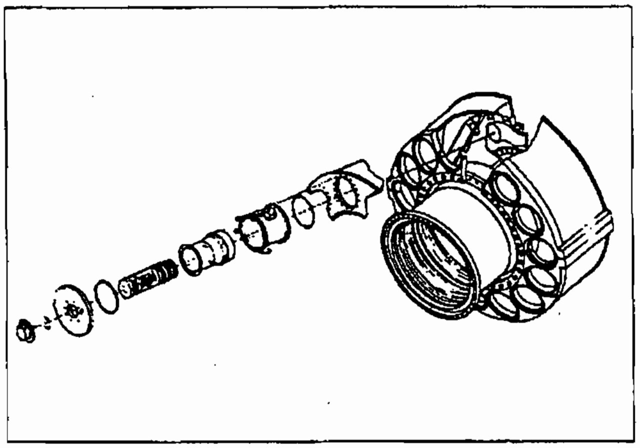
**Figure A1. MS7001EA Dry Low $NO_x$ combustion chamber**



GT18556

**Figure A2. Exploded view of combustion chamber**

requirements, as in aircraft gas turbine combustors

- Small can-type combustors can be completely developed in the laboratory through a combination of both atmospheric and full-pressure, full-flow tests. Therefore, there is a higher degree of confidence that a combustor will perform as designed across all load ranges before it is installed and tested in a machine.

## Gas Turbine Emissions

The significant products of combustion in gas turbine emissions are:

- Oxides of nitrogen (NO and $NO_2$, collectively called $NO_x$)
- Carbon monoxide (CO)
- Unburned hydrocarbons or UHCs (usually expressed as equivalent methane ($CH_4$) particles and arise from incomplete combustion)
- Oxides of sulfur ($SO_2$ and $SO_3$) particulates.

Unburned hydrocarbons include both volatile organic compounds (VOCs), which contribute to the formation of atmospheric ozone, and compounds, such as methane, that do not.

There are two sources of $NO_x$ emissions in the exhaust of a gas turbine. Most of the $NO_x$ is generated by the fixation of atmospheric nitrogen in the flame, which is called thermal $NO_x$. Nitrogen oxides are also generated by the conversion of a fraction of any nitrogen chemically bound in the fuel (called fuel-bound nitrogen or FBN). Lower-quality distillates and low-Btu coal gases from gasifiers with hot gas cleanup carry various amounts of fuel-bound nitrogen that must be taken into account when emissions calculations are made. The methods described below to control thermal $NO_x$ emissions are ineffective in controlling the conversion of FBN to $NO_x$.

Thermal $NO_x$ is generated by a chemical reaction sequence called the Zeldovich Mechanism (Reference 6). This set of well-verified chemical reactions postulates that the rate of generation of thermal $NO_x$ is an exponential function of the temperature of the flame. The amount of $NO_x$ generated is a function of the flame temperature and of the time the hot gas mixture is at flame temperature. This turns out to be a linear function of time. Thus, temperature and residence time determine thermal $NO_x$ emissions levels and are the principal variables that a gas turbine designer can adjust to control emission levels.

For a given fuel, since the flame temperature is a unique function of the equivalence ratio, the rate of $NO_x$ generation can be cast as a function of the equivalence ratio. Figure A-3, shows that the highest rate of $NO_x$ production occurs at an equivalence ratio of 1.0, when the temperature is equal to the stoichiometric, adiabatic flame temperature.

To the left of the maximum temperature point (Figure A-3), more oxygen is available (the equivalence ratio is less than 1.0) and the resulting flame temperature is lower. This is a fuel-lean operation. Since the rate of $NO_x$ formation is a function of temperature and time, it follows that some difference in $NO_x$ emissions can be expected when different fuels are burned in a given combustion system. Since distillate oil and natural gas have approximately a 100 F/38 C flame temperature difference, a significant difference in $NO_x$ emissions can be expected if reaction zone equivalence ratio, water injection rate, etc. are equal.

As shown in Figure A-3, the rate of $NO_x$ production dramatically decreases as flame temperature decreases (i.e., the flame becomes fuel lean). This is because of the exponential effect of temperature in the Zeldovich Mechanism and is the reason why diluent injection (usually water or steam) into a gas turbine combustor flame zone reduces $NO_x$ emissions. For the same reason, very lean dry combustors can be used to control emissions. This is desirable for reaching the lower $NO_x$ levels now required in many applications.

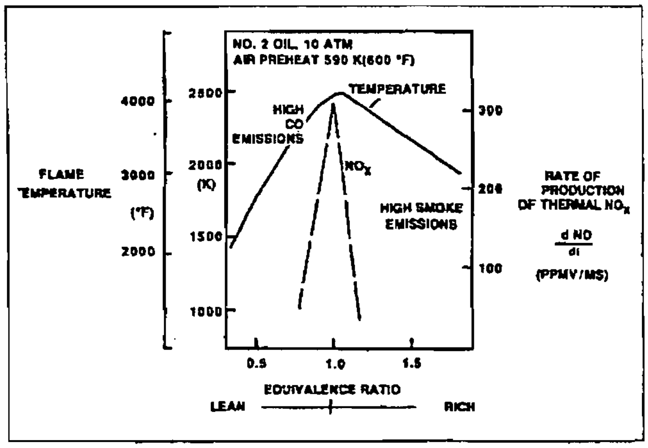



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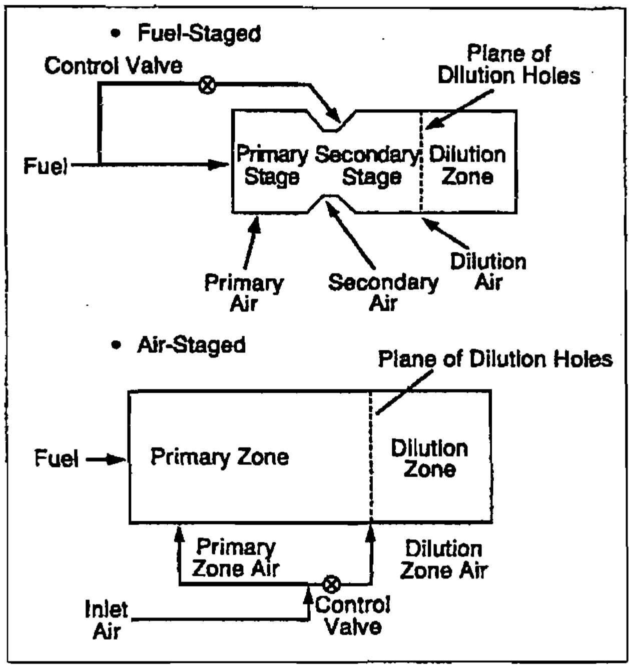
**Figure A3. Rate of thermal $NO_x$ production**




GT17206-1A

**Figure A4. Staged combustors**

There are two design challenges associated with very lean combustors. First, care must be taken to ensure that the flame is stable at the design operating point. Secondly, a turndown capability is necessary since a gas turbine must ignite, accelerate, and operate over the load range. At lower loads, as fuel flow to the combustors decreases, the flame will be very lean and will not burn well, or it can become unstable and blow out.

In response to these challenges, combustion system designers use staged combustors so a portion of the flame zone air can mix with the fuel at lower loads or during startup. The two types of staged combustors are fuel-staged and air-staged (Figure A-4). In its simplest and most common configuration, a fuel-staged combustor has two flame zones; each receives a constant fraction of the combustor airflow. Fuel flow is divided between the two zones so that at each machine operating condition, the amount of fuel fed to a stage matches the amount of air available.

An air-staged combustor uses a mechanism for diverting a fraction of the airflow from the flame zone to the dilution zone at low load to increase turndown. These methods can be combined.

## Emissions Control Methods

There are three principal methods for controlling gas turbine emissions:

- Injection of a diluent such as water or steam into the burning zone of a conventional (diffusion flame) combustor
- Catalytic clean-up of $NO_x$ and CO from the gas turbine exhaust (usually used in conjunction with the other two methods)
- Design of the combustor to limit the formation of pollutants in the burning zone by utilizing "lean-premixed" combustion technology.

The last method includes both DLN combustors and catalytic combustors. GE has considerable experience with each of these three methods.

Since September 1979, when regulations required that $NO_x$ emissions be limited to 75 ppmvd (parts per million by volume, dry), more than 300 GE heavy-duty gas turbines have accumulated more than 2.5 million operating hours using either steam or water-injection to meet or exceed these required $NO_x$ emissions levels. The amount of water required to accomplish this is approximately one-half of the fuel flow. However, there is a 1.8% heat-rate penalty associated with using water to control $NO_x$ emissions for oil-fired simple-cycle gas turbines. Output, increases by approximately 3%, making water (or steam) injection for power augmentation economically attractive in some circumstances (such as peaking applications).

Single-nozzle combustors that use water or steam injection are limited in their ability to reduce $NO_x$ levels below 42 ppmvd on gas fuel and 65 ppmvd on oil fuel. GE developed multi-nozzle quiet combustors (MNQC) for the MS7001EA and MS7001FA capable of achieving 25 ppmvd on gas fuel and 42 ppmvd on oil, using either water or steam injection. Since October 1987, more than 26 MNQC-equipped MS7001s that use water or steam injection have been placed in service. One unit that uses steam injection has operated nearly 50,000 hours at 25 ppmvd $NO_x$ (at 15% $O_2$).

Frequent combustion inspections and decreased hardware life are undesirable side effects that can result from the use of diluent injection to reduce $NO_x$ emissions from combustion turbines. For applications that require $NO_x$ emissions below 42 ppmvd (or 25 ppmvd in the case of the MS7001EA or MS7001FA MNQC), or to avoid the significant cycle efficiency penalties incurred when water or steam injection is used for $NO_x$ control, one of the other two principal methods of $NO_x$ control mentioned above must be used.

Selective catalytic reduction (SCR) converts NO and $NO_2$ in the gas turbine exhaust stream to molecular nitrogen and oxygen by reacting the $NO_x$ with ammonia in the presence of a catalyst. Conventional SCR technology requires that the temperature of the exhaust stream remain in a narrow range (550 F to 750 F or 288 C to 399 C) and is restricted to applications with a heat recovery system installed in the exhaust. The SCR is installed at a location in the boiler where the exhaust gas temperature has decreased to the above temperature range. New high-temperature SCR technology is being developed that may allow SCRs to be used for applications without heat recovery boilers.

For an MS7001EA gas turbine, an SCR designed to remove 90% of the $NO_x$ from the gas turbine exhaust stream has a volume of approximately 175 cubic meters and weighs 111 tons. It is comprised of segments stacked in the exhaust duct. Each segment has a honeycomb pattern with passages that are aligned in the direction of the exhaust gas flow. A catalyst, such as vanadium pentoxide, is deposited on the surface of the honeycomb.

SCR systems are sensitive to fuels containing more than 1,000 ppm of sulfur (light distillate oils may have up to 0.8% sulfur). There are two reasons for this sensitivity: first, sulfur poisons the catalyst being used in SCRs.

Secondly, the ammonia will react with sulfur in the presence of the catalyst to form ammonium bisulfate, which is extremely corrosive, particularly near the discharge of a heat recovery boiler. Special catalyst materials that are less sensitive to sulfur have been identified, and there are some theories as to how to inhibit the formation of ammonium bisulfate. This, however, remains an open issue with SCRs.

More than 100 GE units have accumulated more than 100,000 operating hours with SCRs installed. Twenty of the units are in Japan; others are located in California, New Jersey, New York and several other eastern U.S. states. Units operating with SCRs include MS9000s, MS7000s, MS6000s, LM2500s and LM5000s.

Lean premixed combustion is the basis for achieving low emissions from Dry Low $NO_x$ and catalytic combustors. GE has participated in the development of catalytic combustors for many years. These systems use a catalytic reactor bed mounted within the combustor to burn a very lean fuel-air mixture. They have the potential to achieve extremely low emissions levels without resorting to exhaust gas cleanup. Technical challenges in the combustor and in the catalyst and reactor bed materials must be overcome in order to develop an operational catalytic combustor. GE has development programs in place with both ceramic and catalyst manufacturers to address these challenges. GE does not believe commercial systems employing this technology will be available in the near term.

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2. Davis, L. B. and Washam, R. M., "Development of a Dry Low $NO_x$ Combustor," ASME Paper No. 89-GT-255, June 1989.
3. Dibelius, N.R., Hilt, M.B., and Johnson, R.H., "Reduction of Nitrogen Oxides from Gas Turbines by Steam Injection," ASME Paper No. 71-GT-58, Dec. 1970.
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6. Zeldovich, J., "The Oxidation of Nitrogen in Combustion and Explosions," Acta Physicochimica USSR, Vol. 21, No. 4, 1946, pp 577-628.
7. Washam, R. M., "Dry Low $NO_x$ Combustion System for Utility Gas Turbine," ASME Paper 83-JPGC-GT-13, Sept. 1983.
8. Davis, L. B., and Washam, R. M., "Development of a Dry Low $NO_x$ Combustor," ASME Paper No. 89-GT-255, June 1989.

summary

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|---|---|---|---|---|---|---|---|---|
| | IPS 50120 | | *City of Tallahassee/Raytheon* | | | | | |
| | | | *Emissions Summary-GE MS7001FA w/DLN Combustion* | | | | | |
| | Fuel: Natural Gas (Methane) 21515 Btu/lb LHV | | | | | | | |
| **Ambient Conditions** | | | | **20 F, 60%rh** | | | | |
| **Evap Cooler** | | | **Off** | **Off** | **Off** | | | |
| **GT Load** | | | **Base** | **75%** | **50%** | | | |
| **NOx, ppmvd @ 15%O2** | | | 9 | 9 | 9 | | | |
| **NOx, lb/h as NO2** | | | 62 | 50 | 39 | | | |
| **CO, ppmvd** | | | 9 | 10 | 25 | | | |
| **CO, lb/h** | | | 31 | 28 | 56 | | | |
| **UHC, ppmvw** | | | 7 | 7 | 10 | | | |
| **UHC, lb/h** | | | 15 | 12 | 14 | | | |
| **VOC, ppmvw** | | | 1.4 | 1.4 | 2 | | | |
| **VOC, lb/h** | | | 3 | 2.4 | 2.8 | | | |
| **Particulates, lb/h** | | | 9 | 9 | 9 | | | |
| **Heat Cons., 10^6 Btu/h LHV** | | | 1682.2 | 1360.7 | 1083.5 | | | |
| **Stack Temp, F** | | | 190 | 181 | 171 | | | |
| **Exhaust Flow, lb/s** | | | 1052 | 841 | 690 | | | |
| **Exhaust Temp (°F)** | | | 1066 | 1108 | 1151 | | | |
| **Exhaust Analysis % Vol** | | | | | | | | |
| **Oxygen** | | | 12.62% | 12.64% | 12.93% | | | |
| **Water** | | | 7.72% | 7.69% | 7.43% | | | |
| **Carbon Dioxide** | | | 3.78% | 3.77% | 3.64% | | | |
| **Nitrogen** | | | 74.99% | 75.00% | 75.10% | | | |
| **Argon** | | | 0.89% | 0.90% | 0.90% | | | |
| | | | | | | | | |
| **Ambient Conditions** | | | | **59 F, 60%rh** | | | | |
| **Evap Cooler** | | | **Off** | **Off** | **Off** | | | |
| **GT Load** | | | **Base** | **75%** | **50%** | | | |
| **NOx, ppmvd @ 15%O2** | | | 9 | 9 | 9 | | | |
| **NOx, lb/h as NO2** | | | 58 | 47 | 37 | | | |
| **CO, ppmvd** | | | 9 | 10 | 25 | | | |
| **CO, lb/h** | | | 29 | 26 | 53 | | | |
| **UHC, ppmvw** | | | 7 | 7 | 10 | | | |
| **UHC, lb/h** | | | 14 | 11 | 13 | | | |
| **VOC, ppmvw** | | | 1.4 | 1.4 | 2 | | | |
| **VOC, lb/h** | | | 2.8 | 2.2 | 2.6 | | | |
| **Particulates, lb/h** | | | 9 | 9 | 9 | | | |
| **Heat Cons., 10^6 Btu/h LHV** | | | 1563.2 | 1274.4 | 1020.4 | | | |
| **Stack Temp, F** | | | 193 | 185 | 176 | | | |
| **Exhaust Flow, lb/s** | | | 981 | 803 | 664 | | | |
| **Exhaust Temp (°F)** | | | 1111 | 1135 | 1175 | | | |
| **Exhaust Analysis % Vol** | | | | | | | | |
| **Oxygen** | | | 12.51% | 12.60% | 12.91% | | | |
| **Water** | | | 8.44% | 8.35% | 8.08% | | | |
| **Carbon Dioxide** | | | 3.76% | 3.71% | 3.58% | | | |
| **Nitrogen** | | | 74.41% | 74.44% | 74.54% | | | |
| **Argon** | | | 0.88% | 0.90% | 0.89% | | | |
| CM Jones | | 12/18/1996 Rev.1 | | tall.xls | | | | |

summary

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|---|---|---|---|---|---|---|---|---|
| | IPS 50120 | | *City of Tallahassee/Raytheon* | | | | | |
| | | | *Emissions Summary-GE MS7001FA w/DLN Combustion* | | | | | |
| | Fuel: Natural Gas (Methane) 21515 Btu/lb LHV | | | | | | | |
| Ambient Conditions | | | | 95 F, 60%rh | | | | |
| Evap Cooler | | | On | Off | Off | Off | | |
| GT Load | | | Base | 75% | ~55% | Base | | |
| NOx, ppmvd @ 15%O2 | | | 9 | 9 | 9 | 9 | | |
| NOx, lb/h as NO2 | | | 54 | 44 | 35 | 52 | | |
| CO, ppmvd | | | 9 | 10 | 25 | 9 | | |
| CO, lb/h | | | 26 | 24 | 50 | 26 | | |
| UHC, ppmvw | | | 7 | 7 | 10 | 7 | | |
| UHC, lb/h | | | 13 | 11 | 13 | 13 | | |
| VOC, ppmvw | | | 1.4 | 1.4 | 2 | 1.4 | | |
| VOC, lb/h | | | 2.6 | 2.2 | 2.8 | 2.5 | | |
| Particulates, lb/h | | | 9 | 9 | 9 | 9 | | |
| Heat Cons., 10^6 Btu/h LHV | | | 1467.7 | 1202.1 | 965 | 1427.51 | | |
| Stack Temp, F | | | 198 | 190 | 183 | 197 | | |
| Exhaust Flow, lb/s | | | 921 | 751 | 622 | 901 | | |
| Exhaust Temp (°F) | | | 1134.3 | 1164 | 1200 | 1143 | | |
| Exhaust Analysis % Vol | | | | | | | | |
| Oxygen | | | 12.05% | 12.29% | 12.60% | 12.24% | | |
| Water | | | 10.96% | 10.46% | 10.21% | 10.51% | | |
| Carbon Dioxide | | | 3.72% | 3.64% | 3.50% | 3.66% | | |
| Nitrogen | | | 72.41% | 72.74% | 72.82% | 72.72% | | |
| Argon | | | 0.86% | 0.87% | 0.87% | 0.87% | | |
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| CM Jones | | 12/18/1996 Rev.1 | | tall.xls | | | | |
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|---|---|---|---|---|---|---|---|---|
| | IPS 50120 | | *City of Tallahassee/Raytheon* | | | | | |
| | | | *Emissions Summary-GE MS7001FA w/DLN Combustion* | | | | | |
| | Fuel: Distillate 18550 Btu/lb LHV | | | | | | | |
| | | | | | | | | |
| **Ambient Conditions** | | | | **20 F, 60%rh** | | | | |
| **Evap Cooler** | | | **Off** | **Off** | **Off** | | | |
| **GT Load** | | | **Base** | **75%** | **50%** | | | |
| **NOx, ppmvd @ 15%O2** | | | 42 | 42 | 42 | | | |
| **NOx, lb/h as NO2** | | | 347 | 281 | 217 | | | |
| **CO, ppmvd** | | | 30 | 40 | 90 | | | |
| **CO, lb/h** | | | 104 | 101 | 192 | | | |
| **UHC, ppmvw** | | | 7 | 10 | 25 | | | |
| **UHC, lb/h** | | | 16 | 17 | 34 | | | |
| **VOC, ppmvw** | | | 3.5 | 5 | 12.5 | | | |
| **VOC, lb/h** | | | 8 | 8.5 | 17 | | | |
| **SO2 ppmvw** | | * | 12 | 12 | 12 | | | |
| **SO2, lb/h** | | * | 98 | 80 | 62 | | | |
| **SO3 ppmvw** | | * | 1 | 1 | 1 | | | |
| **SO3, lb/h** | | * | 6 | 6 | 5.5 | | | |
| **Sulfur Mist lb/h** | | * | 10 | 8 | 7 | | | |
| **Particulates, lb/h** | | | 17 | 17 | 17 | (not including sulfur salts) | | |
| **Heat Cons., 10^6 Btu/h LHV** | | | 1914.1 | 1567 | 1219.9 | | | |
| **Stack Temp, F** | | | 198 | 186 | 176 | | | |
| **Exhaust Flow, lb/s** | | | 1097 | 848 | 674 | | | |
| **Exhaust Temp (°F)** | | | 1040 | 1107 | 1152 | | | |
| **Exhaust Analysis % Vol** | | | | | | | | |
| **Oxygen** | | | 10.90% | 9.91% | 10.81% | | | |
| **Water** | | | 11.66% | 12.93% | 11.47% | | | |
| **Carbon Dioxide** | | | 5.35% | 5.86% | 5.44% | | | |
| **Nitrogen** | | | 71.24% | 70.46% | 71.43% | | | |
| **Argon** | | | 0.85% | 0.84% | 0.85% | | | |
| CM Jones | | 12/18/1996 Rev.1 | | tall.xls | | | | |

summary

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|---|---|---|---|---|---|---|---|---|
| | IPS 50120 | | *City of Tallahassee/Raytheon* | | | | | |
| | | | ***Emissions Summary-GE MS7001FA w/DLN Combustion*** | | | | | |
| | Fuel: Distillate 18550 Btu/lb LHV | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Ambient Conditions** | | | | **59 F, 60%rh** | | | | |
| **Evap Cooler** | | | **Off** | **Off** | **Off** | | | |
| **GT Load** | | | **Base** | **75%** | **50%** | | | |
| **NOx, ppmvd @ 15%O2** | | | 42 | 42 | 42 | | | |
| **NOx, lb/h as NO2** | | | 322 | 263 | 204 | | | |
| **CO, ppmvd** | | | 30 | 40 | 90 | | | |
| **CO, lb/h** | | | 96 | 97 | 189 | | | |
| **UHC, ppmvw** | | | 7 | 10 | 25 | | | |
| **UHC, lb/h** | | | 15 | 16 | 32 | | | |
| **VOC, ppmvw** | | | 3.5 | 5 | 12.5 | | | |
| **VOC, lb/h** | | | 7.5 | 8 | 16 | | | |
| **SO2 ppmvw** | | * | 12 | 12 | 12 | | | |
| **SO2, lb/h** | | * | 92 | 75 | 60 | | | |
| **SO3 ppmvw** | | * | 1 | 1 | 1 | | | |
| **SO3, lb/h** | | * | 6 | 5 | 4 | | | |
| **Sulfur Mist lb/h** | | * | 10 | 8 | 6 | | | |
| **Particulates, lb/h** | | | 17 | 17 | 17 | (not including sulfur salts) | | |
| **Heat Cons., 10^6 Btu/h LHV** | | | 1779.5 | 1465.5 | 1148.9 | | | |
| **Stack Temp, F** | | | 201 | 190 | 181 | | | |
| **Exhaust Flow, lb/s** | | | 1022 | 816 | 674 | | | |
| **Exhaust Temp (°F)** | | | 1086 | 1132 | 1174 | | | |
| **Exhaust Analysis % Vol** | | | | | | | | |
| **Oxygen** | | | 10.89% | 10.86% | 11.41% | | | |
| **Water** | | | 11.98% | 11.44% | 11.00% | | | |
| **Carbon Dioxide** | | | 5.31% | 5.41% | 5.09% | | | |
| **Nitrogen** | | | 70.96% | 71.43% | 71.64% | | | |
| **Argon** | | | 0.85% | 0.86% | 0.86% | | | |
| CM Jones | | 12/18/1996 Rev.1 | | tall.xls | | | | |

$$92 \frac{Lb}{hr} \times \underbrace{\frac{8760\ hr}{YR} \cdot \frac{Ton}{2000\ Lb}}_{4.38} = 403\ TPY$$

summary

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | IPS 50120 | | *City of Tallahassee/Raytheon* | | | | | |
| | | | *Emissions Summary-GE MS7001FA w/DLN Combustion* | | | | | |
| | Fuel: Distillate 18550 Btu/lb LHV | | | | | | | |
| | | | | | | | | |
| **Ambient Conditions** | | | | **95 F, 60%rh** | | | | |
| **Evap Cooler** | | | **Off** | **Off** | **Off** | **On** | | |
| **GT Load** | | | **Base** | **75%** | **50%** | **Base** | | |
| **NOx, ppmvd @ 15%O2** | | | 42 | 42 | 42 | 42 | | |
| **NOx, lb/h as NO2** | | | 288 | 235 | 182 | 297 | | |
| **CO, ppmvd** | | | 30 | 40 | 90 | 30 | | |
| **CO, lb/h** | | | 87 | 94 | 177 | 89 | | |
| **UHC, ppmvw** | | | 7 | 10 | 25 | 7 | | |
| **UHC, lb/h** | | | 13 | 15 | 32 | 14 | | |
| **VOC, ppmvw** | | | 3.5 | 5 | 12.5 | 3.5 | | |
| **VOC, lb/h** | | | 6.5 | 7.5 | 16 | 6.6 | | |
| **SO2 ppmvw** | | * | 12 | 12 | 12 | 12 | | |
| **SO2, lb/h** | | * | 82 | 67 | 53 | 85 | | |
| **SO3 ppmvw** | | * | 1 | 1 | 1 | 1 | | |
| **SO3, lb/h** | | * | 5 | 5 | 3 | 6 | | |
| **Sulfur Mist lb/h** | | * | 9 | 7 | 6 | 9 | | |
| **Particulates, lb/h** | | | 17 | 17 | 17 | 17 | (not including sulfur s | |
| **Heat Cons., 10^6 Btu/h LHV** | | | 1594.5 | 1313.3 | 1027.3 | 1659.5 | | |
| **Stack Temp, F** | | | 203 | 196 | 188 | 205 | | |
| **Exhaust Flow, lb/s** | | | 933 | 765 | 635 | 954 | | |
| **Exhaust Temp (°F)** | | | 1131 | 1161 | 1200 | 1122 | | |
| **Exhaust Analysis % Vol** | | | | | | | | |
| **Oxygen** | | | 10.78% | 10.61% | 11.42% | 10.69% | | |
| **Water** | | | 13.18% | 13.22% | 12.08% | 13.42% | | |
| **Carbon Dioxide** | | | 5.22% | 5.33% | 4.93% | 5.24% | | |
| **Nitrogen** | | | 69.99% | 70.00% | 70.72% | 69.81% | | |
| **Argon** | | | 0.84% | 0.84% | 0.85% | 0.84% | | |
| | | | | | | | | |
| * Based on 0.05% (wt.) sulfur in fuel oil | | | | | | | | |
| | | | | | | | | |
| CM Jones | | 12/18/1996 Rev.1 | | tall.xls | | | | |

## VOLUME DIRECTORY (Cont'd)

## VOLUME 2



## VOLUME 3

## VOLUME DIRECTORY (Cont'd)

## VOLUME 4

# APPENDIX B

# CALCULATIONS OF CURRENT ACTUAL EMISSIONS

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

| | | |
|---|---|---|
| **By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008 |
| **Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS |
| **Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** GT 1 |

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the short term and annual emission rates associated with Gas Turbine No. 1 based on material balances and AP-42 emission factors for the known hours of operation, natutral gas, and fuel oil usage.

**References:**

| | |
|---|---|
| No. 1 | COT Generation Logs |
| No. 2 | Calculation: Trace Metal Emissions |
| No. 3 | FGT Sulfur Content Data |
| No. 4 | AP-42, Section 3.1, Table 3.1-1, 5th Edition |

**Knowns/Assumptions:**

| | | |
|---|---|---|
| Fuel Usage Rate (gal/hr) for GT1: | **1,727** | Ref. No. 2 |
| Firing Rate (mmBtu/hr) for GT1: | **228** | Calculation |
| Lower Heating Value of Distillate Oil (Btu/gal): | **132,000** | Set |
| Lower Heating Value of Natural Gas (Btu/cf): | **904** | Set |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 3 |
| Fuel Oil Sulfur Content (% wt): | **0.31%** | Ref. No. 3 |
| Fuel Oil Density (lb/gal): | **6.75** | Set |

**Operating Data:**

| Month/Year | Hours of Operating | Fuel Oil Usage (Gal) | Natural Gas Usage (1000 CF) | Reference Nos. |
|---|---|---|---|---|
| Aug-94 | 9.2 | 0 | 1646 | 1 |
| Sep-94 | 1 | 0 | 150 | 1 |
| Oct-94 | 2 | 0 | 158 | 1 |
| Nov-94 | 0 | 0 | 0 | 1 |
| Dec-94 | 1 | 0 | 86 | 1 |
| Jan-95 | 3 | 0 | 432 | 1 |
| Feb-95 | 2.4 | 0 | 455 | 1 |
| Mar-95 | 1 | 0 | 148 | 1 |
| Apr-95 | 1 | 0 | 134 | 1 |
| May-95 | 1.4 | 0 | 205 | 1 |
| Jun-95 | 12.7 | 0 | 1978 | 1 |
| Jul-95 | 3.8 | 0 | 423 | 1 |
| Aug-95 | 40.8 | 0 | 6020 | 1 |
| Sep-95 | 1.1 | 0 | 183 | 1 |
| Oct-95 | 5.1 | 0 | 733 | 1 |
| Nov-95 | 29.1 | 2782 | 3424 | 1 |
| Dec-95 | 8.4 | 2415 | 1377 | 1 |
| Jan-96 | 18.2 | 12501 | 1010 | 1 |
| Feb-96 | 29.7 | 0 | 4280 | 1 |
| Mar-96 | 8.5 | 0 | 683 | 1 |
| Apr-96 | 8.6 | 0 | 1316 | 1 |
| May-96 | 12.8 | 0 | 1887 | 1 |
| Jun-96 | 12.6 | 0 | 2168 | 1 |
| Jul-96 | 4.9 | 0 | 869 | 1 |
| **2-yr Ave.** | **109.15** | **8849** | **14882.5** | **Calculation** |

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

| | | |
|---|---|---|
| **By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008 |
| **Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS |
| **Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** GT 1 |

**Client:** City of Tallahassee
**Project:** *Purdom Unit 8*

gt1

**Calculations:**

| | Emission Factors (lb/mmBtu) | | Hourly Emissions (lb/hr) | | Annual Emissions (TPY) - Actual | | |
|---|---|---|---|---|---|---|---|
| **Pollutant** | **Nat. Gas** | **Fuel Oil** | **Nat. Gas** | **Fuel Oil** | **Nat. Gas** | **Fuel Oil** | **Total** |
| **NOx** | 0.44 | 0.698 | 100.30 | 159.12 | 2.96 | 0.41 | 3.37 |
| **CO** | 0.11 | 0.048 | 25.08 | 10.94 | 0.74 | 0.03 | 0.77 |
| **VOC** | 0.024 | 0.017 | 5.47 | 3.88 | 0.16 | 0.01 | 0.17 |
| **SO2** | MB | MB | 0.22 | 68.66 | 0.00646 | 0.18 | 0.18 |
| **PM-10** | 0.0419 | 0.061 | 3.82 | 6.67 | 0.28 | 0.04 | 0.32 |

MB - Mass Balance Calculation assuming 95 percent of sulfur is converted to SO2, with remaining being converted to other sulfur compounds.
PM-10 emissions estimated from speciation data in AP-42 (40% - NG & 48% - Fuel Oil)

995 $\quad .44 \frac{Lb_{NOx}}{mmBtu} \times 904 \frac{Btu}{Ft^3_g} \times \frac{14\,882{,}000\ Ft^3_g}{(109.15?)\ hr} \times \frac{mmBtu}{10^6\ Btu} = 54$ pph

$\frac{.44\ (904)(14.882)}{109.1} =$

$\times \frac{\frac{mmBtu}{hr}\Big|_{Limit}}{904 \times 10^{-6}\ \frac{mmBtu}{Ft^3_g}}$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore  **Date:**  **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97  **Date:** 11/22/96  **File:** EMISS.XLS
**Rvd. By:** C. Moore  **Date:** 12/03/97  **Sheet:** GT 2

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the short term and annual emission rates associated with Gas Turbine No. 2 based on material balances and AP-42 emission factors for the known hours of operation, natutral gas, and fuel oil usage.

**References:**

| | |
|---|---|
| No. 1 | COT Generation Logs |
| No. 2 | Calculation: Trace Metal Emissions |
| No. 3 | FGT Sulfur Content Data |
| No. 4 | AP-42, Section 3.1, Table 3.1-1, 5th Edition |

**Knowns/Assumptions:**

| | | |
|---|---|---|
| Fuel Usage Rate (gal/hr) for GT2: | **1,727** | Ref. No. 2 |
| Firing Rate (mmBtu/hr) for GT2: | **228** | Calculation |
| Lower Heating Value of Distillate Oil (Btu/gal): | **132,000** | Set |
| Lower Heating Value of Natural Gas (Btu/cf): | **904** | Set |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 3 |
| Fuel Oil Sulfur Content (% wt): | **0.31%** | Ref. No. 3 |
| Fuel Oil Density (lb/gal): | **6.75** | Set |

**Operating Data:**

| Month/Year | Hours of Operating | Fuel Oil Usage (Gal) | Natural Gas Usage (1000 CF) | Reference Nos. |
|---|---|---|---|---|
| Aug-94 | 13 | 0 | 2359 | 1 |
| Sep-94 | 1 | 0 | 122 | 1 |
| Oct-94 | 1.3 | 0 | 205 | 1 |
| Nov-94 | 0 | 0 | 0 | 1 |
| Dec-94 | 1 | 0 | 41 | 1 |
| Jan-95 | 3.2 | 0 | 464 | 1 |
| Feb-95 | 2.9 | 0 | 528 | 1 |
| Mar-95 | 0.9 | 0 | 112 | 1 |
| Apr-95 | 1 | 0 | 134 | 1 |
| May-95 | 1 | 0 | 140 | 1 |
| Jun-95 | 3.6 | 0 | 536 | 1 |
| Jul-95 | 6.7 | 0 | 832 | 1 |
| Aug-95 | 40.9 | 0 | 6613 | 1 |
| Sep-95 | 1.1 | 0 | 140 | 1 |
| Oct-95 | 2.7 | 0 | 462 | 1 |
| Nov-95 | 27.6 | 0 | 3275 | 1 |
| Dec-95 | 5.5 | 4082 | 788 | 1 |
| Jan-96 | 19.6 | 0 | 2188 | 1 |
| Feb-96 | 29.8 | 0 | 4169 | 1 |
| Mar-96 | 8.1 | 0 | 643 | 1 |
| Apr-96 | 12.5 | 0 | 1908 | 1 |
| May-96 | 11.8 | 0 | 1841 | 1 |
| Jun-96 | 10.2 | 0 | 1934 | 1 |
| Jul-96 | 4.3 | 0 | 739 | 1 |
| **2-yr Ave.** | **104.85** | **2041** | **15086.5** | **Calculation** |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore **Date:** **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 11/22/96 **File:** EMISS.XLS
**Rvd. By:** C. Moore **Date:** 12/03/97 **Sheet:** GT 2

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations:** gt2

| | Emission Factors (lb/mmBtu) | | Hourly Emissions (lb/hr) | | Annual Emissions (TPY) - Actual | | |
|---|---|---|---|---|---|---|---|
| Pollutant | Nat. Gas | Fuel Oil | Nat. Gas | Fuel Oil | Nat. Gas | Fuel Oil | Total |
| NOx | 0.44 | 0.698 | 100.30 | 159.12 | 3.00 | 0.09 | 3.09 |
| CO | 0.11 | 0.048 | 25.08 | 10.94 | 0.75 | 0.01 | 0.76 |
| VOC | 0.024 | 0.017 | 5.47 | 3.88 | 0.16 | 0.0023 | 0.17 |
| SO2 | MB | MB | 0.22 | 68.66 | 0.00655 | 0.04 | 0.05 |
| PM-10 | 0.0419 | 0.061 | 3.82 | 6.67 | 0.11 | 0.0039 | 0.12 |

MB - Mass Balance Calculation assuming 95 percent of sulfur is converted to SO2, with remainder being converted to other sulfur compounds.
PM-10 emissions estimated from speciation data in AP-42 (40% - NG & 48% - Fuel Oil)

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS
**Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** Unit 5

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the short term and annual emission rates associated with Unit 5 based on material balances and AP-42 emission factors for the known hours of operation, natutral gas, and fuel oil usage.

**References:**

| | |
|---|---|
| No. 1 | COT Generation Logs |
| No. 2 | Calculation: Trace Metal Emissions |
| No. 3 | AP-42, Section 1.4, 5th Edition |
| No. 4 | AP-42, Section 1.3, 5th Edition |
| No. 5 | FGT Sulfur Data |

**Knowns/Assumptions:**

| | | |
|---|---|---|
| Fuel Usage Rate (gal/hr) for Unit 5: | **2,000** | Calculation |
| Firing Rate (mmBtu/hr) for Unit 5: | **300** | Set |
| Higher Heating Value of Residual Oil (Btu/gal): | **150,000** | Ref. No. 3 |
| Higher Heating Value of Natural Gas (Btu/cf): | **1,040** | Approximation (from analytical data) |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 5 |
| Weighted Fuel Oil Sulfur Content (% wt): | **1.70%** | Calculation |
| Fuel Oil Density (lb/gal): | **8.05** | Approximation (from analytical data) |

**Operating Data:**

| Month/Year | Fuel Oil Usage (Bbls) | Fuel Oil Sulfur Content (% wt) | Sufur Content Wt'd Ave. (lb - S)* | Natural Gas Usage (1000 CF) | Reference Nos. |
|---|---|---|---|---|---|
| Aug-94 | 0 | 1.45 | 0 | 3260 | 1 |
| Sep-94 | 0 | 1.45 | 0 | 23090 | 1 |
| Oct-94 | 0 | 1.45 | 0 | 62290 | 1 |
| Nov-94 | 0 | 0.53 | 0 | 0 | 1 |
| Dec-94 | 0 | 0.53 | 0 | 0 | 1 |
| Jan-95 | 0 | 1.3 | 0 | 0 | 1 |
| Feb-95 | 0 | 0.67 | 0 | 0 | 1 |
| Mar-95 | 0 | 0.67 | 0 | 2704 | 1 |
| Apr-95 | 0 | 1.2 | 0 | 31730 | 1 |
| May-95 | 0 | 1.1 | 0 | 17517 | 1 |
| Jun-95 | 0 | 1.1 | 0 | 0 | 1 |
| Jul-95 | 0 | 0.974 | 0 | 72772 | 1 |
| Aug-95 | 0 | 0.956 | 0 | 96088 | 1 |
| Sep-95 | 0 | 0.991 | 0 | 24548 | 1 |
| Oct-95 | 0 | 0.991 | 0 | 7219 | 1 |
| Nov-95 | 0 | 0.903 | 0 | 82087 | 1 |
| Dec-95 | 0 | 0.863 | 0 | 74483 | 1 |
| Jan-96 | 0 | 1.7 | 0 | 85785 | 1 |
| Feb-96 | 0 | 0.5 | 0 | 42865 | 1 |
| Mar-96 | 0 | 0.82 | 0 | 87763 | 1 |
| Apr-96 | 0 | 1.06 | 0 | 3323 | 1 |
| May-96 | 107 | 1.7 | 615 | 96317 | 1 |
| Jun-96 | 0 | 1.7 | 0 | 35,758 | 1 |
| Jul-96 | 0 | 1.7 | 0 | 102507 | 1 |
| **2-yr Ave.** | **53.5** | **1.70%** | **615.00** | **476053** | **Calculation** |

*** - Pounds of Sulfur were calculated for purposes of developing a weighted sulfur content.**

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS
**Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** Unit 5

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations:**

| | Emission Factors | | Emission Rates - two year average | | | | |
|---|---|---|---|---|---|---|---|
| | Nat. Gas | Fuel Oil | Hourly Emissions (lb/hr) | | Annual Emissions (TPY) - Actual | | |
| Pollutant | Units as defined | | Nat. Gas | Fuel Oil | Nat. Gas | Fuel Oil | Total |
| NOx (1) | 286 | 42 | 82.50 | 84.00 | 68.08 | 0.05 | 68.12 |
| CO (1) | 41.6 | 5 | 12.00 | 10.00 | 9.90 | 0.006 | 9.91 |
| VOC (1) | 1.47 | 0.76 | 0.42 | 1.52 | 0.29 | 0.001 | 0.29 |
| SO2 (1 & 2) | MB | 266.9 | 0.26 | 533.80 | 0.22 | 0.300 | 0.52 |
| SO3 (1) | NA | 9.690 | NA | 19.38 | NA | 0.011 | 0.011 |
| Pb (3) | NA | 1.94E-10 | NA | 0.0582 | NA | 3.27E-05 | 3.27E-05 |
| Be (3) | NA | 4.2E-12 | NA | 0.00126 | NA | 7.08E-07 | 7.08E-07 |
| Hg (3 & 4) | 7.8E-16 | 3.2E-11 | 2.34E-07 | 0.0096 | 1.93E-07 | 5.39E-06 | 5.59E-06 |
| HF (5) | NA | 0.16 | NA | 0.32 | NA | 1.80E-04 | 1.80E-04 |
| PM-10(& PM) (1 & 6) | 5.2 | 0.080 | 1.50 | 24.00 | 1.24 | 0.01 | 1.25 |

(1) AP-42 emission factors, units of lb/mmCF for natural gas and lb/kGal for oil.
(2) For natural gas, SO2 emissions based on AP-42 assumption that 100% of the sulfur was converted.
(3) For Fuel Oil, trace metal emissions based on AP-42 emission factors in units of lb/10^12 Btu
(4) For natural gas an EPRI (1994) factor was used
(5) Factor based on fuel analysis of City of Tallahassee oil.
(6) Based on stack test data for oil firing in units of lb/mmBtu.
NA = Not Applicable
MB = Material Balance
Sulfur Content of fuel oil based on as burn fuel oil analysis. Sulfur Content of natural gas based on FGT analytical data.

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore **Date:** **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 11/22/96 **File:** EMISS.XLS
**Rvd. By:** C. Moore **Date:** 12/03/97 **Sheet:** Unit 6

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the short term and annual emission rates associated with Unit 6 based on material balances, teast data, and AP-42 emission factors for the known hours of operation, natutral gas usage, and fuel oil usage.

**References:**

| | |
|---|---|
| No. 1 | COT Generation Logs |
| No. 2 | Calculation: Trace Metal Emissions |
| No. 3 | AP-42, Section 1.4, 5th Edition |
| No. 4 | AP-42, Section 1.3, 5th Edition |
| No. 5 | FGT Sulfur Data |

**Knowns/Assumptions:**

| | | |
|---|---|---|
| Fuel Usage Rate (gal/hr) for Unit 6: | **2,000** | Calculation |
| Firing Rate (mmBtu/hr).for Unit 6: | **300** | Set |
| Higher Heating Value of Residual Oil (Btu/gal): | **150,000** | Ref. No. 3 |
| Higher Heating Value of Natural Gas (Btu/cf): | **1,040** | Approximation (from analytical data) |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 5 |
| Weighted Fuel Oil Sulfur Content (% wt): | **1.05%** | Calculation |
| Fuel Oil Density (lb/gal): | **8.05** | Approximation (from analytical data) |
| Total Firing Under Soot Blowing (mmBtu/yr): | **447.30** | Ref. No. 1 |

**Operating Data:**

| Month/Year | Fuel Oil Usage (Bbls) | Fuel Oil Sulfur Content (% wt) | Sufur Content Wt'd Ave. (lb - S)* | Natural Gas Usage (1000 CF) | Reference Nos. |
|---|---|---|---|---|---|
| Aug-94 | 183 | 1.45 | 897 | 82494 | 1 |
| Sep-94 | 0 | 1.45 | 0 | 8430 | 1 |
| Oct-94 | 0 | 1.45 | 0 | 59683 | 1 |
| Nov-94 | 0 | 0.53 | 0 | 0 | 1 |
| Dec-94 | 0 | 0.53 | 0 | 0 | 1 |
| Jan-95 | 0 | 1.3 | 0 | 0 | 1 |
| Feb-95 | 0 | 0.67 | 0 | 0 | 1 |
| Mar-95 | 0 | 0.67 | 0 | 0 | 1 |
| Apr-95 | 0 | 1.2 | 0 | 39050 | 1 |
| May-95 | 0 | 1.1 | 0 | 10897 | 1 |
| Jun-95 | 0 | 1.1 | 0 | 0 | 1 |
| Jul-95 | 770 | 0.974 | 2536 | 88809 | 1 |
| Aug-95 | 163 | 0.956 | 527 | 104573 | 1 |
| Sep-95 | 253 | 0.991 | 848 | 27249 | 1 |
| Oct-95 | 0 | 0.991 | 0 | 3152 | 1 |
| Nov-95 | 0 | 0.903 | 0 | 44200 | 1 |
| Dec-95 | 0 | 0.863 | 0 | 50463 | 1 |
| Jan-96 | 295 | 1.7 | 1696 | 80979 | 1 |
| Feb-96 | 299 | 0.5 | 505 | 42509 | 1 |
| Mar-96 | 85 | 0.82 | 236 | 77917 | 1 |
| Apr-96 | 0 | 1.06 | 0 | 13354 | 1 |
| May-96 | 0 | 1.7 | 0 | 103368 | 1 |
| Jun-96 | 0 | 1.7 | 0 | 66899 | 1 |
| Jul-96 | 0 | 1.7 | 0 | 69548 | 1 |
| **2-yr Ave.** | **1024** | **1.05%** | **7244** | **486787** | **Calculation** |

*** - Pounds of Sulfur were calculated for purposes of developing a weighted sulfur content.**

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore    **Date:**    **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE  DJG 3/4/97  **Date:** 11/22/96    **File:** EMISS.XLS
**Rvd. By:** C. Moore    **Date:** 12/03/97    **Sheet:** Unit 6

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations:**

| | Emission Factors | | Emission Rates - two year average | | | | |
|---|---|---|---|---|---|---|---|
| | Nat. Gas | Fuel Oil | Hourly Emissions (lb/hr) | | Annual Emissions (TPY) - Actual | | |
| Pollutant | Units as defined | | Nat. Gas | Fuel Oil | Nat. Gas | Fuel Oil | Total |
| **NOx (1)** | 572 | 67 | 165.00 | 134.00 | 139.22 | 1.44 | 140.66 |
| **CO (1)** | 41.6 | 5 | 12.00 | 10.00 | 10.13 | 0.108 | 10.23 |
| **VOC (1)** | 1.467 | 0.76 | 0.42 | 1.52 | 0.30 | 0.016 | 0.31 |
| **SO2 (1 & 2)** | MB | 164.25 | 0.26 | 328.50 | 0.22 | 3.532 | 3.75 |
| **SO3 (1)** | NA | 5.96 | NA | 11.93 | NA | 0.128 | 0.128 |
| **Pb (3)** | NA | 1.94E-10 | NA | 0.0582 | NA | 6.26E-04 | 6.26E-04 |
| **Be (3)** | NA | 4.2E-12 | NA | 0.00126 | NA | 1.35E-05 | 1.35E-05 |
| **Hg (3 & 4)** | 7.8E-16 | 3.2E-11 | 2.34E-07 | 0.0096 | 1.97E-07 | 1.03E-04 | 1.03E-04 |
| **HF (5)** | NA | 0.16 | NA | 0.32 | NA | 0.003 | 0.003 |
| **PM-10 (1 & 6)** | 5 | 0.048 | 1.44 | 14.40 | 1.22 | 0.155 | 1.37 |
| **PM-10 (7 & 8)** | 0 | 0.161 | 0.00 | 0.32 | 0.00 | 0.018 | 0.02 |

(1) AP-42 emission factors, units of lb/mmCF for natural gas and lb/kGal for oil.
(2) For natural gas, SO2 emissions based on AP-42 assumption that 100% of the sulfur was converted.
(3) For Fuel Oil, trace metal emissions based on AP-42 emission factors in units of lb/10^12 Btu
(4) For natural gas an EPRI (1994) factor was used
(5) Factor based on fuel analysis of City of Tallahassee oil.
(6) Fuel Oil data based on Stack Test (0.048 lb/mmBtu)
(7) Additional PM10 emissions associated with soot blowing (Test Data - 0.209 lb/mmBtu)
(8) Additional PM10 emissions associated with soot blowing (lb/mmBtu) from test data
NA = Not Applicable
MB = Material Balance
Sulfur Content of fuel oil based on as burn fuel oil analysis. Sulfur Content of natural gas based on FGT analytical data.

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

**By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS
**Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** Unit 7

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the short term and annual emission rates associated with Unit 7 based on material balances, teast data, CEMS data, and AP-42 emission factors for the known hours of operation, natutral gas usage, and fuel oil usage.

**References:**
No. 1 COT Generation Logs
No. 2 Calculation: Trace Metal Emissions
No. 3 AP-42, Section 1.4, 5th Edition
No. 4 AP-42, Section 1.3, 5th Edition
No. 5 Calculation: Unit 7- Continuous Emissions Monitor (CEMS) & Monthly Generation Report (MGR) data
No. 6 FGT Sulfur Content Data

**Knowns/Assumptions:**

| | | |
|---|---|---|
| Fuel Usage Rate (gal/hr) for Unit 7: | **4,140** | Calculation |
| Firing Rate (mmBtu/hr) for Unit 7: | **621** | Set |
| Higher Heating Value of Residual Oil (Btu/gal): | **150,000** | Ref. No. 3 |
| Higher Heating Value of Natural Gas (Btu/cf): | **1,040** | Approximation (from analytical data) |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 6 |
| Weighted Fuel Oil Sulfur Content (% wt): | **1.06%** | Calculation |
| Fuel Oil Density (lb/gal): | **8.05** | Approximation (from analytical data) |
| Total Firing Under Soot Blowing (mmBtu/yr): | **8,477.28** | Ref. No. 1 |

**Operating Data:**

| Month/Year | Fuel Oil Usage (kgal) | Fuel Oil Sulfur Content (% wt) | Sufur Content Wt'd Ave. (lb - S)* | Natural Gas Usage (1000 CF) | Reference Nos. |
|---|---|---|---|---|---|
| Aug-94 | 125.748 | 1.45% | 14677.94 | *120125* | 5 |
| Sep-94 | 271.908 | 1.45% | 31738.46 | *150492* | 5 |
| Oct-94 | 103.572 | 1.45% | 12089.44 | *127718* | 5 |
| Nov-94 | 189.086 | 1.33% | 20226.52 | *167291* | 5 |
| Dec-94 | 229.698 | 0.71% | 13162.54 | *139865* | 5 |
| Jan-95 | 3.780 | 1.30% | 395.58 | *148227* | 5 |
| Feb-95 | 122.304 | 0.55% | 5415.01 | *138958* | 5 |
| Mar-95 | 0.000 | 0.00% | 0.00 | *79162* | 5 |
| Apr-95 | 5.270 | 1.20% | 509.09 | 155279 | 5 |
| May-95 | 15.752 | 1.10% | 1394.86 | 207271 | 5 |
| Jun-95 | 0.000 | 0.00% | 0.00 | 153582 | 5 |
| Jul-95 | 33.661 | 0.97% | 2639.27 | 201694 | 5 |
| Aug-95 | 187.728 | 0.97% | 14617.02 | 199229 | 5 |
| Sep-95 | 17.201 | 0.99% | 1372.22 | 82389 | 5 |
| Oct-95 | 0.000 | 0.00% | 0.00 | 203212 | 5 |
| Nov-95 | 10.140 | 0.90% | 737.09 | 169909 | 5 |
| Dec-95 | 132.618 | 0.96% | 10226.65 | 198234 | 5 |
| Jan-96 | 38.751 | 0.83% | 2589.13 | 231836 | 5 |
| Feb-96 | 170.159 | 0.73% | 9965.94 | 171262 | 5 |
| Mar-96 | 5.050 | 0.84% | 343.47 | 212566 | 5 |
| Apr-96 | 48.433 | 1.07% | 4159.62 | 160524 | 5 |
| May-96 | 77.904 | 1.07% | 6732.93 | 187689 | 5 |
| Jun-96 | 0.000 | 0.00% | 0.00 | 223,591 | 5 |
| Jul-96 | *0.000* | *0.00%* | 0.00 | *231499* | 5 |
| **2-yr Ave.** | **894.381** | **1.06%** | **152992.76** | **2030802** | **Calculation** |

CEMS mid 1995 applied

aug-95 - aug 96

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS
**Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** Unit 7

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations:** UNIT 7

| | Emission Factors | | Emission Rates - two year average | | | | |
|---|---|---|---|---|---|---|---|
| | Nat. Gas | Fuel Oil | Hourly Emissions (lb/hr) | | Annual Emissions (TPY) - Actual | | |
| Pollutant | Units as defined | | Nat. Gas | Fuel Oil | Nat. Gas | Fuel Oil | Total |
| NOx (1) | 0.23 | 0.33 | 142.83 | 204.930 | 227.84 | 23.40 | 251.24 |
| CO (2) | 41.6 | 5 | 24.84 | 20.700 | 42.24 | 2.236 | 44.48 |
| VOC (2) | 1.47 | 0.76 | 0.88 | 3.146 | 1.49 | 0.340 | 1.83 |
| SO2 (2&3) | MB | 166.81 | 0.55 | 690.593 | 0.93 | 74.596 | 75.52 |
| SO3 (1) | NA | 6.06 | NA | 25.072 | NA | 2.708 | 2.708 |
| Pb (4) | NA | 1.94E-10 | NA | 0.120 | NA | 1.30E-02 | 1.30E-02 |
| Be (4) | NA | 4.2E-12 | NA | 0.003 | NA | 2.82E-04 | 2.82E-04 |
| Hg (4 & 5) | 7.8E-16 | 3.2E-11 | 4.84E-07 | 0.020 | 8.24E-07 | 2.15E-03 | 2.15E-03 |
| HF (6) | NA | 0.16 | NA | 0.662 | NA | 0.072 | 0.072 |
| PM-10 (2 & 7) | 5.2 | 0.033 | 3.11 | 20.651 | 5.28 | 2.231 | 7.51 |
| PM-10 (7 & 8) | 0 | 0.064 | 0.00 | 0.267 | 0.00 | 0.066 | 0.07 |

(1) Short Term NOx data based on 0.23 lb/mmBtu - gas & 0.33 lb/mmBtu oil, annual based on Calculation Unit 7 CEMS & MGR
(2) Reference Nos. 3 & 4, gas-lb/mmcf & oil-lb/kgal
(2) For natural gas, SO2 emissions based on AP-42 assumption that 100% of the sulfur was converted.
(4) For Fuel Oil, trace metal emissions based on AP-42 emission factors in units of lb/10^12 Btu
(5) For natural gas an EPRI (1994) factor was used
(6) Factor based on fuel analysis of City of Tallahassee oil.
(7) Fuel Oil data based on Stack Test results (lb/mmBtu)
(8) Additional PM10 emissions associated with soot blowing (lb/mmBtu) from test data

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore **Date:** **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJB 3/4/97 **Date:** 11/22/96 **File:** EMISS.XLS
**Rvd. By:** C. Moore **Date:** 12/03/97 **Sheet:** Unit 7 CEMS & MGR

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

***Description:*** *Data reduction for the Fuel Oil Usage for the period 8/94 through 7/96*
**References:**
No. 1 FGT Sulfur Content Data
**Knowns/Assumptions:**

| | | |
|---|---|---|
| Higher Heating Value of Residual Oil (Btu/gal): | **150,000** | Set |
| Fuel Oil Density (lb/gal): | **8.05** | Set |
| Higher Heating Value of Natural Gas (Btu/cf): | **1,040** | Set |
| Natural Gas Sulfur Content (gr/100 SCF): | **0.32** | Ref. No. 1 |

**Natural Gas Usage Data**

| Period | MGR GAS (mcf) | CEMS GAS (mcf) | Difference (%) | CEMS NOX-Data (lb/mmBtu) | CEMS NOX-Data (lbs) | Emissions Estimate Basis |
|---|---|---|---|---|---|---|
| Aug-94 | 120125 | ND | N/A | 0.23 | 28733.9 | MGR |
| Sep-94 | 150492 | ND | N/A | 0.23 | 35997.7 | MGR |
| Oct-94 | 127718 | ND | N/A | 0.23 | 30550.1 | MGR |
| Nov-94 | 167291 | ND | N/A | 0.23 | 40016.0 | MGR |
| Dec-94 | 139865 | ND | N/A | 0.23 | 33455.7 | MGR |
| Jan-95 | 148227 | 185459 | 20 | 0.23 | 35455.9 | MGR |
| Feb-95 | 138958 | 0 | N/A | 0.23 | 33238.8 | MGR |
| Mar-95 | 79162 | 0 | N/A | 0.23 | 18935.6 | MGR |
| Apr-95 | 155279 | 159657.5 | 3 | *0.231* | 38356.1 | CEMS |
| May-95 | 207271 | 201462.5 | -3 | *0.231* | 48399.4 | CEMS |
| Jun-95 | 153582 | 173838.8 | 12 | *0.231* | 41763.0 | CEMS |
| Jul-95 | 201694 | 181561.9 | -11 | *0.217* | 40974.9 | CEMS |
| Aug-95 | 199229 | 188223.8 | -6 | *0.217* | 42478.3 | CEMS |
| Sep-95 | 82389 | 72500.23 | -14 | *0.222* | 16738.9 | CEMS |
| Oct-95 | 203212 | 205639.1 | 1 | *0.222* | 47478.0 | CEMS |
| Nov-95 | 169909 | 154860 | -10 | *0.222* | 35754.1 | CEMS |
| Dec-95 | 198234 | 180331.2 | -10 | *0.222* | 41634.9 | CEMS |
| Jan-96 | 231836 | 204178.3 | -14 | *0.244* | 51812.3 | CEMS |
| Feb-96 | 171262 | 159820.2 | -7 | *0.244* | 40556.0 | CEMS |
| Mar-96 | 212566 | 193968.6 | -10 | *0.244* | 49221.0 | CEMS |
| Apr-96 | 160524 | 153055.3 | -5 | *0.21* | 33427.3 | CEMS |
| May-96 | 187689 | 169551 | -11 | *0.21* | 37029.9 | CEMS |
| Jun-96 | 223591 | 202355.1 | -10 | *0.21* | 44194.4 | CEMS |
| Jul-96 | ND | 206782.3 | N/A | *0.21* | 45161.3 | CEMS |

Italics represent average values for gas and oil
MGR = monthly generation reports
CEMS = Continuous Emissions Monitoring System

**Fuel Oil Usage**

| Period | lbs | (kGal) | NOx Data (lb/mmBtu) | % Sulfur (wt) | Lbs of Sulfur | Period (kgal) | Monthly Summaries (lbs - S) | (lbs-Nox) |
|---|---|---|---|---|---|---|---|---|
| Aug-94 | 1012271.40 | 125.748 | 0.33 | 1.45 | 14677.9 | 125.7 | 14677.9 | 6224.5 |
| Sep-94 | 2188859.40 | 271.908 | 0.33 | 1.45 | 31738.5 | 271.9 | 31738.5 | 13459.4 |
| Oct-94 | 833754.60 | 103.572 | 0.33 | 1.45 | 12089.4 | 103.6 | 12089.4 | 5126.8 |
| Nov-94 | 1321649.00 | 164.18 | 0.33 | 1.45 | 19163.9 | 189.086 | 20226.5 | 9359.8 |
| Nov-94 | 200493.30 | 24.906 | 0.33 | 0.53 | 1062.6 | | | |
| Dec-94 | 365486.10 | 45.402 | 0.33 | 1.45 | 5299.5 | 229.698 | 13162.5 | 11370.1 |
| Dec-94 | 1483582.80 | 184.296 | 0.33 | 0.53 | 7863.0 | | | |
| Jan-95 | 30429.00 | 3.78 | 0.33 | 1.3 | 395.6 | 3.8 | 395.6 | 187.1 |
| Feb-95 | 984547.20 | 122.304 | 0.33 | 0.55 | 5415.0 | 122.3 | 5415.0 | 6054.0 |
| Mar-95 | 0.00 | 0 | 0.33 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Apr-95 | 1043.6 | 0.130 | ***0.231*** | 1.2 | 12.5 | 5.270 | 509.1 | 182.6 |
| Apr-95 | 6560.6 | 0.815 | ***0.231*** | 1.2 | 78.7 | | | |
| Apr-95 | 5912.2 | 0.734 | ***0.231*** | 1.2 | 70.9 | | | |
| Apr-95 | 6266.8 | 0.778 | ***0.231*** | 1.2 | 75.2 | | | |
| Apr-95 | 6090.6 | 0.757 | ***0.231*** | 1.2 | 73.1 | | | |
| Apr-95 | 6124.8 | 0.761 | ***0.231*** | 1.2 | 73.5 | | | |
| Apr-95 | 6175 | 0.767 | ***0.231*** | 1.2 | 74.1 | | | |
| Apr-95 | 4250.2 | 0.528 | ***0.231*** | 1.2 | 51.0 | | | |
| May-95 | 9384.7 | 1.166 | ***0.231*** | 1.1 | 103.2 | 15.752 | 1394.9 | 545.8 |
| May-95 | 14891 | 1.850 | ***0.231*** | 1.1 | 163.8 | | | |
| May-95 | 14881.4 | 1.849 | ***0.231*** | 1.1 | 163.7 | | | |
| May-95 | 20534.1 | 2.551 | ***0.231*** | 1.1 | 225.9 | | | |
| May-95 | 21384.3 | 2.656 | ***0.231*** | 1.1 | 235.2 | | | |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore
**Ckd. By:** D. Graziani, PE 3/4/97 DJG
**Rvd. By:** C. Moore

**Date:**
**Date:** 11/22/96
**Date:** 12/03/97

**OFS No.:** 1584.0005.0008
**File:** EMISS.XLS
**Sheet:** Unit 7 CEMS & MGR

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| Period | lbs | (kGal) | NOx Data (lb/mmBtu) | % Sulfur (wt) | Lbs of Sulfur | Period (kgal) | Period (lbs - S) | Period (lbs-Nox) |
|---|---|---|---|---|---|---|---|---|
| May-95 | 21387.5 | 2.657 | ***0.231*** | 1.1 | 235.3 | 15.75217391 | 1394.855 | |
| May-95 | 19821.6 | 2.462 | ***0.231*** | 1.1 | 218.0 | | | |
| May-95 | 4520.4 | 0.562 | ***0.231*** | 1.1 | 49.7 | | | |
| Jun-95 | 0 | 0.000 | ***0.217*** | 0 | 0.0 | 0 | 0 | 0.0 |
| Jul-95 | 4579.3 | 0.569 | ***0.217*** | 0.974 | 44.6 | 33.661 | 2639.3 | 1095.7 |
| Jul-95 | 13242 | 1.645 | ***0.217*** | 0.974 | 129.0 | | | |
| Jul-95 | 13330.5 | 1.656 | ***0.217*** | 0.974 | 129.8 | | | |
| Jul-95 | 17931.2 | 2.227 | ***0.217*** | 0.974 | 174.6 | | | |
| Jul-95 | 23696.1 | 2.944 | ***0.217*** | 0.974 | 230.8 | | | |
| Jul-95 | 19698.2 | 2.447 | ***0.217*** | 0.974 | 191.9 | | | |
| Jul-95 | 18733.8 | 2.327 | ***0.217*** | 0.974 | 182.5 | | | |
| Jul-95 | 18750.6 | 2.329 | ***0.217*** | 0.974 | 182.6 | | | |
| Jul-95 | 18781.1 | 2.333 | ***0.217*** | 0.974 | 182.9 | | | |
| Jul-95 | 18753.6 | 2.330 | ***0.217*** | 0.974 | 182.7 | | | |
| Jul-95 | 23084.2 | 2.868 | ***0.217*** | 0.974 | 224.8 | | | |
| Jul-95 | 25101.5 | 3.118 | ***0.217*** | 0.974 | 244.5 | | | |
| Jul-95 | 24663.5 | 3.064 | ***0.217*** | 0.974 | 240.2 | | | |
| Jul-95 | 24602.5 | 3.056 | ***0.217*** | 0.974 | 239.6 | | | |
| Jul-95 | 6024.4 | 0.748 | ***0.217*** | 0.974 | 58.7 | | | |
| Aug-95 | 10263.4 | 1.275 | ***0.217*** | 0.982 | 100.8 | 187.7 | 14617.0 | 6110.5 |
| Aug-95 | 14456.6 | 1.796 | ***0.217*** | 0.982 | 142.0 | | | |
| Aug-95 | 13919.5 | 1.729 | ***0.217*** | 0.982 | 136.7 | | | |
| Aug-95 | 13414.4 | 1.666 | ***0.217*** | 0.982 | 131.7 | | | |
| Aug-95 | 13444.9 | 1.670 | ***0.217*** | 0.982 | 132.0 | | | |
| Aug-95 | 14423 | 1.792 | ***0.217*** | 0.982 | 141.6 | | | |
| Aug-95 | 14801.5 | 1.839 | ***0.217*** | 0.98 | 145.1 | | | |
| Aug-95 | 14035.5 | 1.744 | ***0.217*** | 0.98 | 137.5 | | | |
| Aug-95 | 13954.6 | 1.733 | ***0.217*** | 0.98 | 136.8 | | | |
| Aug-95 | 13954.6 | 1.733 | ***0.217*** | 0.98 | 136.8 | | | |
| Aug-95 | 14890 | 1.850 | ***0.217*** | 0.98 | 145.9 | | | |
| Aug-95 | 25284.6 | 3.141 | ***0.217*** | 0.98 | 247.8 | | | |
| Aug-95 | 26679.3 | 3.314 | ***0.217*** | 0.98 | 261.5 | | | |
| Aug-95 | 26621.3 | 3.307 | ***0.217*** | 0.98 | 260.9 | | | |
| Aug-95 | 26966.2 | 3.350 | ***0.217*** | 0.98 | 264.3 | | | |
| Aug-95 | 26686.9 | 3.315 | ***0.217*** | 0.98 | 261.5 | | | |
| Aug-95 | 26618.2 | 3.307 | ***0.217*** | 0.98 | 260.9 | | | |
| Aug-95 | 26757.1 | 3.324 | ***0.217*** | 0.98 | 262.2 | | | |
| Aug-95 | 26964.6 | 3.350 | ***0.217*** | 0.98 | 264.3 | | | |
| Aug-95 | 26705.2 | 3.317 | ***0.217*** | 0.98 | 261.7 | | | |
| Aug-95 | 26659.4 | 3.312 | ***0.217*** | 0.98 | 261.3 | | | |
| Aug-95 | 26865.4 | 3.337 | ***0.217*** | 0.98 | 263.3 | | | |
| Aug-95 | 25109.1 | 3.119 | ***0.217*** | 0.98 | 246.1 | | | |
| Aug-95 | 8050.8 | 1.000 | ***0.217*** | 0.98 | 78.9 | | | |
| Aug-95 | 1294 | 0.161 | ***0.217*** | 0.964 | 12.5 | | | |
| Aug-95 | 21854.3 | 2.715 | ***0.217*** | 0.964 | 210.7 | | | |
| Aug-95 | 27292.7 | 3.390 | ***0.217*** | 0.964 | 263.1 | | | |
| Aug-95 | 27245.4 | 3.385 | ***0.217*** | 0.964 | 262.6 | | | |
| Aug-95 | 27237.8 | 3.384 | ***0.217*** | 0.964 | 262.6 | | | |
| Aug-95 | 27237.8 | 3.384 | ***0.217*** | 0.964 | 262.6 | | | |
| Aug-95 | 27227.1 | 3.382 | ***0.217*** | 0.964 | 262.5 | | | |
| Aug-95 | 27214.9 | 3.381 | ***0.217*** | 0.964 | 262.4 | | | |
| Aug-95 | 27196.6 | 3.378 | ***0.217*** | 0.964 | 262.2 | | | |
| Aug-95 | 27166.1 | 3.375 | ***0.217*** | 0.964 | 261.9 | | | |
| Aug-95 | 24495.7 | 3.043 | ***0.217*** | 0.964 | 236.1 | | | |
| Aug-95 | 24131 | 2.998 | ***0.217*** | 0.964 | 232.6 | | | |
| Aug-95 | 24442.3 | 3.036 | ***0.217*** | 0.964 | 235.6 | | | |
| Aug-95 | 19187 | 2.383 | ***0.217*** | 0.962 | 184.6 | | | |
| Aug-95 | 18601 | 2.311 | ***0.217*** | 0.962 | 178.9 | | | |
| Aug-95 | 18761.3 | 2.331 | ***0.217*** | 0.962 | 180.5 | | | |
| Aug-95 | 18776.5 | 2.332 | ***0.217*** | 0.962 | 180.6 | | | |
| Aug-95 | 18616.3 | 2.313 | ***0.217*** | 0.962 | 179.1 | | | |
| Aug-95 | 19832.5 | 2.464 | ***0.217*** | 0.962 | 190.8 | | | |
| Aug-95 | 25431.1 | 3.159 | ***0.217*** | 0.962 | 244.6 | | | |
| Aug-95 | 25338 | 3.148 | ***0.217*** | 0.962 | 243.8 | | | |
| Aug-95 | 24094.4 | 2.993 | ***0.217*** | 0.962 | 231.8 | | | |
| Aug-95 | 26184.9 | 3.253 | ***0.217*** | 0.962 | 251.9 | | | |
| Aug-95 | 27491.1 | 3.415 | ***0.217*** | 0.962 | 264.5 | | | |
| Aug-95 | 27198.1 | 3.379 | ***0.217*** | 0.962 | 261.6 | | | |

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

| | | |
|---|---|---|
| **By:** C. Moore | **Date:** | **OFS No.:** 1584.0005.0008 |
| **Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 11/22/96 | **File:** EMISS.XLS |
| **Rvd. By:** C. Moore | **Date:** 12/03/97 | **Sheet:** Unit 7 CEMS & MGR |

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| Period | lbs | (kGal) | NOx Data (lb/mmBtu) | % Sulfur (wt) | Lbs of Sulfur | Period (kgal) | Period (lbs - S) | Period (lbs-Nox) |
|---|---|---|---|---|---|---|---|---|
| Aug-95 | 27021.1 | 3.357 | *0.217* | 0.962 | 259.9 | 187.7 | 14617.0 | 6110.5 |
| Aug-95 | 27100.4 | 3.367 | *0.217* | 0.962 | 260.7 | | | |
| Aug-95 | 27184.4 | 3.377 | *0.217* | 0.962 | 261.5 | | | |
| Aug-95 | 27593.3 | 3.428 | *0.217* | 0.962 | 265.4 | | | |
| Aug-95 | 27353.7 | 3.398 | *0.217* | 0.962 | 263.1 | | | |
| Aug-95 | 27619.3 | 3.431 | *0.217* | 0.962 | 265.7 | | | |
| Aug-95 | 27114.2 | 3.368 | *0.217* | 0.962 | 260.8 | | | |
| Aug-95 | 14229.3 | 1.768 | *0.217* | 0.962 | 136.9 | | | |
| Aug-95 | 683.6 | 0.085 | *0.217* | 0.962 | 6.6 | | | |
| Aug-95 | 8916 | 1.108 | *0.217* | 0.956 | 85.2 | | | |
| Aug-95 | 15588.9 | 1.937 | *0.217* | 0.956 | 149.0 | | | |
| Aug-95 | 27878.7 | 3.463 | *0.217* | 0.956 | 266.5 | | | |
| Aug-95 | 27185.9 | 3.377 | *0.217* | 0.956 | 259.9 | | | |
| Aug-95 | 27111.1 | 3.368 | *0.217* | 0.956 | 259.2 | | | |
| Aug-95 | 27097.4 | 3.366 | *0.217* | 0.956 | 259.1 | | | |
| Aug-95 | 27401 | 3.404 | *0.217* | 0.956 | 262.0 | | | |
| Aug-95 | 27098.9 | 3.366 | *0.217* | 0.956 | 259.1 | | | |
| Aug-95 | 26703.7 | 3.317 | *0.217* | 0.956 | 255.3 | | | |
| Aug-95 | 20761.7 | 2.579 | *0.217* | 0.956 | 198.5 | | | |
| Aug-95 | 8493.3 | 1.055 | *0.217* | 0.956 | 81.2 | | | |
| Sep-95 | 13918 | 1.729 | *0.222* | 0.991 | 137.9 | 17.201 | 1372.2 | 572.8 |
| Sep-95 | 16957.6 | 2.107 | *0.222* | 0.991 | 168.0 | | | |
| Sep-95 | 18253.1 | 2.267 | *0.222* | 0.991 | 180.9 | | | |
| Sep-95 | 18041 | 2.241 | *0.222* | 0.991 | 178.8 | | | |
| Sep-95 | 18010.5 | 2.237 | *0.222* | 0.991 | 178.5 | | | |
| Sep-95 | 18009 | 2.237 | *0.222* | 0.991 | 178.5 | | | |
| Sep-95 | 17995.2 | 2.235 | *0.222* | 0.991 | 178.3 | | | |
| Sep-95 | 15518.7 | 1.928 | *0.222* | 0.991 | 153.8 | | | |
| Sep-95 | 1765.5 | 0.219 | *0.222* | 0.991 | 17.5 | | | |
| Oct-95 | 0 | 0.000 | *0.222* | 0 | 0.0 | 0 | 0 | 0.0 |
| Nov-95 | 3022.9 | 0.376 | *0.222* | 0.903 | 27.3 | 10.140 | 737.1 | 337.7 |
| Nov-95 | 13309.1 | 1.653 | *0.222* | 0.903 | 120.2 | | | |
| Nov-95 | 15866.6 | 1.971 | *0.222* | 0.903 | 143.3 | | | |
| Nov-95 | 15247 | 1.894 | *0.222* | 0.903 | 137.7 | | | |
| Nov-95 | 16757.7 | 2.082 | *0.222* | 0.903 | 151.3 | | | |
| Nov-95 | 14983.1 | 1.861 | *0.222* | 0.903 | 135.3 | | | |
| Nov-95 | 2440 | 0.303 | *0.222* | 0.903 | 22.0 | | | |
| Dec-95 | 3698.8 | 0.459 | *0.222* | 0.91 | 33.7 | 132.618 | 10226.6 | 4416.2 |
| Dec-95 | 21736.8 | 2.700 | *0.222* | 0.91 | 197.8 | | | |
| Dec-95 | 27723 | 3.444 | *0.222* | 0.91 | 252.3 | | | |
| Dec-95 | 27976.3 | 3.475 | *0.222* | 0.91 | 254.6 | | | |
| Dec-95 | 19109.2 | 2.374 | *0.222* | 0.91 | 173.9 | | | |
| Dec-95 | 20120.9 | 2.499 | *0.222* | 0.91 | 183.1 | | | |
| Dec-95 | 5401.8 | 0.671 | *0.222* | 0.91 | 49.2 | | | |
| Dec-95 | 8919 | 1.108 | *0.222* | 0.951 | 84.8 | | | |
| Dec-95 | 8500.9 | 1.056 | *0.222* | 0.951 | 80.8 | | | |
| Dec-95 | 8746.6 | 1.087 | *0.222* | 0.951 | 83.2 | | | |
| Dec-95 | 7408.4 | 0.920 | *0.222* | 0.951 | 70.5 | | | |
| Dec-95 | 8868.7 | 1.102 | *0.222* | 0.951 | 84.3 | | | |
| Dec-95 | 8877.8 | 1.103 | *0.222* | 0.951 | 84.4 | | | |
| Dec-95 | 8899.2 | 1.105 | *0.222* | 0.951 | 84.6 | | | |
| Dec-95 | 3724.8 | 0.463 | *0.222* | 0.951 | 35.4 | | | |
| Dec-95 | 12067 | 1.499 | *0.222* | 1.024 | 123.6 | | | |
| Dec-95 | 21526.2 | 2.674 | *0.222* | 1.024 | 220.4 | | | |
| Dec-95 | 17754.1 | 2.205 | *0.222* | 1.024 | 181.8 | | | |
| Dec-95 | 19576.1 | 2.432 | *0.222* | 1.024 | 200.5 | | | |
| Dec-95 | 13899.7 | 1.727 | *0.222* | 1.024 | 142.3 | | | |
| Dec-95 | 13742.5 | 1.707 | *0.222* | 1.024 | 140.7 | | | |
| Dec-95 | 13109.2 | 1.628 | *0.222* | 1.024 | 134.2 | | | |
| Dec-95 | 12921.5 | 1.605 | *0.222* | 1.024 | 132.3 | | | |
| Dec-95 | 17528.3 | 2.177 | *0.222* | 1.024 | 179.5 | | | |
| Dec-95 | 24056.2 | 2.988 | *0.222* | 1.024 | 246.3 | | | |
| Dec-95 | 26027.7 | 3.233 | *0.222* | 1.024 | 266.5 | | | |
| Dec-95 | 26119.3 | 3.245 | *0.222* | 1.024 | 267.5 | | | |
| Dec-95 | 27134 | 3.371 | *0.222* | 1.024 | 277.9 | | | |
| Dec-95 | 26493.1 | 3.291 | *0.222* | 1.024 | 271.3 | | | |
| Dec-95 | 24855.8 | 3.088 | *0.222* | 1.024 | 254.5 | | | |
| Dec-95 | 18576.6 | 2.308 | *0.222* | 1.024 | 190.2 | | | |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore  **Date:**  **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97  **Date:** 11/22/96  **File:** EMISS.XLS
**Rvd. By:** C. Moore  **Date:** 12/03/97  **Sheet:** Unit 7 CEMS & MGR

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | | | NOx Data | % Sulfur | Lbs of | Period | | |
|---|---|---|---|---|---|---|---|---|
| Period | lbs | (kGal) | (lb/mmBtu) | (wt) | Sulfur | (kgal) | (lbs - S) | (lbs-Nox) |
| Dec-95 | 20885.3 | 2.594 | ***0.222*** | 0.956 | 199.7 | 132.6 | 10226.6 | 4416.2 |
| Dec-95 | 18900.1 | 2.348 | ***0.222*** | 0.956 | 180.7 | | | |
| Dec-95 | 21507.9 | 2.672 | ***0.222*** | 0.956 | 205.6 | | | |
| Dec-95 | 24343.1 | 3.024 | ***0.222*** | 0.956 | 232.7 | | | |
| Dec-95 | 24265.3 | 3.014 | ***0.222*** | 0.956 | 232.0 | | | |
| Dec-95 | 24875.6 | 3.090 | ***0.222*** | 0.956 | 237.8 | | | |
| Dec-95 | 19917.9 | 2.474 | ***0.222*** | 0.956 | 190.4 | | | |
| Dec-95 | 22437.2 | 2.787 | ***0.222*** | 0.956 | 214.5 | | | |
| Dec-95 | 24816.1 | 3.083 | ***0.222*** | 0.956 | 237.2 | | | |
| Dec-95 | 24749 | 3.074 | ***0.222*** | 0.956 | 236.6 | | | |
| Dec-95 | 19631 | 2.439 | ***0.222*** | 0.956 | 187.7 | | | |
| Dec-95 | 14577.2 | 1.811 | ***0.222*** | 0.956 | 139.4 | | | |
| Dec-95 | 12573.6 | 1.562 | ***0.222*** | 0.956 | 120.2 | | | |
| Dec-95 | 12561.4 | 1.560 | ***0.222*** | 0.956 | 120.1 | | | |
| Dec-95 | 12558.4 | 1.560 | ***0.222*** | 0.956 | 120.1 | | | |
| Dec-95 | 12572.1 | 1.562 | ***0.222*** | 0.956 | 120.2 | | | |
| Dec-95 | 12630.1 | 1.569 | ***0.222*** | 0.956 | 120.7 | | | |
| Dec-95 | 13992.7 | 1.738 | ***0.222*** | 0.956 | 133.8 | | | |
| Dec-95 | 13116.9 | 1.629 | ***0.222*** | 0.956 | 125.4 | | | |
| Dec-95 | 13179.4 | 1.637 | ***0.222*** | 0.956 | 126.0 | | | |
| Dec-95 | 13525.8 | 1.680 | ***0.222*** | 0.956 | 129.3 | | | |
| Dec-95 | 13528.9 | 1.681 | ***0.222*** | 0.956 | 129.3 | | | |
| Dec-95 | 13524.3 | 1.680 | ***0.222*** | 0.956 | 129.3 | | | |
| Dec-95 | 15036.5 | 1.868 | ***0.222*** | 0.956 | 143.7 | | | |
| Dec-95 | 16664.6 | 2.070 | ***0.222*** | 0.863 | 143.8 | | | |
| Dec-95 | 16916.4 | 2.101 | ***0.222*** | 0.863 | 146.0 | | | |
| Dec-95 | 16666.2 | 2.070 | ***0.222*** | 0.863 | 143.8 | | | |
| Dec-95 | 16602.1 | 2.062 | ***0.222*** | 0.863 | 143.3 | | | |
| Dec-95 | 17343.7 | 2.154 | ***0.222*** | 0.863 | 149.7 | | | |
| Dec-95 | 20621.4 | 2.562 | ***0.222*** | 0.863 | 178.0 | | | |
| Dec-95 | 17854.9 | 2.218 | ***0.222*** | 0.863 | 154.1 | | | |
| Dec-95 | 18610.2 | 2.312 | ***0.222*** | 0.863 | 160.6 | | | |
| Dec-95 | 1489.3 | 0.185 | ***0.222*** | 0.863 | 12.9 | | | |
| Jan-96 | 4828 | 0.600 | ***0.244*** | 0.83 | 40.1 | 38.751 | 2589.1 | 1418.3 |
| Jan-96 | 25196.1 | 3.130 | ***0.244*** | 0.83 | 209.1 | | | |
| Jan-96 | 26877.7 | 3.339 | ***0.244*** | 0.83 | 223.1 | | | |
| Jan-96 | 24105 | 2.994 | ***0.244*** | 0.83 | 200.1 | | | |
| Jan-96 | 23714.4 | 2.946 | ***0.244*** | 0.83 | 196.8 | | | |
| Jan-96 | 19046.6 | 2.366 | ***0.244*** | 0.83 | 158.1 | | | |
| Jan-96 | 20326.9 | 2.525 | ***0.244*** | 0.83 | 168.7 | | | |
| Jan-96 | 25064.9 | 3.114 | ***0.244*** | 0.83 | 208.0 | | | |
| Jan-96 | 26671.7 | 3.313 | ***0.244*** | 0.83 | 221.4 | | | |
| Jan-96 | 26688.4 | 3.315 | ***0.244*** | 0.83 | 221.5 | | | |
| Jan-96 | 25792.7 | 3.204 | ***0.244*** | 0.83 | 214.1 | | | |
| Jan-96 | 24945.8 | 3.099 | ***0.244*** | 0.83 | 207.1 | | | |
| Jan-96 | 13661.6 | 1.697 | ***0.244*** | 0.83 | 113.4 | | | |
| Jan-96 | 11639.8 | 1.446 | ***0.244*** | 0.83 | 96.6 | | | |
| Jan-96 | 9659.1 | 1.200 | ***0.244*** | 0.83 | 80.2 | | | |
| Jan-96 | 3338.7 | 0.415 | ***0.244*** | 0.83 | 27.7 | | | |
| Jan-96 | 386.1 | 0.048 | ***0.244*** | 0.83 | 3.2 | | | |
| Feb-96 | 7406.8 | 0.920 | ***0.244*** | 0.8 | 59.3 | 170.159 | 9965.9 | 6227.8 |
| Feb-96 | 23278 | 2.892 | ***0.244*** | 0.8 | 186.2 | | | |
| Feb-96 | 23647.3 | 2.938 | ***0.244*** | 0.8 | 189.2 | | | |
| Feb-96 | 21431.6 | 2.662 | ***0.244*** | 0.8 | 171.5 | | | |
| Feb-96 | 21048.6 | 2.615 | ***0.244*** | 0.8 | 168.4 | | | |
| Feb-96 | 19356.4 | 2.405 | ***0.244*** | 0.8 | 154.9 | | | |
| Feb-96 | 21260.7 | 2.641 | ***0.244*** | 0.8 | 170.1 | | | |
| Feb-96 | 19437.2 | 2.415 | ***0.244*** | 0.8 | 155.5 | | | |
| Feb-96 | 28080.1 | 3.488 | ***0.244*** | 0.8 | 224.6 | | | |
| Feb-96 | 25154.9 | 3.125 | ***0.244*** | 0.8 | 201.2 | | | |
| Feb-96 | 28237.3 | 3.508 | ***0.244*** | 0.8 | 225.9 | | | |
| Feb-96 | 26506.9 | 3.293 | ***0.244*** | 0.8 | 212.1 | | | |
| Feb-96 | 26628.9 | 3.308 | ***0.244*** | 0.8 | 213.0 | | | |
| Feb-96 | 22861.4 | 2.840 | ***0.244*** | 0.8 | 182.9 | | | |
| Feb-96 | 20751.1 | 2.578 | ***0.244*** | 0.8 | 166.0 | | | |
| Feb-96 | 20770.9 | 2.580 | ***0.244*** | 0.8 | 166.2 | | | |
| Feb-96 | 20761.7 | 2.579 | ***0.244*** | 0.8 | 166.1 | | | |
| Feb-96 | 20758.7 | 2.579 | ***0.244*** | 0.8 | 166.1 | | | |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** C. Moore **Date:** **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 11/22/96 **File:** EMISS.XLS
**Rvd. By:** C. Moore **Date:** 12/03/97 **Sheet:** Unit 7 CEMS & MGR

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| Period | lbs | (kGal) | NOx Data (lb/mmBtu) | % Sulfur (wt) | Lbs of Sulfur | Period (kgal) | Period (lbs - S) | Period (lbs-Nox) |
|---|---|---|---|---|---|---|---|---|
| Feb-96 | 26705.2 | 3.317 | *0.244* | 0.8 | 213.6 | 170.16 | 9965.94 | 6227.8 |
| Feb-96 | 28049.6 | 3.484 | *0.244* | 0.8 | 224.4 | | | |
| Feb-96 | 29171.1 | 3.624 | *0.244* | 0.8 | 233.4 | | | |
| Feb-96 | 29131.4 | 3.619 | *0.244* | 0.8 | 233.1 | | | |
| Feb-96 | 29189.4 | 3.626 | *0.244* | 0.8 | 233.5 | | | |
| Feb-96 | 27451.4 | 3.410 | *0.244* | 0.8 | 219.6 | | | |
| Feb-96 | 21039.5 | 2.614 | *0.244* | 0.74 | 155.7 | | | |
| Feb-96 | 21201.2 | 2.634 | *0.244* | 0.74 | 156.9 | | | |
| Feb-96 | 21402.6 | 2.659 | *0.244* | 0.74 | 158.4 | | | |
| Feb-96 | 21160 | 2.629 | *0.244* | 0.74 | 156.6 | | | |
| Feb-96 | 17130 | 2.128 | *0.244* | 0.74 | 126.8 | | | |
| Feb-96 | 28327.3 | 3.519 | *0.244* | 0.74 | 209.6 | | | |
| Feb-96 | 28910.2 | 3.591 | *0.244* | 0.74 | 213.9 | | | |
| Feb-96 | 27390.4 | 3.403 | *0.244* | 0.74 | 202.7 | | | |
| Feb-96 | 26009.4 | 3.231 | *0.244* | 0.74 | 192.5 | | | |
| Feb-96 | 24268.3 | 3.015 | *0.244* | 0.74 | 179.6 | | | |
| Feb-96 | 23564.9 | 2.927 | *0.244* | 0.74 | 174.4 | | | |
| Feb-96 | 27892.4 | 3.465 | *0.244* | 0.74 | 206.4 | | | |
| Feb-96 | 27817.6 | 3.456 | *0.244* | 0.74 | 205.9 | | | |
| Feb-96 | 27889.3 | 3.465 | *0.244* | 0.74 | 206.4 | | | |
| Feb-96 | 27993.1 | 3.477 | *0.244* | 0.74 | 207.1 | | | |
| Feb-96 | 22211.4 | 2.759 | *0.244* | 0.74 | 164.4 | | | |
| Feb-96 | 20813.6 | 2.586 | *0.244* | 0.74 | 154.0 | | | |
| Feb-96 | 24869.5 | 3.089 | *0.244* | 0.74 | 184.0 | | | |
| Feb-96 | 29099.4 | 3.615 | *0.244* | 0.74 | 215.3 | | | |
| Feb-96 | 28847.6 | 3.584 | *0.244* | 0.74 | 213.5 | | | |
| Feb-96 | 25421.9 | 3.158 | *0.244* | 0.74 | 188.1 | | | |
| Feb-96 | 26227.6 | 3.258 | *0.244* | 0.74 | 194.1 | | | |
| Feb-96 | 25113.7 | 3.120 | *0.244* | 0.74 | 185.8 | | | |
| Feb-96 | 15317.2 | 1.903 | *0.244* | 0.74 | 113.3 | | | |
| Feb-96 | 13991.2 | 1.738 | *0.244* | 0.5 | 70.0 | | | |
| Feb-96 | 14304 | 1.777 | *0.244* | 0.5 | 71.5 | | | |
| Feb-96 | 14488.7 | 1.800 | *0.244* | 0.5 | 72.4 | | | |
| Feb-96 | 14511.6 | 1.803 | *0.244* | 0.5 | 72.6 | | | |
| Feb-96 | 14455.1 | 1.796 | *0.244* | 0.5 | 72.3 | | | |
| Feb-96 | 14481 | 1.799 | *0.244* | 0.5 | 72.4 | | | |
| Feb-96 | 15723.1 | 1.953 | *0.244* | 0.5 | 78.6 | | | |
| Feb-96 | 25515 | 3.170 | *0.244* | 0.5 | 127.6 | | | |
| Feb-96 | 23331.4 | 2.898 | *0.244* | 0.5 | 116.7 | | | |
| Feb-96 | 23348.2 | 2.900 | *0.244* | 0.5 | 116.7 | | | |
| Feb-96 | 22647.8 | 2.813 | *0.244* | 0.5 | 113.2 | | | |
| Feb-96 | 15988.6 | 1.986 | *0.244* | 0.5 | 79.9 | | | |
| Mar-96 | 248.7 | 0.031 | *0.244* | 0.94 | 2.3 | 5.050 | 343.5 | 184.8 |
| Mar-96 | 8072.1 | 1.003 | *0.244* | 0.92 | 74.3 | | | |
| Mar-96 | 1724.3 | 0.214 | *0.244* | 0.92 | 15.9 | | | |
| Mar-96 | 11024.8 | 1.370 | *0.244* | 0.82 | 90.4 | | | |
| Mar-96 | 19032.9 | 2.364 | *0.244* | 0.82 | 156.1 | | | |
| Mar-96 | 552.4 | 0.069 | *0.244* | 0.82 | 4.5 | | | |
| Apr-96 | 134287.4 | 16.682 | *0.210* | 1.08 | 1450.3 | 48.433 | 4159.6 | 1525.6 |
| Apr-96 | 255595.6 | 31.751 | *0.210* | 1.06 | 2709.3 | | | |
| May-96 | 226933.2 | 28.190 | *0.210* | 1.08 | 2450.9 | 77.904 | 6732.9 | 2454.0 |
| May-96 | 400192 | 49.713 | *0.210* | 1.07 | 4282.1 | | | |
| Jun-96 | 0 | 0.000 | *0.210* | 0 | 0.0 | 0.000 | 0.0 | 0.0 |
| Jul-96 | 0 | 0.000 | *0.210* | 0 | 0.0 | 0.000 | 0.0 | 0.0 |

Note: There was no fuel oil usage in Unit 7 in June or July, 1996.

# APPENDIX C

# SUMMARY OF EMISSION RATES USED IN MODELLING

# SUPPORTING CALCULATIONS

# TITLE V EMISSION FACTORS - FCG
# EMISSION FACTORS WORKSHOP VERSION 3.1

## SIGNIFICANT IMPACT

Future Emis (yr 2000) - Current Actual

| | CURRENT | UNIT 1-4 | | | | UNIT 5 | | | | UNIT 6 | | | | UNIT 7 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ACTUAL PERIOD | SHEET # | FUTURE | -CURRENT | =(g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | FUTURE | -CURRENT | (g/s) |
| SO2 SHORT | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 6 | 0.00 | 49.18 | **-49.18** | NO - 6 | 0.00 | 49.18 | **-49.18** | 4 - 6 | 146.45 | 146.45 | **0.00** |
| SO2 LONG | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 5 | 0.00 | 0.01 | **-0.01** | NO - 5 | 0.00 | 0.11 | **-0.11** | 3 - 5 | 2.30 | 2.17 | **0.12** |
| PM SHORT | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 6 | 0.00 | 4.73 | **-4.73** | NO - 6 | 0.00 | 4.73 | **-4.73** | 4 - 6 | 9.79 | 9.79 | **0.00** |
| PM LONG | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 5 | 0.00 | 0.04 | **-0.04** | NO - 5 | 0.00 | 0.04 | **-0.04** | 3 - 5 | 0.24 | 0.22 | **0.03** |
| NO2 LONG | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 5 | 0.00 | 1.96 | **-1.96** | NO - 5 | 0.00 | 4.05 | **-4.05** | 3 - 5 | 13.18 | 7.23 | **5.95** |
| CO SHORT | Aug94Jul96 | NO-NO | 0.00 | 0.00 | **0.00** | NO - 6 | 0.00 | 1.26 | **-1.26** | NO - 6 | 0.00 | 1.26 | **-1.26** | 4 - 6 | 2.61 | 2.61 | **0.00** |
| | | | | | | | | | | | | | | | | | |

U8?

Note: Long term Emission rates were based on Scenarios
The Scenario which produced the highest emissions was selected
This worst case selection process may result it some units having zero emissions in the Long term analysis.

NO = Not Operating

## SIGNIFICANT IMPACT

**Future Emis (yr 2000) - Current Actual**

| | CURRENT | UNIT GT1 | | | | UNIT GT2 | | | | UNIT 8 | | UNIT Cooling Tower | | AUXILARY BOILER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ACTUAL PERIOD | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | (g/s) | | (g/s) | SHEET # | (g/s) |
| SO2 SHORT | Aug94Jul96 | 4 - 6 | 1.47 | 11.76 | -10.29 | 4 - 6 | 1.47 | 11.76 | -10.29 | 4 | 7.82 | NA | NA | NA** | NA |
| SO2 LONG | Aug94Jul96 | There is only info on the | | | 0.00 | 5 - 5(a) | 0.01 | 0.01 | 0.00 | 3 | 0.00 | NA | NA | 3 | 2.89E-04 |
| PM SHORT | Aug94Jul96 | 4 - 6 | 1.09 | 1.09 | 0.00 | 4 - 6 | 1.09 | 1.09 | NA | 4 | 2.14 | | 0.30 | NA** | NA |
| PM LONG | Aug94Jul96 | combined operation of | | | 0.00 | 5 - 5(a) | 0.01 | 0.01 | 0.00 | 3 | 1.14 | | 0.30 | 3 | 2.99E-03 |
| NO2 LONG | Aug94Jul96 | GT 1&2 see GT2 column | | | 0.00 | 5 - 5(a) | 0.19 | 0.19 | 0.00 | 3 | 0.00 | NA | NA | 3 | 6.75E-02 |
| CO SHORT | Aug94Jul96 | 4 - 6 | 1.38 | 1.38 | 0.00 | 4 - 6 | 1.38 | 1.38 | NA | 4 | 14.34 | NA | NA | NA** | NA |
| | | | | | | | | | | | | | | | |

(a) GT 1 and GT 2 are assumed to operate at the current utilization in the futrure.

** aux Boiler will never operate with the other steam units (unit 7 & 8) so it is not included in any "short term" Modelling

NO = Not Operating

NO = Not Operating

## MONITORING EXEMPTION

EMISSION RATES BASED ON:

Future Emis (yr 2000) - Current Actual

| | CURRENT ACTUAL PERIOD | UNIT 1-4 | | | | UNIT 5 | | | | UNIT 6 | | | | UNIT 7 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SHEET # | FUTURE | -CURRENT | =(g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEE | FUTURE | -CURRENT | (g/s) |
| PM SHORT | Aug94Jul96 | NO-NO | 0.00 | 0.00 | 0.00 | NO - 6 | 0.00 | 4.73 | -4.73 | NO - 6 | 0.00 | 4.73 | -4.73 | 4 - 6 | 9.79 | 9.79 | 0.00 |
| CO SHORT | Aug94Jul96 | NO-NO | 0.00 | 0.00 | 0.00 | NO - 6 | 0.00 | 1.26 | -1.26 | NO - 6 | 0.00 | 1.26 | -1.26 | 4 - 6 | 2.61 | 2.61 | 0.00 |

## MONITORING EXEMPTION

EMISSION RATES BASED ON:

Future Emis (yr 2000) - Current Actual

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CURRENT | UNIT GT1 | | | | UNIT GT2 | | | | UNIT 8 | | UNIT Cooling Tower | | AUXILARY BOILER | |
| | ACTUAL PERIOD | SHEE | FUTURE | -CURRENT | (g/s) | SHEET # | FUTURE | -CURRENT | (g/s) | SHEET # | (g/s) | | (g/s) | SHEET # | (g/s) |
| PM SHORT | Aug94Jul96 | 4 - 6 | 1.09 | 1.09 | 0.00 | 4 - 6 | 1.09 | 1.09 | 0.00 | 4 | 2.14 | 4 | 0.30 | NA** | NA |
| CO SHORT | Aug94Jul96 | 4 - 6 | 1.38 | 1.38 | 0.00 | 4 - 6 | 1.38 | 1.38 | 0.00 | 4 | 14.34 | NA | NA | NA** | NA |

** aux Boiler will never operate with the other steam units (unit 7 & 8) so it is not included in any "short term" Modelling

NO = Not Operating

## PSD CLASS II

Future Emis (yr 2000) - Baseline Actual

| | BASELINE PERIOD | UNIT 1 SHEET # | UNIT 1 FUTURE | UNIT 1 BASELINE | UNIT 1 =(g/s) | UNIT 2 SHEET # | UNIT 2 FUTURE | UNIT 2 BASELINE | UNIT 2 =(g/s) | UNIT 3 SHEET # | UNIT 3 FUTURE | UNIT 3 BASELINE | UNIT 3 =(g/s) | UNIT 4 SHEET # | UNIT 4 FUTURE | UNIT 4 BASELINE | UNIT 4 =(g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 SHORT | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | O - NO | 0.00 | 39.88 | -39.88 | NO - 2 | 0.00 | 39.88 | -39.88 | NO - 2 | 0.00 | 39.88 | -39.88 |
| SO2 LONG | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 2 | 0.00 | 0.31 | -0.31 | NO - 1 | 0.00 | 0.84 | -0.84 | NO - 1 | 0.00 | 0.79 | -0.79 |
| PM SHORT | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 1.81 | -1.81 | NO - 2 | 0.00 | 1.81 | -1.81 | NO - 2 | 0.00 | 1.81 | -1.81 |
| PM LONG | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 2 | 0.00 | 0.01 | -0.01 | NO - 1 | 0.00 | 0.04 | -0.04 | NO - 1 | 0.00 | 0.04 | -0.04 |
| NO2 LONG | 1986-1987 | O - NO | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 0.00 | 0.00 |

**PSD CLASS II**

Future Emis (yr 2000) - Baseline Actual

| | BASELINE PERIOD | UNIT 5 | | | | UNIT 6 | | | | UNIT 7 | | | | UNIT GT1 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SHEET # | FUTURE | BASELINE | =(g/s) | SHEET # | FUTURE | BASELINE | =(g/s) | SHEET # | FUTURE | BASELINE | =(g/s) | SHEET # | FUTURE | BASELINE | =(g/s) |
| SO2 SHORT | 1976-1977 | NO - 2 | 0.00 | 104.04 | -104.04 | NO - 2 | 0.00 | 104.04 | -104.04 | 4 - 2 | 146.45 | 215.37 | -68.92 | 4 - 2 | 1.47 | 11.76 | -10.29 |
| SO2 LONG | 1976-1977 | NO - 1 | 0.00 | 22.66 | -22.66 | NO - 1 | 0.00 | 26.08 | -26.08 | 3 - 1 | 2.30 | 97.68 | -95.39 | see note below | | | 0.00 |
| PM SHORT | 1976-1977 | NO - 2 | 0.00 | 4.73 | -4.73 | NO - 2 | 0.00 | 4.73 | -4.73 | 4 - 2 | 9.79 | 9.79 | 0.00 | 4 - 2 | 1.09 | 1.09 | 0.00 |
| PM LONG | 1976-1977 | NO - 1 | 0.00 | 1.04 | -1.04 | NO - 1 | 0.00 | 1.19 | -1.19 | 3 - 1 | 0.00 | 4.46 | -4.46 | see note below | | | 0.00 |
| NO2 LONG | 1986-1987 | NO - 1 | 0.00 | 0.52 | -0.52 | NO - 1 | 0.00 | 1.25 | -1.25 | 3 - 1 | 13.18 | 1.20 | 11.98 | see note below | | | 0.00 |

Note: GT 1&2 long term emission rates are a combination of the two units and are presented in the GT2 column.

* For GT 1&2 Current and Future long term emissions are based on Current Utilization factor
* (this is an assumption not a permit condition)

** aux Boiler will never operate with the other units so it is not included in any "short term" Modelling

NO = Not Operating

**PSD CLASS II**

**Future Emis (yr 2000) - Baseline Actual**

| | BASELINE PERIOD | UNIT GT2 SHEET # | UNIT GT2 FUTURE | UNIT GT2 -BASELINE | UNIT GT2 =(g/s) | UNIT 8 SHEET # | UNIT 8 (g/s) | UNIT Cooling Tower | UNIT Cooling Tower (g/s) | AUXILARY BOILER SHEET # | AUXILARY BOILER (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 SHORT | 1976-1977 | 4 - 2 | 1.47 | 11.76 | -10.29 | 4 | 7.82 | NA | NA | NA** | NA |
| SO2 LONG | 1976-1977 | 5* - 1 | 0.01 | 0.04 | -0.03 | 3 | 0.00 | NA | NA | 3 | 2.89E-04 |
| PM SHORT | 1976-1977 | 4 - 2 | 1.09 | 1.09 | NA | 4 | 2.14 | 4.00 | 0.30 | NA** | NA |
| PM LONG | 1976-1977 | 5* - 1 | 0.01 | 0.006 | 0.01 | 3 | 2.30 | 4.00 | 0.30 | 3 | 2.99E-03 |
| NO2 LONG | 1986-1987 | 5* - 1 | 0.19 | 0.04 | 0.14 | 3 | 0.00 | NA | NA | 3 | 6.75E-02 |

## PSD CLASS I

**Future Emis (yr 2000) - Baseline**

| | BASELINE PERIOD | UNIT 1 | | | | UNIT 2 | | | | UNIT 3 | | | | UNIT 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SHEET # | FUTURE | -BASELINE | =(g/s) | SHEET # | FUTURE | -BASELINE | =(g/s) | SHEET # | FUTURE | -BASELINE | =(g/s) | SHEET # | FUTURE | -BASELINE | =(g/s) |
| SO2 SHORT | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 2 | 0.00 | 39.88 | -39.88 | NO - 2 | 0.00 | 39.88 | -39.88 | NO - 2 | 0.00 | 39.88 | -39.88 |
| SO2 LONG | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 0.31 | -0.31 | NO - 1 | 0.00 | 0.84 | -0.84 | NO - 1 | 0.00 | 0.79 | -0.79 |
| PM SHORT | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 2 | 0.00 | 1.81 | -1.81 | NO - 2 | 0.00 | 1.81 | -1.81 | NO - 2 | 0.00 | 1.81 | -1.81 |
| PM LONG | 1976-1977 | O - NO | 0.00 | 0.00 | 0.00 | NO - 1 | 0.00 | 0.01 | -0.01 | NO - 1 | 0.00 | 0.04 | -0.04 | NO - 1 | 0.00 | 0.04 | -0.04 |
| NO2 LONG | 1986-1987 | O - NO | 0.00 | 0.00 | 0.00 | O - NO | 0.00 | 0.00 | 0.00 | O - NO | 0.00 | 0.00 | 0.00 | O - NO | 0.00 | 0.00 | 0.00 |

## PSD CLASS I

**Future Emis (yr 2000) - Baseline**

| | BASELINE PERIOD | UNIT 5 SHEET # | UNIT 5 FUTURE | UNIT 5 -BASELINE | UNIT 5 =(g/s) | UNIT 6 SHEET # | UNIT 6 FUTURE | UNIT 6 -BASELINE | UNIT 6 =(g/s) | UNIT 7 SHEET # | UNIT 7 FUTURE | UNIT 7 -BASELINE | UNIT 7 =(g/s) | UNIT GT1 SHEET # | UNIT GT1 FUTURE | UNIT GT1 -BASELINE | UNIT GT1 =(g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 SHORT | 1976-1977 | NO - 2 | 0.00 | 104.04 | -104.04 | NO - 2 | 0.00 | 104.04 | -104.04 | 4 - 2 | 146.45 | 215.37 | -68.92 | 4 - 2 | 1.47 | 11.76 | -10.29 |
| SO2 LONG | 1976-1977 | NO - 1 | 0.00 | 22.66 | -22.66 | NO - 1 | 0.00 | 26.08 | -26.08 | 3 - 1 | 2.30 | 97.68 | -95.39 | see note below | | | 0.00 |
| PM SHORT | 1976-1977 | NO - 2 | 0.00 | 4.73 | -4.73 | NO - 2 | 0.00 | 4.73 | -4.73 | 4 - 2 | 9.79 | 9.79 | 0.00 | 4 - 2 | 1.09 | 1.09 | 0.00 |
| PM LONG | 1976-1977 | NO - 1 | 0.00 | 1.04 | -1.04 | NO - 1 | 0.00 | 1.19 | -1.19 | 3 - 1 | 0.00 | 4.46 | -4.46 | see note below | | | 0.00 |
| NO2 LONG | 1986-1987 | NO - 1 | 0.00 | 0.52 | -0.52 | NO - 1 | 0.00 | 1.25 | -1.25 | 3 - 1 | 13.18 | 1.20 | 11.98 | see note below | | | 0.00 |

Note: GT 1&2 long term emission rates are a combination of the two units and are presented in the GT2 column.

* For GT 1&2 Current and Future long term emissions are based on Current Utilization factor
* (this is an assumption not a permit condition)

** aux Boiler will never operate with the other units so it is not included in any "short term" Modelling

NO = Not Operating

## PSD CLASS I

**Future Emis (yr 2000) - Baseline**

| | | UNIT GT2 | | | | UNIT 8 | | UNIT Cooling Tower | | AUXILARY BOILER | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | BASELINE PERIOD | SHEET # | FUTURE | -BASELINE | =(g/s) | SHEET # | (g/s) | | (g/s) | SHEET # | (g/s) |
| SO2 SHORT | 1976-1977 | 4 - 2 | 1.47 | 11.76 | -10.29 | 4 | 7.82 | NA | NA | NA** | NA |
| SO2 LONG | 1976-1977 | 5* - 1 | 0.01 | 0.04 | -0.03 | 3 | 0.00 | NA | NA | 3 | 2.89E-04 |
| PM SHORT | 1976-1977 | 4 - 2 | 1.09 | 1.09 | NA | 4 | 2.14 | 4 | 0.30 | NA** | NA |
| PM LONG | 1976-1977 | 5* - 1 | 0.01 | 0.006 | 0.01 | 3 | 2.30 | 4 | 0.30 | 3 | 2.99E-03 |
| NO2 LONG | 1986-1987 | 5* - 1 | 0.19 | 0.04 | 0.14 | 3 | 0.00 | NA | NA | 3 | 6.75E-02 |

## AAQS

Future Emissions (year 2000)

| | FUTURE PERIOD | UNIT 1-4 | | UNIT 5 | | UNIT 6 | | UNIT 7 | | UNIT GT1 | | UNIT GT2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) |
| SO2 SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 146.45 | 4 | 1.47 | 4 | 1.47 |
| SO2 LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 2.30 | SEE | NOTE | 5* | 0.01 |
| PM SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 9.79 | 4 | 1.09 | 4 | 1.09 |
| PM LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.24 | SEE | NOTE | 5* | 0.01 |
| NO2 LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 13.18 | SEE | NOTE | 5* | ~~0.19~~ 0.21 |
| CO SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 2.61 | 4 | 1.38 | 4 | 1.38 |
| Pb SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 0.0152 | 4 | 0.00167 | 4 | 0.00167 |

Note: GT 1&2 long term emission rates are a combination of the two units and are presented in the GT2 column.

* For GT 1&2 Current and Future long term emissions are based on Current Utilization factor
* (this is an assumption not a permit condition)

** aux Boiler will never operate with the other units so it is not included in any "short term" Modelling

NO = Not Operating

AAQS

Future Emissions (year 2000)

| | FUTURE PERIOD | UNIT 8 | | UNIT Cooling Tower | | AUXILARY BOILER | |
|---|---|---|---|---|---|---|---|
| | | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) |
| SO2 SHORT | 2000 | 4 | 7.82 | NA | NA | NA** | NA |
| SO2 LONG | 2000 | 3 | 0.00 | NA | NA | 3 | 2.89E-04 |
| PM SHORT | 2000 | 4 | 2.14 | 4 | 0.30 | NA** | NA |
| PM LONG | 2000 | 3 | 1.14 | 4 | 0.30 | 3 | 6.75E-02 |
| NO2 LONG | 2000 | 3 | 0.00 | NA | NA | 3 | 2.99E-03 |
| CO SHORT | 2000 | 4 | 14.34 | NA | NA | NA** | NA |
| Pb SHORT | 2000 | 4 | 0.00892 | NA | NA | NA** | NA |

## FARCS

Future Emissions (year 2000)

| | | FUTURE PERIOD | UNIT 1-4 SHEET # | UNIT 1-4 (g/s) | UNIT 5 SHEET # | UNIT 5 (g/s) | UNIT 6 SHEET # | UNIT 6 (g/s) | UNIT 7 SHEET # | UNIT 7 (g/s) | UNIT GT1 SHEET # | UNIT GT1 (g/s) | UNIT GT2 SHEET # | UNIT GT2 (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| As | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 8.93E-03 | 4 | 1.41E-04 | 4 | 1.41E-04 |
| Cd | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 3.62E-03 | 4 | 1.21E-04 | 4 | 1.21E-04 |
| Cr | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 1.00E-02 | 4 | 1.35E-03 | 4 | 1.35E-03 |
| Pb | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 1.52E-02 | 4 | 1.67E-03 | 4 | 1.67E-03 |
| Mn | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 5.80E-03 | 4 | 9.49E-03 | 4 | 9.49E-03 |
| Hg | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 2.51E-03 | 4 | 2.62E-05 | 4 | 2.62E-05 |
| Ni | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 1.82E-01 | 4 | 3.45E-02 | 4 | 3.45E-02 |
| Co | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 9.48E-03 | 4 | 2.62E-04 | 4 | 2.62E-04 |
| Sb | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 3.60E-03 | 4 | 6.32E-04 | 4 | 6.32E-04 |
| V | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 1.39E-01 | 4 | 1.26E-04 | 4 | 1.26E-04 |
| POM | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 3.21E-04 | 4 | 6.90E-04 | 4 | 6.90E-04 |
| Ben(a)P | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 2.98E-07 | 4 | 1.17E-07 | 4 | 1.17E-07 |
| Benzene | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 8.61E-05 | 4 | 3.38E-05 | 4 | 3.38E-05 |
| Toluene | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 7.75E-04 | 4 | 3.04E-04 | 4 | 3.04E-04 |
| Se | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 2.98E-03 | 4 | 1.52E-04 | 4 | 1.52E-04 |
| HCL | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 4.40E-01 | 4 | 2.17E-01 | 4 | 2.17E-01 |
| HF | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 8.35E-02 | 4 | 3.05E-02 | 4 | 3.05E-02 |
| 378TCDD | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 6.53E-10 | 4 | 2.55E-10 | 4 | 2.55E-10 |
| HCOH | SHORT | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 4 | 3.17E-02 | 4 | 6.14E-04 | 4 | 6.14E-04 |

## FARCS

Future Emissions (year 2000)

| | | FUTURE PERIOD | UNIT 1-4 SHEET # | UNIT 1-4 (g/s) | UNIT 5 SHEET # | UNIT 5 (g/s) | UNIT 6 SHEET # | UNIT 6 (g/s) | UNIT 7 SHEET # | UNIT 7 (g/s) | UNIT GT1 SHEET # | UNIT GT1 (g/s) | UNIT GT2 SHEET # | UNIT GT2 (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| As | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 2.44E-04 | 3 | 1.61E-06 | 3 | 1.61E-06 |
| Be | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.08E-07 | 3 | 1.08E-07 |
| Cd | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.38E-06 | 3 | 1.38E-06 |
| Cr | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.54E-05 | 3 | 1.54E-05 |
| Pb | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 2.62E-04 | 3 | 1.90E-05 | 3 | 1.90E-05 |
| Mn | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.08E-04 | 3 | 1.08E-04 |
| Hg | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 6.85E-05 | 3 | 2.99E-07 | 3 | 2.99E-07 |
| Ni | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 3.94E-04 | 3 | 3.94E-04 |
| Co | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 2.99E-06 | 3 | 2.99E-06 |
| Sb | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 7.22E-06 | 3 | 7.22E-06 |
| V | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 3.79E-03 | 3 | 1.44E-06 | 3 | 1.44E-06 |
| POM | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 7.88E-06 | 3 | 7.88E-06 |
| Ben(a)P | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.33E-09 | 3 | 1.33E-09 |
| Benzene | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 2.04E-05 | 3 | 3.85E-07 | 3 | 3.85E-07 |
| Toluene | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 5.73E-04 | 3 | 3.47E-06 | 3 | 3.47E-06 |
| Se | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 1.74E-06 | 3 | 1.74E-06 |
| HCL | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 2.48E-03 | 3 | 2.48E-03 |
| HF | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 2.09E-03 | 3 | 2.09E-03 |
| 378TCDD | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 0.00E+00 | 3 | 2.91E-12 | 3 | 2.91E-12 |
| HCOH | LONG | 2000 | NO | 0.00 | NO | 0.00 | NO | 0.00 | 3 | 7.92E-04 | 3 | 7.01E-06 | 3 | 7.01E-06 |

## FARCS

Future Emissions (year 2000)

| | | FUTURE PERIOD | UNIT 8 | | UNIT Cooling Tower | | UNIT AUX. BOILER | |
|---|---|---|---|---|---|---|---|---|
| | | | SHEET # | (g/s) | SHEET # | (g/s) | SHEET # | (g/s) |
| As | SHORT | 2000 | 4 | 7.54E-04 | (a) | NA | (b) | NA |
| Cd | SHORT | 2000 | 4 | 6.46E-04 | (a) | NA | (b) | NA |
| Cr | SHORT | 2000 | 4 | 7.23E-03 | (a) | NA | (b) | NA |
| Pb | SHORT | 2000 | 4 | 8.92E-03 | (a) | NA | (b) | NA |
| Mn | SHORT | 2000 | 4 | 5.08E-02 | (a) | NA | (b) | NA |
| Hg | SHORT | 2000 | 4 | 1.40E-04 | (a) | NA | (b) | NA |
| Ni | SHORT | 2000 | 4 | 1.85E-01 | (a) | NA | (b) | NA |
| Co | SHORT | 2000 | 4 | 1.40E-03 | (a) | NA | (b) | NA |
| Sb | SHORT | 2000 | 4 | 3.38E-03 | (a) | NA | (b) | NA |
| V | SHORT | 2000 | 4 | 6.77E-04 | (a) | NA | (b) | NA |
| POM | SHORT | 2000 | 4 | 3.69E-03 | (a) | NA | (b) | NA |
| Ben(a)P | SHORT | 2000 | 4 | 6.24E-07 | (a) | NA | (b) | NA |
| Benzene | SHORT | 2000 | 4 | 1.81E-04 | (a) | NA | (b) | NA |
| Toluene | SHORT | 2000 | 4 | 1.63E-03 | (a) | NA | (b) | NA |
| Se | SHORT | 2000 | 4 | 8.15E-04 | (a) | NA | (b) | NA |
| HCL | SHORT | 2000 | 4 | 1.16E+00 | (a) | NA | (b) | NA |
| HF | SHORT | 2000 | 4 | 1.63E-01 | (a) | NA | (b) | NA |
| 378TCDD | SHORT | 2000 | 4 | 1.36E-09 | (a) | NA | (b) | NA |
| HCOH | SHORT | 2000 | 4 | 3.29E-03 | (a) | NA | (b) | NA |

## FARCS

Future Emissions (year 2000)

| | | FUTURE PERIOD | UNIT 8 SHEET # | UNIT 8 (g/s) | UNIT Cooling Tower SHEET # | UNIT Cooling Tower (g/s) | UNIT AUX. BOILER SHEET # | UNIT AUX. BOILER (g/s) |
|---|---|---|---|---|---|---|---|---|
| As | LONG | 2000 | 3 | 0.00E+00 | 3 | NA | 3 | NA |
| Be | LONG | 2000 | 3 | 1.47E-05 | 3 | NA | 3 | NA |
| Cd | LONG | 2000 | 3 | 1.87E-04 | 3 | NA | 3 | NA |
| Cr | LONG | 2000 | 3 | 2.09E-03 | 3 | NA | 3 | NA |
| Pb | LONG | 2000 | 3 | 2.58E-03 | 3 | NA | 3 | NA |
| Mn | LONG | 2000 | 3 | 1.47E-02 | 3 | NA | 3 | NA |
| Hg | LONG | 2000 | 3 | 0.00E+00 | 3 | NA | 3 | 3.76E-10 |
| Ni | LONG | 2000 | 3 | 5.33E-02 | 3 | NA | 3 | NA |
| Co | LONG | 2000 | 3 | 4.04E-04 | 3 | NA | 3 | NA |
| Sb | LONG | 2000 | 3 | 9.78E-04 | 3 | NA | 3 | NA |
| V | LONG | 2000 | 3 | 0.00E+00 | 3 | NA | 3 | NA |
| POM | LONG | 2000 | 3 | 1.07E-03 | 3 | NA | 3 | NA |
| Ben(a)P | LONG | 2000 | 3 | 1.80E-07 | 3 | NA | 3 | NA |
| Benzene | LONG | 2000 | 3 | 1.58E-04 | 3 | NA | 3 | NA |
| Toluene | LONG | 2000 | 3 | 0.00E+00 | 3 | NA | 3 | NA |
| Se | LONG | 2000 | 3 | 2.36E-04 | 3 | NA | 3 | NA |
| HCL | LONG | 2000 | 3 | 3.36E-01 | 3 | NA | 3 | NA |
| HF | LONG | 2000 | 3 | 4.71E-02 | 3 | NA | 3 | NA |
| 378TCDD | LONG | 2000 | 3 | 3.94E-10 | 3 | NA | 3 | NA |
| HCOH | LONG | 2000 | 3 | 6.70E-03 | 3 | NA | 3 | NA |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/25/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJ [initials] 3/4/97 **Date:** 1/9/97 **File:** P8EMISS2.XLS
**Rvd. By:** M. Bilello **Date:** 03/04/97 **Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description: This calculation provides the annualized emission rates for Units 1 thru 7 and GT1 and GT2**
during the period 1/76 thru 12/77 for SO2 and PM and 1/86 thru 1/87 for NO2

**References:**

No. 1 COT Operating Data Report Summary
No. 2 Average Sulfur Content Natural Gas (0.32 grain/100CF)
No. 3 2.75 lb/mmBtu per 62-296.405(1)(c), F.A.C.
No. 4 0.125 lb/mmBtu per 62-296.405(1)(b) & 62-210.700(3) F.A.C. (assumes 3 hrs/day soot blowing)
No. 5 AP-42 Section 1.4 (emission factors adjusted to 1040 Btu/CF per table 1.4-2 (a))
No. 6 Unit 7 CEM NO2 emission factors (0.23 lb/mmBtu Nat. Gas) (0.33 lb/mmBtu Oil)
No. 7 Original Permit
No. 8 Typical density of #2 fuel oil at Purdom site (from analytical data).
No. 9 AP-42 Appendix sec 3.1

**Operating Data 1976 1977**

| | Gross Generation Rate (kW*hr) | | | | | | | Units 3-7 (a) Generation Split (%) | |
|---|---|---|---|---|---|---|---|---|---|
| **Month/Year** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **Gas** | **Oil** |
| Jan-76 | 0 | 0 | 584,300 | 714,700 | 7,721,000 | 8,251,000 | 26,617,000 | 0.0% | 100.0% |
| Feb-76 | 0 | 0 | 0 | 95,800 | 4,098,000 | 3,865,000 | 22,466,000 | 0.0% | 100.0% |
| Mar-76 | 0 | 0 | 0 | 0 | 2,980,000 | 4,611,000 | 24,054,000 | 0.0% | 100.0% |
| Apr-76 | 0 | 0 | 0 | 0 | 5,395,000 | 4,857,000 | 13,277,000 | 0.0% | 100.0% |
| May-76 | 0 | 0 | 0 | 0 | 0 | 0 | 25,166,000 | 0.0% | 100.0% |
| Jun-76 | 0 | 0 | 0 | 0 | 3,272,000 | 1,039,000 | 24,983,000 | 0.0% | 100.0% |
| Jul-76 | 0 | 0 | 529,300 | 349,000 | 7,907,000 | 7,719,000 | 25,297,000 | 0.0% | 100.0% |
| Aug-76 | 0 | 0 | 0 | 0 | 4,623,000 | 576,000 | 25,557,000 | 3.4% | 96.6% |
| Sep-76 | 0 | 0 | 0 | 0 | 1,422,000 | 2,048,000 | 19,926,000 | 0.0% | 100.0% |
| Oct-76 | 0 | 0 | 0 | 0 | 1,514,000 | 7,548,000 | 0 | 0.0% | 100.0% |
| Nov-76 | 0 | 0 | 0 | 0 | 388,000 | 8,499,000 | 0 | 0.0% | 100.0% |
| Dec-76 | 0 | 0 | 0 | 0 | 4,800,000 | 5,013,000 | 20,021,000 | 0.0% | 100.0% |
| Jan-77 | 0 | 234,000 | 395,800 | 385,800 | 3,599,000 | 4,491,000 | 28,515,000 | 0.0% | 100.0% |
| Feb-77 | 0 | 0 | 34,300 | 45,200 | 408,000 | 1,239,000 | 25,579,000 | 0.0% | 100.0% |
| Mar-77 | 0 | 0 | 0 | 0 | 0 | 4,936,000 | 15,171,000 | 11.2% | 88.8% |
| Apr-77 | 0 | 0 | 0 | 0 | 0 | 0 | 23,750,000 | 23.5% | 76.5% |
| May-77 | 0 | 0 | 0 | 0 | 4,658,000 | 4,145,000 | 25,837,000 | 30.4% | 69.6% |
| Jun-77 | 0 | 361,100 | 854,100 | 514,000 | 9,664,000 | 10,823,000 | 26,585,000 | 26.4% | 73.6% |
| Jul-77 | 0 | 439,000 | 883,200 | 1,090,400 | 11,756,000 | 11,222,000 | 27,920,000 | 15.6% | 84.4% |
| Aug-77 | 0 | 100,400 | 183,600 | 74,400 | 11,824,000 | 11,212,000 | 27,676,000 | 3.0% | 97.0% |
| Sep-77 | 0 | 0 | 0 | 0 | 10,940,000 | 7,256,000 | 25,733,000 | 24.8% | 75.2% |
| Oct-77 | 0 | 0 | 0 | 0 | 896,000 | 701,000 | 20,131,000 | 93.5% | 6.5% |
| Nov-77 | 0 | 0 | 0 | 0 | 963,000 | 2,436,000 | 18,655,000 | 23.6% | 76.4% |
| Dec-77 | 0 | 0 | 0 | 0 | 7,000 | 1,243,000 | 19,830,000 | 6.1% | 93.9% |
| Average (%) | | | | | | | | ***10.89%*** | ***89.11%*** |
| Total kW-hr | 0 | 1,134,500 | 3,464,600 | 3,269,300 | 98,835,000 | 113,730,000 | 512,746,000 | | |
| Btu/kW-hr | 13,700 | 13,700 | 13,700 | 13,700 | 13,000 | 13,000 | 10,800 | (a) Units 1 & 2 fire | |
| Gas (mmBtu)76&77 | 0 | 0 | 5,169 | 4,878 | 139,929 | 161,018 | 603,088 | Oil Only | |
| Oil (mmBtu)76&77 | 0 | 15,543 | 42,296 | 39,912 | 1,144,926 | 1,317,472 | 4,934,568 | | |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello | **Date:** 11/25/96 | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 1/9/97 | **File:** P8EMISS2.XLS
**Rvd. By:**M. Bilello | **Date:** 03/04/97 | **Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

```
Note all ITALIC data is from COT PURDOM (CURTIS GOLDEN)
GT 1 & 2 Operating Information (COMBINATION OF TWO UNITS)
Operating Information: unit rating 12.3 MW x 2
```

| | | |
|---|---|---|
| Operating Information: unit rating 12.3 MW x 2 | 24.6 | mw |
| Heat Input 228* mmBtu/hr x 2 | 456 | mmBtu/hr |
| BTU per KW-hr based on unit ratings (heat input/mw) | 18537 | Btu/kwh |
| LHV of natural gas Per GE data sheet | 904 | Btu/CF |
| LHV of #2 Fuel oil | 132000 | Btu/gal |

WHEN OPERATING DATA DOES NOT HAVE FUEL USAGE THE FUEL USAGE WAS CALCULATED
FUEL USAGE= KWH*BTU/KWH/HEATING VALUE OF THE FUEL

GT1 & GT2 Operating Data

| *Year - 1978* | mmCF gas | Kgal oil | *Hours on Gas* | *Hours on Oil* | *Total Hours* | *Oil Burn Gallons* | *Gas Burn M.C.F.* | *Gross KWH Gas* | *Gross KWH Oil* |
|---|---|---|---|---|---|---|---|---|---|
| *Month* | | | | | | | | | |
| *January* | 0.00 | 0.00 | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *February* | 0.00 | 32.07 | | | | *32067* | *0* | *0* | *241000* |
| *March* | 0.00 | 0.00 | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *April* | 5.78 | 0.00 | | | | | | *282000* | *0* |
| *May* | 3.24 | 17.12 | | | | *17118* | | *158000* | *123000* |
| *June* | 0.73 | 8.40 | *7* | *5* | *12* | *8401* | *730* | *38000* | *46000* |
| *July* | 0.55 | 6.67 | | | *7* | *6674* | | *27000* | *50000* |
| *August* | 0.00 | 5.31 | *0* | | *3* | *5313* | *0* | *0* | *40000* |
| *September* | 4.94 | 2.16 | | | *25* | *2163* | | *241000* | *10000* |
| *October* | 0.00 | 0.00 | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *November* | 0.00 | 0.00 | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *December* | 0.00 | 13.88 | *0* | | | *13882* | *0* | *0* | *101000* |
| TOTAL | 15.25 | 85.62 | | | | | | | |

| *Year - 1979* | mmCF gas | Kgal oil | *Hours on Gas* | *Hours on Oil* | *Total Hours* | *Oil Burn Gallons* | *Gas Burn M.C.F.* | *Gross KWH Gas* | *Gross KWH Oil* |
|---|---|---|---|---|---|---|---|---|---|
| *Month* | | | | | | | | | |
| *January* | 0.00 | 17.81 | *0.00* | *11.50* | *11.50* | *17805* | *0* | *0* | *138000* |
| *February* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *March* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *April* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *May* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *June* | 0.08 | 0.00 | | *0.00* | | *0* | | *4000* | *0* |
| *July* | 1.11 | 0.00 | | *0.00* | | *0* | | *54000* | *0* |
| *August* | 3.06 | 0.00 | | *0.00* | | *0* | | *149000* | *0* |
| *September* | 0.92 | 0.00 | | *0.00* | | *0* | | *45000* | *0* |
| *October* | 0.23 | 0.00 | | *0.00* | | *0* | | *11000* | *0* |
| *November* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *December* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| TOTAL | 5.39 | 17.81 | | | | | | | |

blank means no data

| 1978 1979 Summary | mmCF gas | Kgal oil |
|---|---|---|
| 1978 | 15.25 | 85.62 |
| 1979 | 5.39 | 17.81 |
| two year total | *20.64* | *103.42* |

** The heat input is based on the current permitted level. It is understood that during the baseline years it was somewhat lower. ( 188 mmBtu/hr @ site elev.). The fuel oil sulfur content in the original application was 0.27% but this limit was not reflected in the permit issued. Given the low number of operating hours for these units these differences will have no material effect on the modelled impacts.*

Note 1978 and 1979 are the oldest data available on the operation of GT1 and GT2. These data are being used as the most representative data available to 1976 and 1977

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello
**Ckd. By:** D. Graziani, PE DJD 3/4/97
**Rvd. By:**M. Bilello

**Date:** 11/25/96
**Date:** 1/9/97
**Date:** 03/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS2.XLS
**Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

Note all ITALIC data is from COT PURDOM (CURTIS GOLDEN)
GT 1 & 2 Operating Information (COMBINATION OF TWO UNITS)
Operating Information: unit rating 12.3 MW x 2

| | | |
|---|---|---|
| | 24.6 | mw |
| Heat Input 228* mmBtu/hr x 2 | 456 | mmBtu/hr |
| BTU per KW-hr based on unit ratings (heat input/mw) | 18537 | Btu/kw-hr |
| LHV of natural gas Per GE data sheet) | 904 | Btu/CF |
| LHV of #2 Fuel oil | 132000 | Btu/gal |

WHEN OPERATING DATA DOES NOT HAVE FUEL USAGE THE FUEL USAGE WAS CALCULATED
FUEL USAGE= KWH*BTU/KWH/HEATING VALUE OF THE FUEL

| *Year - 1986* | mmCF gas | Kgal oil | *Hours on Gas* | *Hours on Oil* | *Total Hours* | *Oil Burn Gallons* | *Gas Burn M.C.F.* | *Gross KWH Gas* | *Gross KWH Oil* |
|---|---|---|---|---|---|---|---|---|---|
| *Month* | | | | | | | | | |
| *January* | 1.95 | 0.00 | *8.50* | *0* | *8.50* | *0* | | *85000* | *0* |
| *February* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *March* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *April* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *May* | 2.79 | 0.00 | *13.00* | *0* | *13.00* | *0* | | *136000* | *0* |
| *June* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *July* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *August* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *September* | 0.88 | 0.00 | *4.50* | *0* | *4.50* | *0* | | *43000* | *0* |
| *October* | 2.48 | 0.00 | *11.50* | *0* | *11.50* | *0* | | *121000* | *0* |
| *November* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| *December* | 0.00 | 0.00 | *0.00* | *0* | *0.00* | *0* | *0* | *0* | *0* |
| Annual | 8.10 | 0.00 | 37.50 | 0.00 | 37.50 | 0.00 | 0.00 | 395000.00 | 0.00 |

| *Year - 1987* | mmCF gas | Kgal oil | *Hours on Gas* | *Hours on Oil* | *Total Hours* | *Oil Burn Gallons* | *Gas Burn M.C.F.* | *Gross KWH Gas* | *Gross KWH Oil* |
|---|---|---|---|---|---|---|---|---|---|
| *Month* | | | | | | | | | |
| *January* | 0.45 | 0.00 | *3.00* | *0.00* | *3.00* | *0* | *448* | *32000* | *0* |
| *February* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *March* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *April* | 0.66 | 0.00 | *6.00* | *0.00* | *6.00* | *0* | *662* | *64000* | *0* |
| *May* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *June* | 0.74 | 0.00 | *3.50* | *0.00* | *3.50* | *0* | | *36000* | *0* |
| *July* | 1.36 | 0.00 | *10.30* | *0.00* | *10.30* | *0* | *1358* | *97000* | *0* |
| *August* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *September* | 0.00 | 0.00 | *0.00* | *0.00* | *0.00* | *0* | *0* | *0* | *0* |
| *October* | 0.20 | 0.00 | *2.00* | *0.00* | *2.00* | *0* | *196* | *14000* | *0* |
| *November* | 1.70 | 0.00 | *8.25* | *0.00* | *8.25* | *0* | | *83000* | *0* |
| *December* | 1.81 | 0.00 | *13.75* | *0.00* | *13.75* | *0* | *1806* | *129000* | *0* |
| Annual | 6.91 | 0.00 | 46.80 | 0.00 | 46.80 | 0.00 | 4470.00 | 455000.00 | 0.00 |

**blank means no data**

| 1986 1987 Summary | mmCF gas | Kgal oil |
|---|---|---|
| 1978 | 8.10 | 0.00 |
| 1979 | 6.91 | 0.00 |
| two year total | 15.01 | 0.00 |

** The heat input is based on the current permitted level. It is understood that during the baseline years it was somewhat lower. ( 188 mmBtu/hr @ site elev.). The fuel oil sulfur content in the original application was 0.27% but this limit was not reflected in the permit issued. Given the low number of operating hours for these units these differences will have no material effect on the modelled impacts.*

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Biliello **Date:** 11/25/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJD 3/4/97 **Date:** 1/9/97 **File:** P8EMISS2.XLS
**Rvd. By:** M. Biliello **Date:** 03/04/97 **Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Operating Data 1986 1987**

| Year | Unit 5 Gas (10^3 CF) | Unit 5 Oil (kgal) | Unit 6 Gas (10^3 CF) | Unit 6 Oil (kgal) | Unit 7 Gas (10^3 CF) | Unit 7 Oil (kgal) | Ref. No. |
|---|---|---|---|---|---|---|---|
| 1986 | 142450 | 55.1 | 240370 | 59.81 | 1762910 | 559.9 | 1 |
| 1987 | 102227 | 0 | 55045 | 0 | 664245 | 0 | 1 |
| Totals | 244677 | 55.1 | 295415 | 59.81 | 2427155 | 559.9 | |
| mmBtu 1986/87 | 254464.08 | 8265 | 307231.6 | 8971.5 | 2524241.2 | 83985 | |
| | | | | | | | |

Assume 150000 Btu/gal heat content for #6 Oil or 0.15 mmBtu/gal
Assume 132000 Btu/gal heat content for #2 Oil or 0.132 mmBtu/gal
Assume 1040 Btu/scf heat content for natural gas HHV for Boilers
Assume 904 Btu/scf heat content for natural gas, LHV for Combustion Turbines (per GE Data Sheet)
Ref 8 6.75 lb/gal weight of # 2 fuel oil

**Calculations Oil Fired**

| Pollutant | UNIT 1 em. factor | | 1 TPY | 2 em. factor | | 2 TPY |
|---|---|---|---|---|---|---|
| SO2 | 2.75 | lb/mmBtu(7) | 0.00E+00 | 2.75 | lb/mmBtu(7) | 1.07E+01 |
| NO2 | na | na | na | na | na | na |
| PM | 0.125 | lb/mmBtu(3) | 0.00E+00 | 0.125 | lb/mmBtu(3) | 4.86E-01 |

Units 1- 4 were not operating during the NO2 baseline years 1986/87

**Calculations Oil Fired**

| Pollutant | UNIT 3 em. factor | | 3 TPY | 4 em. factor | | 4 TPY |
|---|---|---|---|---|---|---|
| SO2 | 2.75 | lb/mmBtu(7) | 2.91E+01 | 2.75 | lb/mmBtu(7) | 2.74E+01 |
| NO2 | na | na | na | na | na | na |
| PM | 0.125 | lb/mmBtu(3) | 1.32E+00 | 0.125 | lb/mmBtu(3) | 1.25E+00 |

**Calculations Oil Fired**

| Pollutant | UNIT 5 em. factor | | 5 TPY | 6 em. factor | | 6 TPY |
|---|---|---|---|---|---|---|
| SO2 | 2.75 | lb/mmBtu(7) | 7.87E+02 | 2.75 | lb/mmBtu(7) | 9.06E+02 |
| NO2 | 42 | lb/Kgal (1) | 5.79E-01 | 67 | lb/Kgal (1) | 1.00E+00 |
| PM | 0.125 | lb/mmBtu(3) | 3.58E+01 | 0.125 | lb/mmBtu(3) | 4.12E+01 |

**Calculations Oil Fired**

| Pollutant | UNIT 7 em. factor | | 7 TPY | GT1 em. factor | GT1 TPY | GT2 em. factor | | GT2 TPY |
|---|---|---|---|---|---|---|---|---|
| SO2 | 2.75 | lb/mmBtu(7) | 3.39E+03 | OPERATING DATA IS ONLY | | 0.4 | %S (7)* | 1.40E+00 |
| NO2 | 0.33 | lb/mmBtu(3) | 6.93E+00 | AVAILABLE FOR THE COMBINATION | | 0.698 | lb/mmBtu(9) | 0.00E+00 |
| PM | 0.125 | lb/mmBtu(3) | 1.54E+02 | OF GT1& GT2 (SEE GT2 COLUMN) | | 0.038 | lb/mmBtu(9)(f) | 1.30E-01 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/25/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJD 3/4/97 **Date:** 1/9/97 **File:** P8EMISS2.XLS
**Rvd. By:** M. Bilello **Date:** 03/04/97 **Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations Natural Gas Fired**

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 1 em. factor | | 1 TPY | 2 em. factor | | 2 TPY |
| SO2 | na | na | na | na | na | na |
| NO2 | na | na | na | na | na | na |
| PM | na | na | na | na | na | na |

Unit 1 & 2 are only capable of firing oil.

**Calculations Natural Gas Fired**

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 3 em. factor | | 3 TPY | 4 em. factor | | 4 TPY |
| SO2 | 0.32 | gr/100CF | 1.14E-03 | 0.32 | gr/100CF | 1.07E-03 |
| NO2 | na | na | na | na | na | na |
| PM | 5.2 | lb/mmCF(5) | 6.46E-03 | 5.2 | lb/mmCF(5) | 6.10E-03 |

Units 1-4 were not running during NO2 baseline years

**Calculations Natural Gas Fired**

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 5 em. factor | | 5 TPY | 6 em. factor | | 6 TPY |
| SO2 | 0.32 | gr/100CF | 3.08E-02 | 0.32 | gr/100CF | 3.64E-02 |
| NO2 | 286 | lb/mmCF(5) | 1.75E+01 | 572 | lb/mmCF(5) | 4.22E+01 |
| PM | 5.2 | lb/mmCF(5) | 1.75E-01 | 5.2 | lb/mmCF(5) | 2.01E-01 |

**Calculations Natural Gas Fired**

| Pollutant | UNIT | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 7 em. factor | | 7 TPY | GT1 em. factor | GT1 TPY | GT2 em. factor | | GT2 TPY |
| SO2 | 0.32 | gr/100CF | 1.33E-01 | OPERATING DATA IS ONLY | | 0.32 | gr/100CF | 4.72E-03 |
| NO2 | 0.23 | lb/mmBTU(5) | 3.47E+01 | AVAILABLE FOR THE COMBINATION | | 0.44 | lb/mmBtu(9) | 1.49E+00 |
| PM | 5.2 | lb/mmCF(5) | 7.54E-01 | OF GT1& GT2 (SEE GT2 COLUMN) | | 0.0193 | lb/mmBtu (9) | 9.00E-02 |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello
**Ckd. By:** D. Graziani, PE DG 3/4/97
**Rvd. By:** M. Bilello

**Date:** 11/25/96
**Date:** 1/9/97
**Date:** 03/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS2.XLS
**Sheet:** Baseline LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Annualized Emission Rates =[Oil (tpy) + Gas(tpy)] x 2000lb/ton x 454gm/lb /8760hr/yr / 3600sec/hr**

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 1 | | 1 | 2 | | 2 |
| | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 0.00E+00 | na | **0.00E+00** | 1.07E+01 | na | **3.08E-01** |
| NO2 | na | na | **0.00E+00** | na | na | **0.00E+00** |
| PM | 0.00E+00 | na | **0.00E+00** | 4.86E-01 | na | **1.40E-02** |

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 3 | | 3 | 4 | | 4 |
| | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 2.91E+01 | 1.14E-03 | **8.37E-01** | 2.74E+01 | 1.07E-03 | **7.90E-01** |
| NO2 | na | na | **0.00E+00** | na | na | **0.00E+00** |
| PM | 1.32E+00 | 6.46E-03 | **3.82E-02** | 1.25E+00 | 6.10E-03 | **3.61E-02** |

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 5 | | 5 | 6 | | 6 |
| | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 7.87E+02 | 3.08E-02 | **2.27E+01** | 9.06E+02 | 3.54E-02 | **2.61E+01** |
| NO2 | 5.79E-01 | 1.75E+01 | **5.20E-01** | 1.00E+00 | 4.22E+01 | **1.25E+00** |
| PM | 3.58E+01 | 1.75E-01 | **1.04E+00** | 4.12E+01 | 2.01E-01 | **1.19E+00** |

| Pollutant | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 7 | | 7 | GT1 | | GT1 |
| | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 3.39E+03 | 1.33E-01 | **9.77E+01** | OPERATING DATA IS ONLY | | |
| NO2 | 6.93E+00 | 3.47E+01 | **1.20E+00** | AVAILABLE FOR THE COMBINATION | | |
| PM | 1.54E+02 | 7.54E-01 | **4.46E+00** | OF GT1& GT2 (SEE GT2 COLUMN) | | |

| Pollutant | UNIT | | |
|---|---|---|---|
| | GT2 | | GT2 |
| | OIL(TPY) | Gas TPY | g/s |
| SO2 | 1.40E+00 | 4.72E-03 | **4.03E-02** |
| NO2 | 0.00E+00 | 1.49E+00 | **4.30E-02** |
| PM | 1.30E-01 | 9.00E-02 | **6.33E-03** |

Calculation Formats:

| EmissionFactor Units | Equation |
|---|---|
| lb/mmBtu | **TPY= EF(lb/mmBtu) X Heat Input(mmBtu/2yr baseline) / 2000(lb/ton) / 2(yr/Baseline period)** |
| lb/Kgal | **TPY= EF(lb/Kgal) X Fuel usage(Kgal/2yr baseline) / 2000(lb/ton) / 2(yr/Baseline period)** |
| gr/100CF | **TPY= EF(gr/100CF) X Heat Input(mmBtu/2yr baseline) X 10^6Btu/mmBtu / 100(CF) / Heat rate(Btu/CF) X 7000 gr/lb / 2000(lb/ton) / 2(yr/Baseline period)** |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97 **File:** P8EMISS.XLS
**Rvd. By:**M. Bilello **Date:** 03/04/97 **Sheet:** Baseline ST Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description: This calculation provides the short term emission rates for Units 1-7, GTs 1 & 2 based on allowable emission rates**

**References:**

No. 1 AP-42, Section 1.3
No. 2 Original Permits
No. 3 0.125 lb/mmBtu per 62-296.405(1)(b) & 62-210.700(3) F.A. (assumes 3 hrs/day soot blowing)
No. 4 Typical densities of oil (#2 and #6) at Purdom site (from analytical data).
No. 5 Title V Application (11/04/96)
No. 7 AP-42, Section 3.1
No. 8 Letter from Kennard F. Kosky (KBN) to Howard Rhodes (FDEP) 4-28-95Re: Florida [Electric Power] Coordinating Group [,Inc.]Emission Factors for Title [V] Permit Applications dated 4-28-95
No.9 Analysis of City of Tallahssee oil

**General Information**

| | Unit No. | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 5 | 6 | 7 | GT 1 | GT 2 |
| mmBTU | 115 | 300 | 300 | 621 | 228.0 | 228.0 |
| gal/hr | 767 | 2,000 | 2000 | 4140 | 1727 | 1727.0 |
| oil densi | 8.05 | 8.05 | 8.05 | 8.05 | 6.75 | 6.75 |
| lb Oil/hr | 6172 | 16100 | 16100 | 33327 | 11657 | 11657 |

**Calculations**

| | UNIT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Pollutant** | **1 (g) em. factor** | | **1(g) (g/s)** | **5 em. factor** | | **5 (g/s)** | **6 em. factor** | | **6 (g/s)** |
| SO2 | 2.75 | lb/mmBtu (2) | **39.88** | 2.75 | lb/mmBtu (2) | **104.04** | 2.75 | lb/mmBtu (2) | **104.04** |
| NO2 | 67 | lb/Kgal (1) | **6.48** | 42 | lb/Kgal (1)(h) | **10.59** | 67 | lb/Kgal (1) | **16.90** |
| PM | 0.125 | lb/mmBtu(3) | **1.81** | 0.125 | lb/mmBtu(3) | **4.73** | 0.125 | lb/mmBtu(3) | **4.73** |
| CO | 5 | lb/Kgal (1) | **0.48** | 5 | lb/Kgal (1) | **1.26** | 5 | lb/Kgal (1) | **1.26** |
| Be | 4.2 | lb/10^12Btu(1) | **0.0001** | 4.2 | lb/10^12Btu(1) | **0.0002** | 4.2 | lb/10^12Btu(1) | **0.0002** |
| Pb | 194.0 | lb/10^12Btu(1) | **0.0028** | 194.0 | lb/10^12Btu(1) | **0.0073** | 194.0 | lb/10^12Btu(1) | **0.0073** |
| Hg | 32.0 | lb/10^12Btu(1) | **0.0005** | 32.0 | lb/10^12Btu(1) | **0.0012** | 32.0 | lb/10^12Btu(1) | **0.0012** |
| Fl | 0.00016 | lb/gal (9) | **0.0155** | 0.00016 | lb/gal (9) | **0.0404** | 0.00016 | lb/gal (9) | **0.0404** |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG **Date:** 1/9/97 **File:** P8EMISS.XLS
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97 **Sheet:** Baseline ST Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations**

| Pollutant | UNIT 7 em. factor | | 7 (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT2 (g/s) |
|---|---|---|---|---|---|---|---|---|---|
| SO2 | 2.75 | lb/mmBtu (2) | 215.37 | 0.4 | %S (2) | 11.76 | 0.4 | %S (2) | 11.76 |
| NO2 | 0.33 | lb/mmBtu(b) | 25.84 | 0.698 | lb/mmBtu(7) | 20.07 | 0.698 | lb/mmBtu(7) | 20.07 |
| PM | 0.125 | lb/mmBtu(3) | 9.79 | 0.038 | lb/mmBtu(7)(f) | 1.09 | 0.038 | lb/mmBtu(7)(f) | 1.09 |
| CO | 5 | lb/Kgal (1) | 2.61 | 0.048 | lb/mmBtu(7) | 1.38 | 0.048 | lb/mmBtu(7) | 1.38 |
| Be | 4.2 | lb/10^12Btu(1) | 0.0003 | 3.30E-07 | lb/mmBtu(7) | 0.00001 | 3.30E-07 | lb/mmBtu(7) | 0.00001 |
| Pb | 194.0 | lb/10^12Btu(1) | 0.0152 | 5.80E-05 | lb/mmBtu(7) | 0.00167 | 5.80E-05 | lb/mmBtu(7) | 0.00167 |
| Hg | 32.0 | lb/10^12Btu(1) | 0.0025 | 9.10E-07 | lb/mmBtu(7) | 0.00003 | 9.10E-07 | lb/mmBtu(7) | 0.00003 |
| Fl | 0.00016 | lb/gal (9) | 0.0835 | 0.00014 | lb/gal (9) | 0.0305 | 0.00014 | lb/gal (9) | 0.0305 |

all emission rates based on firing oil

(b) Unit 7 NO2 emission factor from CEM data
(e) heat inputs for Units 5,6&7 are from Ref.5
(f) includes only filterable fraction of particulates
(g) Units 1-4 are identical units, as such emissions calculations are identical.
(h) Unit 5 is tangentally fired

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

**By:** Mike Bilello | **Date:** 11/22/96 | **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 | **Date:** 1/9/97 | **File:** P8EMISS.XLS
**Rvd. By:** M. Bilello | **Date:** 3/04/97 | **Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This is a summary of the annual scenario calculation that was used for the determination of future long term emission rates for unit 7 and unit 8 and the calculation of the future long term emissions for GT1 , GT2 and the Aux Boiler.

This is a summary of the calculations performed in the anual scenario calculations.
ALL tpy VALUES PRESENTED IN THIS SUMMARY ARE FROM THE ANNUAL SCEANRIOS.

## Scenarios used for future emissions estimates for Unit 7 and Unit 8

SCENARIO 1 UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 FIRING #6 OIL SO2 LIMIT 1.87 lb/mmBtu
SCENARIO 2 UNIT 8 AS CONTROLLING UNIT OPERATING MAX HOURS ON #2 FUEL OIL / NO OPERATION OF UNIT 7
SCENARIO 3 UNIT 7 AS CONTROLLING UNIT MAX HOURS ON #6 FUEL OIL 1.87 lb/mmBtu/ NO OPERATION OF UNIT 8
SCENARIO 4 UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 OPERATING ON # 6 OIL ASSUME TYPICAL S CONTENT
SCENARIO 5 UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 OPERATION ON NATURAL GAS
SCENARIO 6 UNIT 7 AS CONTROLLING UNIT MAX HOURS ON #6 FUEL OIL ASSUME TYPICAL S CONTENT/ NO OPERATION OF UNIT 8
SCENARIO 7 UNIT 7 AS CONTROLLING UNIT MAX HOURS ON NATURAL GAS/ OPERATION OF UNIT 8 ON NATURAL GAS
SCENARIO 8 UNIT 8 AS CONTROLLING UNIT OPERATING 8260 HOURS ON NATURAL GAS & 500 HR ON #2 OIL / UNIT 7 ON #6 OIL Typical S content 1%
SCENARIO 9 UNIT 8 AS CONTROLLING UNIT OPERATING 8260 HOURS ON NATURAL GAS & 500 HR ON #2 OIL / UNIT 7 ON NATURAL GAS
SCENARIO 10 UNIT 8 AS CONTROLLING UNIT OPERATING 7021 HRS ON NATURAL GAS & 425 HR ON #2 OIL / UNIT 7 ON #6 OIL ASSUME typical S content 1%
SCENARIO 11 UNIT 8 AS CONTROLLING UNIT (85% CAP.) OPERATING 7201 HOURS ON NATURAL GAS & 425 HR ON #2 OIL / UNIT 7 ON NATURAL GAS

Note: These scenarios were used to determine the potential worst case emissions on an annual basis and are not meant to reflect any hourly operational limits on the facility

ALL SCENARIOS BASED ON UNITS OPERATING AT 100 % LOAD

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Summary of annual Scenarios**

| | SO2 | | | PM | | | NO2 | | |
|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL |
| | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY |
| SCENARIO 1 | 72.9 | 6.9 | 79.8 | 4.9 | 39.4 | 44.3 | 12.9 | 254.0 | 266.9 |
| SCENARIO 2 | 0.0 | 79.8 | 79.8 | 0.0 | 14.7 | 14.7 | 0.0 | 279.3 | 279.3 |
| SCENARIO 3 | 79.8 | 0.0 | 79.8 | 5.3 | 0.00 | 5.3 | 14.1 | 0.0 | 14.1 |
| SCENARIO 4 | 72.9 | 6.9 | 79.8 | **8.5** | **39.4** | **47.9** | 22.4 | 254.0 | 276.4 |
| SCENARIO 5 | 0.8 | 6.9 | 7.7 | 4.4 | 39.4 | 43.8 | 203.7 | 254.0 | 457.7 |
| SCENARIO 6 | **79.8** | **0.0** | **79.8** | 9.3 | 0.0 | 9.3 | 24.5 | 0.0 | 24.5 |
| SCENARIO 7 | 1.7 | 0.0 | 1.7 | 10.0 | 0.0 | 10.0 | **457.7** | **0.0** | **457.7** |
| SCENARIO 8 | 50.3 | 29.5 | 79.8 | 5.9 | 41.4 | 47.3 | 15.5 | 320.0 | 335.5 |
| SCENARIO 9 | 0.5 | 29.5 | 30.1 | 3.0 | 41.4 | 44.4 | 137.7 | 320.0 | 457.7 |
| SCENARIO 10 | 54.7 | 25.1 | 79.8 | 6.4 | 35.2 | 41.6 | 16.8 | 272.0 | 288.9 |
| SCENARIO 11 | 0.7 | 25.1 | 25.8 | 4.0 | 35.2 | 39.2 | 185.7 | 272.0 | 457.7 |
| MAX TOTAL | | | 79.8 | | | 47.9 | | | 457.7 |

| | SO2 | | | PM | | | NO2 | | |
|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL |
| Maximum emissions TPY | 79.8 | 0.0 | 79.8 | 8.49 | 39.42 | 47.91 | 457.73 | 0.00 | 457.73 |
| Emission Rate used in annual Modelling (g/s) | **2.30** | **0.00** | 2.30 | **0.24** | **1.14** | 1.38 | **13.18** | **0.00** | 13.18 |
| double check | | OK | | | OK | | | OK | |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | | CO | | | VOC | | | Pb | | | H2SO4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL |
| | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY |
| SCENARIO 1 | 1.3 | 147.0 | 148.3 | 0.2 | 12.3 | 12.5 | 7.56E-03 | 0.00E+00 | 7.56E-03 | 3.37E+00 | 0.00E+00 | 3.37E+00 |
| SCENARIO 2 | 0.0 | 98.6 | 98.6 | 0.0 | 7.9 | 7.9 | **0.00E+00** | **8.95E-02** | **8.95E-02** | **0.00E+00** | **8.67E+00** | **8.67E+00** |
| SCENARIO 3 | 1.4 | 0.0 | 1.4 | 0.2 | 0.0 | 0.2 | 8.28E-03 | 0.00E+00 | 8.28E-03 | 3.69E+00 | 0.00E+00 | 3.69E+00 |
| SCENARIO 4 | 2.3 | 147.0 | 149.3 | 0.3 | 12.3 | 12.6 | 1.32E-02 | 0.00E+00 | 1.32E-02 | 5.88E+00 | 0.00E+00 | 5.88E+00 |
| SCENARIO 5 | 35.4 | 147.0 | 182.4 | 1.2 | 12.3 | 13.5 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SCENARIO 6 | 2.5 | 0.0 | 2.5 | 0.4 | 0.0 | 0.4 | 1.44E-02 | 0.00E+00 | 1.44E-02 | 6.44E+00 | 0.00E+00 | 6.44E+00 |
| SCENARIO 7 | 79.6 | 0.0 | 79.6 | 2.7 | 0.0 | 2.7 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SCENARIO 8 | 1.6 | 167.0 | 168.6 | 0.2 | 13.8 | 14.1 | 9.09E-03 | 2.58E-02 | 3.49E-02 | 4.06E+00 | 2.50E+00 | 6.56E+00 |
| SCENARIO 9 | **23.9** | **167.0** | **191.0** | **0.8** | **13.8** | **14.7** | 0.00E+00 | 2.58E-02 | 2.58E-02 | 0.00E+00 | 2.50E+00 | 2.50E+00 |
| SCENARIO 10 | 1.7 | 142.0 | 143.7 | 0.3 | 11.8 | 12.0 | 9.89E-03 | 2.19E-02 | 3.18E-02 | 4.41E+00 | 2.13E+00 | 6.54E+00 |
| SCENARIO 11 | 32.3 | 142.0 | 174.3 | 1.1 | 11.8 | 12.9 | 0.00E+00 | 2.19E-02 | 2.19E-02 | 0.00E+00 | 2.13E+00 | 2.13E+00 |
| MAX TOTAL | | | 191.0 | | | 14.7 | | | 8.95E-02 | | | 8.67E+00 |

| | | CO | | | VOC | | | Pb | | | H2SO4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL |
| Maximum emissions TPY | 23.95 | 167.02 | 190.97 | 0.8 | 13.8 | 14.7 | 9.09E-03 | 8.95E-02 | 8.95E-02 | 0.00E+00 | 8.67E+00 | 8.67E+00 |
| Emission Rate used in annual Modelling (g/s) | **0.69** | **4.81** | 5.50 | na | na | na | 0.0002616 | 0.0025776 | 0.00257763 | **0.00E+00** | **2.50E-01** | 2.50E-01 |
| double check | | | OK | | | OK | | | OK | | | OK |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** *City of Tallahassee*
**Project:** Purdom Unit 8

| | Fl | | | Hg | | | Be | | | As | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7<br>TPY | UNIT 8<br>TPY | TOTAL<br>TPY | UNIT 7<br>TPY | UNIT 8<br>TPY | TOTAL<br>TPY | UNIT 7<br>TPY | UNIT 8<br>TPY | TOTAL<br>TPY | UNIT 7<br>TPY | UNIT 8<br>TPY | *TOTAL*<br>TPY |
| SCENARIO 1 | 4.16E-02 | 0.00E+00 | 4.16E-02 | 1.25E-03 | 5.34E-06 | 1.25E-03 | 1.64E-04 | 0.00E+00 | 1.64E-04 | 4.44E-03 | 0.00E+00 | *4.44E-03* |
| SCENARIO 2 | **0.00E+00** | **1.64E+00** | **1.64E+00** | **0.00E+00** | **1.40E-03** | **1.40E-03** | **0.00E+00** | **5.09E-04** | **5.09E-04** | 0.00E+00 | 7.56E-03 | *7.56E-03* |
| SCENARIO 3 | 4.55E-02 | 0.00E+00 | 4.55E-02 | 1.37E-03 | 0.00E+00 | 1.37E-03 | 1.79E-04 | 0.00E+00 | 1.79E-04 | 4.86E-03 | 0.00E+00 | *4.86E-03* |
| SCENARIO 4 | 7.24E-02 | 0.00E+00 | 7.24E-02 | 2.17E-03 | 5.34E-06 | 2.18E-03 | 2.85E-04 | 0.00E+00 | 2.85E-04 | 7.74E-03 | 0.00E+00 | *7.74E-03* |
| SCENARIO 5 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.91E-07 | 5.34E-06 | 6.03E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 6 | 7.93E-02 | 0.00E+00 | 7.93E-02 | **2.38E-03** | **0.00E+00** | **2.38E-03** | 3.12E-04 | 0.00E+00 | 3.12E-04 | **8.48E-03** | **0.00E+00** | ***8.48E-03*** |
| SCENARIO 7 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.55E-06 | 0.00E+00 | 1.55E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 8 | 4.72E-01 | 5.00E-02 | 5.22E-01 | 4.10E-04 | 4.10E-04 | 8.20E-04 | 1.97E-04 | 1.47E-04 | 3.44E-04 | 5.34E-03 | 2.18E-03 | *7.52E-03* |
| SCENARIO 9 | 0.00E+00 | 4.72E-01 | 4.72E-01 | 4.67E-07 | 4.10E-04 | 4.10E-04 | 0.00E+00 | 1.47E-04 | 1.47E-04 | 0.00E+00 | 2.18E-03 | *2.18E-03* |
| SCENARIO 10 | 5.44E-02 | 4.01E-01 | 4.55E-01 | 1.63E-03 | 3.48E-04 | 1.98E-03 | 2.14E-04 | 1.25E-04 | 3.39E-04 | 5.81E-03 | 1.85E-03 | *7.66E-03* |
| SCENARIO 11 | 0.00E+00 | 4.01E-01 | 4.01E-01 | 6.30E-07 | 3.48E-04 | 3.49E-04 | 0.00E+00 | 1.25E-04 | 1.25E-04 | 0.00E+00 | 1.85E-03 | *1.85E-03* |
| MAX TOTAL | | | 1.64E+00 | | | 2.38E-03 | | | 5.09E-04 | | | *8.48E-03* |

| | Fl | | | Hg | | | Be | | | As | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *UNIT 7* | *UNIT 8* | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | TOTAL | UNIT 7 | UNIT 8 | *TOTAL* |
| Maximum emissions TPY | 0.00E+00 | 1.64E+00 | 1.64E+00 | 2.38E-03 | 0.00E+00 | 2.38E-03 | 0.00E+00 | 5.09E-04 | 5.09E-04 | 8.48E-03 | 0.00E+00 | 8.48E-03 |
| Emission Rate used in annual Modelling (g/s) | **0.00E+00** | **4.71E-02** | 4.71E-02 | **6.85E-05** | **0.00E+00** | 6.85E-05 | **0.00E+00** | **1.47E-05** | 1.47E-05 | 2.44E-04 | 0.00E+00 | **2.44E-04** |
| double check | | | OK | | | OK | | | OK | | | OK |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | Cd | | | Cr | | | Mn | | | Ni | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 TPY | UNIT 8 TPY | *TOTAL TPY* | UNIT 7 TPY | UNIT 8 TPY | *TOTAL TPY* | UNIT 7 TPY | UNIT 8 TPY | *TOTAL TPY* | UNIT 7 TPY | UNIT 8 TPY | *TOTAL TPY* |
| SCENARIO 1 | 1.80E-03 | 0.00E+00 | *1.80E-03* | 4.99E-03 | 0.00E+00 | *4.99E-03* | 2.88E-03 | 0.00E+00 | *2.88E-03* | 9.08E-02 | 0.00E+00 | *9.08E-02* |
| SCENARIO 2 | **0.00E+00** | **6.48E-03** | ***6.48E-03*** | **0.00E+00** | **7.25E-02** | ***7.25E-02*** | **0.00E+00** | **5.09E-01** | ***5.09E-01*** | **0.00E+00** | **1.85E+00** | ***1.85E+00*** |
| SCENARIO 3 | 1.97E-03 | 0.00E+00 | *1.97E-03* | 5.46E-03 | 0.00E+00 | *5.46E-03* | 3.16E-03 | 0.00E+00 | *3.16E-03* | 9.08E-02 | 0.00E+00 | *9.08E-02* |
| SCENARIO 4 | 3.14E-03 | 0.00E+00 | *3.14E-03* | 8.69E-03 | 0.00E+00 | *8.69E-03* | 5.02E-03 | 0.00E+00 | *5.02E-03* | 1.58E-01 | 0.00E+00 | *1.58E-01* |
| SCENARIO 5 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 6 | 3.43E-03 | 0.00E+00 | *3.43E-03* | 9.52E-03 | 0.00E+00 | *9.52E-03* | 5.50E-03 | 0.00E+00 | *5.50E-03* | 1.73E-01 | 0.00E+00 | *1.73E-01* |
| SCENARIO 7 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 8 | 2.16E-03 | 1.87E-03 | *4.03E-03* | 5.99E-03 | 2.09E-02 | *2.69E-02* | 3.47E-03 | 1.47E-01 | *1.50E-01* | 1.09E-01 | 5.34E-01 | *6.43E-01* |
| SCENARIO 9 | 0.00E+00 | 1.87E-03 | *1.87E-03* | 0.00E+00 | 2.09E-02 | *2.09E-02* | 0.00E+00 | 1.47E-01 | *1.47E-01* | 0.00E+00 | 5.34E-01 | *5.34E-01* |
| SCENARIO 10 | 2.35E-03 | 1.59E-03 | *3.94E-03* | 6.52E-03 | 1.78E-02 | *2.43E-02* | 3.77E-03 | 1.25E-01 | *1.29E-01* | 1.19E-01 | 4.54E-01 | *5.73E-01* |
| SCENARIO 11 | 0.00E+00 | 1.59E-03 | *1.59E-03* | 0.00E+00 | 1.78E-02 | *1.78E-02* | 0.00E+00 | 1.25E-01 | *1.25E-01* | 0.00E+00 | 4.54E-01 | *4.54E-01* |
| MAX TOTAL | | | *6.48E-03* | | | *7.25E-02* | | | *5.09E-01* | | | *1.85E+00* |

| | Cd | | | Cr | | | Mn | | | Ni | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* |
| Maximum emissions TPY | 0.00E+00 | 6.48E-03 | 6.48E-03 | 0.00E+00 | 7.25E-02 | 7.25E-02 | 0.00E+00 | 5.09E-01 | 5.09E-01 | 0.00E+00 | 1.85E+00 | 1.85E+00 |
| Emission Rate used in annual Modelling (g/s) | 0.00E+00 | 1.87E-04 | **1.87E-04** | 0.00E+00 | 2.09E-03 | **2.09E-03** | 0.00E+00 | 1.47E-02 | **1.47E-02** | 0.00E+00 | 5.33E-02 | **5.33E-02** |
| double check | | | OK | | | OK | | | OK | | | OK |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | Co | | | Sb | | | V | | | POM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* |
| | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY | TPY |
| SCENARIO 1 | 4.72E-03 | 0.00E+00 | *4.72E-03* | 1.79E-03 | 0.00E+00 | *1.79E-03* | 6.90E-02 | 0.00E+00 | *6.90E-02* | 1.60E-04 | 0.00E+00 | *1.60E-04* |
| SCENARIO 2 | **0.00E+00** | **1.40E-02** | ***1.40E-02*** | **0.00E+00** | **3.40E-02** | ***3.40E-02*** | 0.00E+00 | 6.79E-03 | *6.79E-03* | **0.00E+00** | **3.71E-02** | ***3.71E-02*** |
| SCENARIO 3 | 4.72E-03 | 0.00E+00 | *4.72E-03* | 1.96E-03 | 0.00E+00 | *1.96E-03* | 7.56E-02 | 0.00E+00 | *7.56E-02* | 1.75E-04 | 0.00E+00 | *1.75E-04* |
| SCENARIO 4 | 8.22E-03 | 0.00E+00 | *8.22E-03* | 3.12E-03 | 0.00E+00 | *3.12E-03* | 1.20E-01 | 0.00E+00 | *1.20E-01* | 2.78E-04 | 0.00E+00 | *2.78E-04* |
| SCENARIO 5 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 6 | 9.00E-03 | 0.00E+00 | *9.00E-03* | 3.42E-03 | 0.00E+00 | *3.42E-03* | **1.32E-01** | **0.00E+00** | ***1.32E-01*** | 3.05E-04 | 0.00E+00 | *3.05E-04* |
| SCENARIO 7 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 8 | 5.67E-03 | 4.05E-03 | *9.72E-03* | 2.15E-03 | 9.79E-03 | *1.19E-02* | 8.29E-02 | 1.96E-03 | *8.49E-02* | 1.92E-04 | 1.07E-02 | *1.09E-02* |
| SCENARIO 9 | 0.00E+00 | 4.05E-03 | *4.05E-03* | 0.00E+00 | 9.79E-03 | *9.79E-03* | 0.00E+00 | 1.96E-03 | *1.96E-03* | 0.00E+00 | 1.07E-02 | *1.07E-02* |
| SCENARIO 10 | 6.17E-03 | 3.44E-03 | *9.61E-03* | 2.34E-03 | 8.32E-03 | *1.07E-02* | 9.02E-02 | 1.66E-03 | *9.19E-02* | 2.09E-04 | 9.08E-03 | *9.29E-03* |
| SCENARIO 11 | 0.00E+00 | 3.44E-03 | *3.44E-03* | 0.00E+00 | 8.32E-03 | *8.32E-03* | 0.00E+00 | 1.66E-03 | *1.66E-03* | 0.00E+00 | 9.08E-03 | *9.08E-03* |
| MAX TOTAL | | | *1.40E-02* | | | *3.40E-02* | | | *1.32E-01* | | | *3.71E-02* |

| | Co | | | Sb | | | V | | | POM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* |
| Maximum emissions TPY | 0.00E+00 | 1.40E-02 | 1.40E-02 | 0.00E+00 | 3.40E-02 | 3.40E-02 | 1.32E-01 | 0.00E+00 | 1.32E-01 | 0.00E+00 | 3.71E-02 | 3.71E-02 |
| Emission Rate used in annual Modelling (g/s) | 0.00E+00 | 4.04E-04 | **4.04E-04** | 0.00E+00 | 9.78E-04 | **9.78E-04** | 3.79E-03 | 0.00E+00 | **3.79E-03** | 0.00E+00 | 1.07E-03 | **1.07E-03** |
| *double check* | | | OK | | | OK | | | OK | | | OK |

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | BaP UNIT 7 TPY | BaP UNIT 8 TPY | BaP *TOTAL* TPY | Benzene UNIT 7 TPY | Benzene UNIT 8 TPY | Benzene *TOTAL* TPY | Toluene UNIT 7 TPY | Toluene UNIT 8 TPY | Toluene *TOTAL* TPY | Se UNIT 7 TPY | Se UNIT 8 TPY | Se *TOTAL* TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 1 | 1.48E-07 | 0.00E+00 | *1.48E-07* | 4.29E-05 | 5.48E-03 | *5.52E-03* | 3.86E-04 | 0.00E+00 | *3.86E-04* | 1.48E-03 | 0.00E+00 | *1.48E-03* |
| SCENARIO 2 | **0.00E+00** | **6.27E-06** | ***6.27E-06*** | 0.00E+00 | 1.81E-03 | *1.81E-03* | 0.00E+00 | 1.63E-02 | *1.63E-02* | **0.00E+00** | **8.18E-03** | ***8.18E-03*** |
| SCENARIO 3 | 1.62E-07 | 0.00E+00 | *1.62E-07* | 4.69E-05 | 0.00E+00 | *4.69E-05* | 4.22E-04 | 0.00E+00 | *4.22E-04* | 1.62E-03 | 0.00E+00 | *1.62E-03* |
| SCENARIO 4 | 2.58E-07 | 0.00E+00 | *2.58E-07* | 7.47E-05 | 5.48E-03 | *5.55E-03* | 6.72E-04 | 0.00E+00 | *6.72E-04* | 2.58E-03 | 0.00E+00 | *2.58E-03* |
| SCENARIO 5 | 0.00E+00 | 0.00E+00 | *0.00E+00* | **7.08E-04** | **5.48E-03** | ***6.19E-03*** | 8.86E-03 | 0.00E+00 | *8.86E-03* | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 6 | 2.83E-07 | 0.00E+00 | *2.83E-07* | 8.18E-05 | 0.00E+00 | *8.18E-05* | 7.36E-04 | 0.00E+00 | *7.36E-04* | 2.83E-03 | 0.00E+00 | *2.83E-03* |
| SCENARIO 7 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 1.59E-03 | 0.00E+00 | *1.59E-03* | **1.99E-02** | **0.00E+00** | ***1.99E-02*** | 0.00E+00 | 0.00E+00 | *0.00E+00* |
| SCENARIO 8 | 1.78E-07 | 1.81E-06 | *1.98E-06* | 5.15E-05 | 5.69E-03 | *5.74E-03* | 4.64E-04 | 4.70E-03 | *5.17E-03* | 1.78E-03 | 2.36E-03 | *4.14E-03* |
| SCENARIO 9 | 0.00E+00 | 1.81E-06 | *1.81E-06* | 4.79E-04 | 5.69E-03 | *6.17E-03* | 5.99E-03 | 4.70E-03 | *1.07E-02* | 0.00E+00 | 2.36E-03 | *2.36E-03* |
| SCENARIO 10 | 1.94E-07 | 1.53E-06 | *1.73E-06* | 5.61E-05 | 4.83E-03 | *4.89E-03* | 5.05E-04 | 4.00E-03 | *4.50E-03* | 1.94E-03 | 2.00E-03 | *3.94E-03* |
| SCENARIO 11 | 0.00E+00 | 1.53E-06 | *1.53E-06* | 6.46E-04 | 4.83E-03 | *5.48E-03* | 8.07E-03 | 4.00E-03 | *1.21E-02* | 0.00E+00 | 2.00E-03 | *2.00E-03* |
| MAX TOTAL | | | *6.27E-06* | | | *6.19E-03* | | | *1.99E-02* | | | *8.18E-03* |

| | BaP UNIT 7 | BaP UNIT 8 | BaP *TOTAL* | Benzene UNIT 7 | Benzene UNIT 8 | Benzene *TOTAL* | Toluene UNIT 7 | Toluene UNIT 8 | Toluene *TOTAL* | Se UNIT 7 | Se UNIT 8 | Se *TOTAL* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum emissions TPY | 0.00E+00 | 6.27E-06 | 6.27E-06 | 7.08E-04 | 5.48E-03 | 6.19E-03 | 1.99E-02 | 0.00E+00 | 1.99E-02 | 0.00E+00 | 8.18E-03 | 8.18E-03 |
| Emission Rate used in annual Modelling (g/s) | 0.00E+00 | 1.80E-07 | **1.80E-07** | 2.04E-05 | 1.58E-04 | **1.78E-04** | 5.73E-04 | 0.00E+00 | **5.73E-04** | 0.00E+00 | 2.36E-04 | **2.36E-04** |
| double check | | | OK | | | OK | | | OK | | | OK |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello — **Date:** 11/22/96 — **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG — **Date:** 1/9/97 — **File:** P8EMISS.XLS
**Rvd. By:** M. Bilello 3/4/97 — **Date:** 3/04/97 — **Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | HCL | | | 2378diox | | | HCOH | | |
|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 TPY | UNIT 8 TPY | *TOTAL* TPY | UNIT 7 TPY | UNIT 8 TPY | *TOTAL* TPY | UNIT 7 TPY | UNIT 8 TPY | *TOTAL* TPY |
| SCENARIO 1 | 2.19E-01 | 0.00E+00 | *2.19E-01* | 3.25E-10 | 0.00E+00 | *3.25E-10* | 1.58E-02 | 2.33E-01 | *2.49E-01* |
| SCENARIO 2 | **0.00E+00** | **1.17E+01** | ***1.17E+01*** | **0.00E+00** | **1.37E-08** | ***1.37E-08*** | 0.00E+00 | 3.30E-02 | *3.30E-02* |
| SCENARIO 3 | 2.40E-01 | 0.00E+00 | *2.40E-01* | 3.56E-10 | 0.00E+00 | *3.56E-10* | 1.73E-02 | 0.00E+00 | *1.73E-02* |
| SCENARIO 4 | 3.81E-01 | 0.00E+00 | *3.81E-01* | 5.66E-10 | 0.00E+00 | *5.66E-10* | **2.75E-02** | **2.33E-01** | ***2.60E-01*** |
| SCENARIO 5 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 1.06E-09 | 0.00E+00 | *1.06E-09* | 0.00E+00 | 2.33E-01 | *2.33E-01* |
| SCENARIO 6 | 4.18E-01 | 0.00E+00 | *4.18E-01* | 6.20E-10 | 0.00E+00 | *6.20E-10* | 3.01E-02 | 0.00E+00 | *3.01E-02* |
| SCENARIO 7 | 0.00E+00 | 0.00E+00 | *0.00E+00* | 2.39E-09 | 0.00E+00 | *2.39E-09* | 6.77E-02 | 0.00E+00 | *6.77E-02* |
| SCENARIO 8 | 2.63E-01 | 3.36E+00 | *3.63E+00* | 3.90E-10 | 3.94E-09 | *4.33E-09* | 1.90E-02 | 2.29E-01 | *2.48E-01* |
| SCENARIO 9 | 0.00E+00 | 3.36E+00 | *3.36E+00* | 7.18E-10 | 3.94E-09 | *4.66E-09* | 2.04E-02 | 2.29E-01 | *2.49E-01* |
| SCENARIO 10 | 2.86E-01 | 2.86E+00 | *3.15E+00* | 4.25E-10 | 3.35E-09 | *3.78E-09* | 2.06E-02 | 1.95E-01 | *2.15E-01* |
| SCENARIO 11 | 0.00E+00 | 2.86E+00 | *2.86E+00* | 9.69E-10 | 3.35E-09 | *4.32E-09* | 2.75E-02 | 1.95E-01 | *2.22E-01* |
| MAX TOTAL | | | *1.17E+01* | | | *1.37E-08* | | | *2.60E-01* |

| | HCL | | | 2378diox | | | HCOH | | |
|---|---|---|---|---|---|---|---|---|---|
| | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* | UNIT 7 | UNIT 8 | *TOTAL* |
| Maximum emissions TPY | 0.00E+00 | 1.17E+01 | 1.17E+01 | 0.00E+00 | 1.37E-08 | 1.37E-08 | 2.75E-02 | 2.33E-01 | 2.60E-01 |
| Emission Rate used in annual Modelling (g/s) | 0.00E+00 | 3.36E-01 | **3.36E-01** | 0.00E+00 | 3.94E-10 | **3.94E-10** | 7.92E-04 | 6.70E-03 | **7.49E-03** |
| double check | | | OK | | | OK | | | OK |

Note: When there is more than one scenario with the total TPY equal to the max the scenario in which Unit 7 has the higer emissions was selected. This is because Unit 7 produces higher impacts than Unit 8 with the same TPY emissions

annualized g/s=TPY x 2000lb/ton x 454gm/lb / 8760hr/yr / 3600sec/hr

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD 3/4/97 **Date:** 1/9/97
**Rvd. By:** M. Bilello **Date:** 3/04/97

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**General Information for Oil firing**

| | GT 1 | GT 2 | Aux B (3) |
|---|---|---|---|
| mmBTU/hr | 228.0 | 228.0 | 16.738 |
| gal/hr | 1727 | 1727.0 | na |
| oil density(5) | 6.75 | 6.75 | na |
| lb Oil/hr | 11657 | 11657 | na |
| hours/year(a) | 100 | 100 | 2000 |

**References:**
No. 1 AP-42, Section 1.3
No. 2 Letter from Kennard F. Kosky (KBN) to Howard Rhodes (FDEP) 4-28-95Re:Florida [Electric Power] Coordinating Group [,Inc.]Emission Factors for Title [V] Permit Applications dated 4-28-95
No. 3 Aux Boiler Permit Application
No. 4 AP-42, Section 1.4
No. 5 Typical densityof #2 fuel oil at Purdom site (from analytical data).
**All calculations based on 100% load**

**Note: These emission rates (g/s) are annualized based on the assumed hrs/yr in the above general information**

| Pollutant | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT2 (g/s) | AUX BOILER em. factor | | AUX (g/s) |
|---|---|---|---|---|---|---|---|---|---|
| As | 4.90E-06 | lb/mmBtu (1) | 1.61E-06 | 4.90E-06 | lb/mmBtu (1) | 1.61E-06 | NA | NA | NA |
| Be | 3.30E-07 | lb/mmBtu (1) | 1.08E-07 | 3.30E-07 | lb/mmBtu (1) | 1.08E-07 | NA | NA | NA |
| Cd | 4.20E-06 | lb/mmBtu (1) | 1.38E-06 | 4.20E-06 | lb/mmBtu (1) | 1.38E-06 | NA | NA | NA |
| Cr | 4.70E-05 | lb/mmBtu (1) | 1.54E-05 | 4.70E-05 | lb/mmBtu (1) | 1.54E-05 | NA | NA | NA |
| Pb | 5.80E-05 | lb/mmBtu (1) | 1.90E-05 | 5.80E-05 | lb/mmBtu (1) | 1.90E-05 | NA | NA | NA |
| Mn | 3.30E-04 | lb/mmBtu (1) | 1.08E-04 | 3.30E-04 | lb/mmBtu (1) | 1.08E-04 | NA | NA | NA |
| Hg | 9.10E-07 | lb/mmBtu (1) | 2.99E-07 | 9.10E-07 | lb/mmBtu (1) | 2.99E-07 | 7.80E-04 | lb/Btu10^12 (2 | 3.76E-10 |
| Ni | 1.20E-03 | lb/mmBtu (1) | 3.94E-04 | 1.20E-03 | lb/mmBtu (1) | 3.94E-04 | NA | NA | NA |
| Co | 9.10E-06 | lb/mmBtu (1) | 2.99E-06 | 9.10E-06 | lb/mmBtu (1) | 2.99E-06 | NA | NA | NA |
| Sb | 2.20E-05 | lb/mmBtu (1) | 7.22E-06 | 2.20E-05 | lb/mmBtu (1) | 7.22E-06 | NA | NA | NA |
| V | 4.40E-06 | lb/mmBtu (1) | 1.44E-06 | 4.40E-06 | lb/mmBtu (1) | 1.44E-06 | NA | NA | NA |
| POM | 0.00317 | lb/Kgal(2) | 7.88E-06 | 0.00317 | lb/Kgal(2) | 7.88E-06 | NA | NA | NA |
| BaP | 5.36E-07 | lb/Kgal(2) | 1.33E-09 | 5.36E-07 | lb/Kgal(2) | 1.33E-09 | NA | NA | NA |
| Benzene | 0.000155 | lb/Kgal(2) | 3.85E-07 | 0.000155 | lb/Kgal(2) | 3.85E-07 | NA | NA | NA |
| Toluene | 0.001396 | lb/Kgal(2) | 3.47E-06 | 0.001396 | lb/Kgal(2) | 3.47E-06 | NA | NA | NA |
| Se | 5.30E-06 | lb/mmBtu (1) | 1.74E-06 | 5.30E-06 | lb/mmBtu (1) | 1.74E-06 | NA | NA | NA |
| HCL | 0.997988 | lb/Kgal(2) | 2.48E-03 | 0.997988 | lb/Kgal(2) | 2.48E-03 | NA | NA | NA |
| HF | 0.842446 | lb/Kgal(2) | 2.09E-03 | 0.842446 | lb/Kgal(2) | 2.09E-03 | NA | NA | NA |
| 2378 diox. | 1.17E-09 | lb/Kgal(2) | 2.91E-12 | 1.17E-09 | lb/Kgal(2) | 2.91E-12 | NA | NA | NA |
| HCOH | 0.00282 | lb/Kgal(2) | 7.01E-06 | 0.00282 | lb/Kgal(2) | 7.01E-06 | NA | NA | NA |

**(a) for purposes of this analysis GT 1 and GT2 are assumed to operate at the current utilization of nominally 100 hrs per year this is not a permit condition**

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

**By:** Mike Biliello **Date:** 11/22/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG **Date:** 1/9/97 **File:** P8EMISS.XLS
**Rvd. By:** M. Biliello 3/4/97 **Date:** 3/04/97 **Sheet:** Future LT Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**General Information for Natural Gas firing**

| | Aux B (3) |
|---|---|
| mmBTU/hr | 16.738 |
| Btu/cf | 1000.0 |
| mmCF/hr | 0.017 |
| annual hr operation | 2000 |

**Note: These emission rates (g/s) are annualized based on the assumed hrs/yr in the above general information**

| Pollutant | Aux Boiler em. factor (g) | | Aux. B (g/s) |
|---|---|---|---|
| SO2 | 0.6 | lb/mmCF (4) | 2.89E-04 |
| NO2 | 140 | lb/mmCF (4) | 6.75E-02 |
| PM | 6.2 | lb/mmCF (4) | 2.99E-03 |
| CO | 35 | lb/mmCF (4) | 1.69E-02 |
| Be | NA | NA | NA |
| Pb | NA | NA | NA |
| Hg | NA | NA | NA |
| Fl | NA | NA | NA |
| VOC | 2.784 | lb/mmCF (4)(j) | 1.34E-03 |
| H2SO4 | na | na | na |

The VOC emission rate is used to calculate TPY; it is not used for modelling

Aux Boiler fires ONLY Nat. Gas

(j) TOC emission factor adjusted for 52% methane (see ref 4 table 1.4-3 footnote g)

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG **Date:** 1/9/97 **File:** P8EMISS.XLS
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97 **Sheet:** Future ST Rates
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the Future short term emission rates for
Units 7 and 8, GTs 1 & 2 and the Aux. Boiler

**References:**

No. 1 AP-42, Section 1.3
No. 2 62-296.405(1)(c), F.A.C.
No. 3 0.125 lb/mmBtu per 62-296.405(1)(b) & 62-210.700(3) F.A.C. (assumes 3 hrs/day soot blowing)
No. 4 Typical densities of oil (#2 and #6) at Purdom site (from analytical data).
No. 5 Title V Application (11/04/96)
No. 6 GE Data Sheet (10/02/96)
No. 7 AP-42, Section 3.1
No. 8 EPRI Synthesis Report , 1994
No. 9 AP-42, Section 1.4(emission facors adjusted per footnote (a) table 1.4-2)
No. 10 H. Frediani Calc. #17
No. 11 Aux Boiler Permit Application
No. 12 Analysis of City of Tallahassee Oil

**General Information for Oil firing**

| | Unit No. | | | | |
|---|---|---|---|---|---|
| | 7 (l) | 8 (a) | 8 (h) | GT 1(m) | GT 2 (m) |
| mmBTU/hr (e) | 621 | 1219.9 | 1779.5 | 228.0 | 228.0 |
| gal/hr | 4140 | 9242 | 13481 | 1727 | 1727.0 |
| oil density(4) | 8.05 | 6.75 | 6.75 | 6.75 | 6.75 |
| lb Oil/hr | 33327 | 62381 | 90997 | 11657 | 11657 |

**General Information for Natural Gas firing**

| | Unit No. | | | | |
|---|---|---|---|---|---|
| | 7 (l) | 8 (h) | GT 1(m) | GT 2 (m) | Aux B.(11) |
| mmBTU/hr (e) | 621 | 1563.2 | 228 | 228 | 16.738 |
| Btu/cf (*) | 1040 | 904 | 904 | 904 | 1000.0 |
| mmCF/hr | 0.597 | 1.729 | 0.252 | 0.252 | 0.017 |

(*) Typical HHV of COT Natural Gas , LHV from GE data sheet used for all Combustion Turbines, HHV value for Aux. Boiler from manf.

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD **Date:** 1/9/97
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future ST Rates

**Calculations**

| Pollutant | UNIT 7 em. factor | | 7 (g/s) | 8 (a) 20oF 60% em. factor | | 8 (a) (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT1 (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 | 1.87 | lb/mmBtu (5) | 146.45 | 62 | lb/hr(6) | 7.82 | 0.05 | %S(c) | 1.47 | 0.05 | %S(c) | 1.47 |
| NO2 | 0.33 | lb/mmBtu(b) | 25.84 | 217 | lb/hr(6) | 27.37 | 0.698 | lb/mmBtu(7) | 20.07 | 0.698 | lb/mmBtu(7) | 20.07 |
| PM | 0.125 | lb/mmBtu(3) | 9.79 | 17 | lb/hr(6) | 2.14 | 0.038 | lb/mmBtu(7)(f) | 1.09 | 0.038 | lb/mmBtu(7)(f) | 1.09 |
| CO | 5 | lb/Kgal (1) | 2.61 | 192 | lb/hr(6) | 24.21 | 0.048 | lb/mmBtu(7) | 1.38 | 0.048 | lb/mmBtu(7) | 1.38 |
| Be | 4.2 | lb/10^12Btu(1) | 0.0003 | 3.30E-07 | lb/mmBtu(7) | 0.00005 | 3.30E-07 | lb/mmBtu(7) | 0.00001 | 3.30E-07 | lb/mmBtu(7) | 0.00001 |
| Pb | 194.0 | lb/10^12Btu(1) | 0.0152 | 5.80E-05 | lb/mmBtu(7) | 0.00892 | 5.80E-05 | lb/mmBtu(7) | 0.00167 | 5.80E-05 | lb/mmBtu(7) | 0.00167 |
| Hg | 32.0 | lb/10^12Btu(1) | 0.0025 | 9.10E-07 | lb/mmBtu(7) | 0.00014 | 9.10E-07 | lb/mmBtu(7) | 0.00003 | 9.10E-07 | lb/mmBtu(7) | 0.00003 |
| Fl | 0.00016 | lb/gal (12) | 0.0835 | 0.00014 | lb/gal (12) | 0.1632 | 0.00014 | lb/gal (12) | 0.0305 | 0.00014 | lb/gal (12) | 0.0305 |
| VOC | 0.76 | lb/Kgal(1) | 0.40 | 17.0 | lb/hr(6) | 2.14 | 0.02 | lb/mmBtu(7)(i) | 0.48873 | 0.02 | lb/mmBtu(7)(i) | 0.48873 |
| H2SO4 | 12.99 | lb/Kgal (1) | 6.78 | 7.0 | lb/hr(6) | 0.88 | NA | NA | NA | NA | NA | NA |

The VOC emission rate is used to calculate TPYIt is not used for modelling

| Pollutant | COOLING TOWER em. factor | | COOL T. (g/s) | Aux Boiler em. factor (g) | | Aux. B (g/s) | 8 (h) 59oF Base Load em. factor | | 8 (h) (g/s) | 8 (h) 59oF Base Load em. factor | | 8 (h) (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SO2 | NA | NA | NA | 0.6 | lb/mmCF (9) | 0.001 | 92 | lb/hr(6) | 11.60 | 92 | lb/hr(6) | 11.60 |
| NO2 | NA | NA | NA | 140 | lb/mmCF (9) | 0.296 | 322 | lb/hr(6) | 40.61 | 322 | lb/hr(6) | 40.61 |
| PM | 2.392 | lb/hr (10) | 0.30 | 6.2 | lb/mmCF (9) | 0.013 | 17 | lb/hr(6) | 2.14 | 17 | lb/hr(6) | 2.14 |
| CO | NA | NA | NA | 35 | lb/mmCF (9) | 0.074 | 113.67 | lb/hr(6) | 14.34 | 96 | lb/hr(6) | 12.11 |
| Be | NA | NA | NA | NA | NA | NA | 3.30E-07 | lb/mmBtu(7) | 0.00007 | 3.30E-07 | lb/mmBtu(7) | 0.00007 |
| Pb | NA | NA | NA | NA | NA | NA | 5.80E-05 | lb/mmBtu(7) | 0.01302 | 5.80E-05 | lb/mmBtu(7) | 0.01302 |
| Hg | NA | NA | NA | NA | NA | NA | 9.10E-07 | lb/mmBtu(7) | 0.00020 | 9.10E-07 | lb/mmBtu(7) | 0.00020 |
| Fl | NA | NA | NA | NA | NA | NA | 0.00014 | lb/gal (12) | 2.38E-01 | 0.00014 | lb/gal (12) | 2.38E-01 |
| VOC | NA | NA | NA | 2.784 | lb/mmCF (9)(j) | 0.006 | 9.1 | lb/hr(6) | 1.15 | 7.5 | lb/hr(6) | 0.95 |
| H2SO4 | NA | NA | NA | na | na | na | 10.0 | lb/hr(6) | 1.26 | 10.0 | lb/hr(6) | 1.26 |

The VOC emission rate is used to calculate TPYIt is not used for modelling

Aux Boiler fires ONLY Nat. Gas

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello　　**Date:** 11/22/96　　**OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG　　**Date:** 1/9/97　　**File:** P8EMISS.XLS
**Rvd. By:** M. Bilello 3/4/97　　**Date:** 03/04/97　　**Sheet:** Future ST Rates
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Calculations for Natural gas <u>not used</u> in the short term modelling analysis but needed for netting analysis**

| Pollutant | UNIT | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 em. factor | | 7 (g/s) | 8 59oF base load em. factor | | 8 (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT1 (g/s) |
| SO2 | 0.32 | gr/100CF | 6.88E-02 | 0.32 | gr/100CF | 1.99E-01 | 0.32 | gr/100CF | 2.91E-02 | 0.32 | gr/100CF | 2.91E-02 |
| NO2 | 0.23 | lb/mmBTU(b) | 18.01 | 58 | lb/hr(6) | 7.31 | 0.44 | lb/mmBtu(7) | 12.64947 | 0.44 | lb/mmBtu(7) | 12.64947 |
| PM | 5.2 | lb/mmCF(9) | 0.39 | 9 | lb/hr(6) | 1.14 | 0.0193 | lb/mmBtu (7) | 0.55485 | 0.0193 | lb/mmBtu (7) | 0.55485 |
| CO | 41.6 | lb/mmCF(9) | 3.13 | 33.56 | lb/hr(6) | 4.23 | 0.11 | lb/mmBtu (7) | 3.16237 | 0.11 | lb/mmBtu (7) | 3.16237 |
| Be | na | na | na | na | na | na | na | na | na | na | na | na |
| Pb | na | na | na | na | na | na | na | na | na | na | na | na |
| Hg | 0.00078 | lb/10^12 Btu (8) | 6.11E-08 | 0.00078 | lb/10^12 Btu (8) | 1.54E-07 | 0.00078 | lb/10^12 Btu (8) | 2.24E-08 | 0.00078 | lb/10^12 Btu (8) | 2.24E-08 |
| Fl | na | na | na | na | na | na | na | na | na | na | na | na |
| VOC | 1.41 | lb/mmCF (9) (k) | 0.11 | 2.8 | lb/hr(6) | 0.35 | 0.02400 | lb/mmBtu(7)(i) | 0.68997 | 0.02400 | lb/mmBtu(7)(i) | 0.68997 |
| H2SO4 | na | na | na | na | na | na | na | na | na | na | na | na |

**The VOC emission rate is used to calculate TPY<u>it is not used for modelling</u>**

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD **Date:** 1/9/97
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future ST Rates

**Calculations for FARCS (OIL FIRING)**

| | UNIT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pollutant | 7 em. factor | | 7 (g/s) | 8 (a) em. factor | | 8 (a) (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT1 (g/s) |
| As | 114 | lb/Btu10^12 (1) | 8.93E-03 | 4.90E-06 | lb/mmBtu (7) | 7.54E-04 | 4.90E-06 | lb/mmBtu (7) | 1.41E-04 | 4.90E-06 | lb/mmBtu (7) | 1.41E-04 |
| Be | 4.2 | lb/Btu10^12 (1) | 3.29E-04 | 3.30E-07 | lb/mmBtu (7) | 5.08E-05 | 3.30E-07 | lb/mmBtu (7) | 9.49E-06 | 3.30E-07 | lb/mmBtu (7) | 9.49E-06 |
| Cd | 46.2 | lb/Btu10^12 (12 | 3.62E-03 | 4.20E-06 | lb/mmBtu (7) | 6.46E-04 | 4.20E-06 | lb/mmBtu (7) | 1.21E-04 | 4.20E-06 | lb/mmBtu (7) | 1.21E-04 |
| Cr | 128 | lb/Btu10^12 (1) | 1.00E-02 | 4.70E-05 | lb/mmBtu (7) | 7.23E-03 | 4.70E-05 | lb/mmBtu (7) | 1.35E-03 | 4.70E-05 | lb/mmBtu (7) | 1.35E-03 |
| Pb | 194 | lb/Btu10^12 (1) | 1.52E-02 | 5.80E-05 | lb/mmBtu (7) | 8.92E-03 | 5.80E-05 | lb/mmBtu (7) | 1.67E-03 | 5.80E-05 | lb/mmBtu (7) | 1.67E-03 |
| Mn | 74 | lb/Btu10^12 (1) | 5.80E-03 | 3.30E-04 | lb/mmBtu (7) | 5.08E-02 | 3.30E-04 | lb/mmBtu (7) | 9.49E-03 | 3.30E-04 | lb/mmBtu (7) | 9.49E-03 |
| Hg | 32 | lb/Btu10^12 (1) | 2.51E-03 | 9.10E-07 | lb/mmBtu (7) | 1.40E-04 | 9.10E-07 | lb/mmBtu (7) | 2.62E-05 | 9.10E-07 | lb/mmBtu (7) | 2.62E-05 |
| Ni | 2330 | lb/Btu10^12 (1) | 1.82E-01 | 1.20E-03 | lb/mmBtu (7) | 1.85E-01 | 1.20E-03 | lb/mmBtu (7) | 3.45E-02 | 1.20E-03 | lb/mmBtu (7) | 3.45E-02 |
| Co | 121 | lb/Btu10^12 (1) | 9.48E-03 | 9.10E-06 | lb/mmBtu (7) | 1.40E-03 | 9.10E-06 | lb/mmBtu (7) | 2.62E-04 | 9.10E-06 | lb/mmBtu (7) | 2.62E-04 |
| Sb | 46 | lb/Btu10^12 (1) | 3.60E-03 | 2.20E-05 | lb/mmBtu (7) | 3.38E-03 | 2.20E-05 | lb/mmBtu (7) | 6.32E-04 | 2.20E-05 | lb/mmBtu (7) | 6.32E-04 |
| V | 0.2656 | lb/Kgal(8) | 1.39E-01 | 4.40E-06 | lb/mmBtu (7) | 6.77E-04 | 4.40E-06 | lb/mmBtu (7) | 1.26E-04 | 4.40E-06 | lb/mmBtu (7) | 1.26E-04 |
| POM | 0.000615 | lb/Kgal(8) | 3.21E-04 | 0.00317 | lb/Kgal(8) | 3.69E-03 | 0.00317 | lb/Kgal(8) | 6.90E-04 | 0.00317 | lb/Kgal(8) | 6.90E-04 |
| Ben(a)P | 5.70E-07 | lb/Kgal(8) | 2.98E-07 | 5.36E-07 | lb/Kgal(8) | 6.24E-07 | 5.36E-07 | lb/Kgal(8) | 1.17E-07 | 5.36E-07 | lb/Kgal(8) | 1.17E-07 |
| Benzene | 0.000165 | lb/Kgal(8) | 8.61E-05 | 0.000155 | lb/Kgal(8) | 1.81E-04 | 0.000155 | lb/Kgal(8) | 3.38E-05 | 0.000155 | lb/Kgal(8) | 3.38E-05 |
| Toluene | 0.001485 | lb/Kgal(8) | 7.75E-04 | 0.001396 | lb/Kgal(8) | 1.63E-03 | 0.001396 | lb/Kgal(8) | 3.04E-04 | 0.001396 | lb/Kgal(8) | 3.04E-04 |
| Se | 38 | lb/Btu10^12 (1) | 2.98E-03 | 5.30E-06 | lb/mmBtu (7) | 8.15E-04 | 5.30E-06 | lb/mmBtu (7) | 1.52E-04 | 5.30E-06 | lb/mmBtu (7) | 1.52E-04 |
| HCL | 0.842446 | lb/Kgal(12) | 4.40E-01 | 0.997988 | lb/Kgal(8) | 1.16E+00 | 0.997988 | lb/Kgal(8) | 2.17E-01 | 0.997988 | lb/Kgal(8) | 2.17E-01 |
| HF | 0.16 | lb/Kgal(12) | 8.35E-02 | 0.14 | lb/Kgal(12) | 1.63E-01 | 0.14 | lb/Kgal(12) | 3.05E-02 | 0.14 | lb/Kgal(12) | 3.05E-02 |
| 2378 TCDD | 1.25E-09 | lb/Kgal(8) | 6.53E-10 | 1.17E-09 | lb/Kgal(8) | 1.36E-09 | 1.17E-09 | lb/Kgal(8) | 2.55E-10 | 1.17E-09 | lb/Kgal(8) | 2.55E-10 |
| HCOH | 405 | lb/Btu10^12 (1) | 3.17E-02 | 0.00282 | lb/Kgal(8) | 3.29E-03 | 0.00282 | lb/Kgal(8) | 6.14E-04 | 0.00282 | lb/Kgal(8) | 6.14E-04 |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD **Date:** 1/9/97
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future ST Rates

These natural gase emission rates are NOT used for short term modelling BUT are used in calculating the annual emissions
**Calculations for FARCS on Natural Gas**

| | UNIT | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pollutant** | 7 em. factor | | 7 (g/s) | 8 (h) em. factor | | 8 (a) (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT2 (g/s) |
| As | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Be | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cd | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cr | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Pb | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Mn | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Hg | 7.80E-04 | lb/Btu10^12 (8) | 6.11E-08 | 7.80E-04 | lb/Btu10^12 (8) | 1.54E-07 | 7.80E-04 | lb/Btu10^12 (8) | 2.24E-08 | 7.80E-04 | lb/Btu10^12 (8) | 2.24E-08 |
| Ni | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Co | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Sb | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| V | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| POM | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Ben(a)P | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Benzene | 0.8 | lb/Btu10^12 (8) | 6.27E-05 | 0.8 | lb/Btu10^12 (8) | 1.58E-04 | 0.8 | lb/Btu10^12 (8) | 2.30E-05 | 0.8 | lb/Btu10^12 (8) | 2.30E-05 |
| Toluene | 10 | lb/Btu10^12 (8) | 7.83E-04 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Se | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HCL | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HF | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 2378 TCDD | 1.20E-06 | lb/Btu10^12 (8) | 9.40E-11 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HCOH | 34 | lb/Btu10^12 (8) | 2.66E-03 | 34 | lb/Btu10^12 (8) | 6.70E-03 | 34 | lb/Btu10^12 (8) | 9.77E-04 | 34 | lb/Btu10^12 (8) | 9.77E-04 |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/22/96
**Ckd. By:** D. Graziani, PE DJD **Date:** 1/9/97
**Rvd. By:** M. Bilello 3/4/97 **Date:** 03/04/97
**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**OFS No.:** 1584.0005.0008
**File:** P8EMISS.XLS
**Sheet:** Future ST Rates

**Calculations for FARCS AUX Boiler on Natural Gas / Unit 8 Oil @ 59oF Base Load**

| | UNIT | | | | | |
|---|---|---|---|---|---|---|
| Pollutant | AUX BOILER em. factor | | AUX (g/s) | 8 (h) 59oF Base Load em. factor | | 8 (h) (g/s) |
| As | NA | NA | NA | 4.90E-06 | lb/mmBtu (7) | 1.10E-03 |
| Be | NA | NA | NA | 3.30E-07 | lb/mmBtu (7) | 7.41E-05 |
| Cd | NA | NA | NA | 4.20E-06 | lb/mmBtu (7) | 9.43E-04 |
| Cr | NA | NA | NA | 4.70E-05 | lb/mmBtu (7) | 1.05E-02 |
| Pb | NA | NA | NA | 5.80E-05 | lb/mmBtu (7) | 1.30E-02 |
| Mn | NA | NA | NA | 3.30E-04 | lb/mmBtu (7) | 7.41E-02 |
| Hg | 7.80E-04 | lb/Btu10^12 (8) | 1.65E-09 | 9.10E-07 | lb/mmBtu (7) | 2.04E-04 |
| Ni | NA | NA | NA | 1.20E-03 | lb/mmBtu (7) | 2.69E-01 |
| Co | NA | NA | NA | 9.10E-06 | lb/mmBtu (7) | 2.04E-03 |
| Sb | NA | NA | NA | 2.20E-05 | lb/mmBtu (7) | 4.94E-03 |
| V | NA | NA | NA | 4.40E-06 | lb/mmBtu (7) | 9.87E-04 |
| POM | NA | NA | NA | 0.00317 | lb/Kgal(8) | 5.39E-03 |
| BaP | NA | NA | NA | 5.36E-07 | lb/Kgal(8) | 9.11E-07 |
| Benzene | NA | NA | NA | 0.000155 | lb/Kgal(8) | 2.64E-04 |
| Toluene | NA | NA | NA | 0.001396 | lb/Kgal(8) | 2.37E-03 |
| Se | NA | NA | NA | 5.30E-06 | lb/mmBtu (7) | 1.19E-03 |
| HCL | NA | NA | NA | 0.997988 | lb/Kgal(8) | 1.70E+00 |
| HF | NA | NA | NA | 0.842446 | lb/Kgal(8) | 1.43E+00 |
| 2378 diox. | NA | NA | NA | 1.17E-09 | lb/Kgal(8) | 1.99E-09 |
| HCOH | NA | NA | NA | 0.00282 | lb/Kgal(8) | 4.79E-03 |

(a) BASED ON 20oF 50% LOAD (worst case ambient impacts)
(b) Unit 7 NO2 emission factor from CEM data
(c) 0.05% S is what will be fired when Unit 8 is constructed.
(d) Unit 8 fuel usage based on lower heat value of oil - 132,000 Btu/gal
(e) heat inputs for Units 5,6&7 are from Ref.5 , Unit 8 value is from Ref.6
(f) includes only filterable fraction of particulates
(g) Heating value for natural gas used in Aux Boiler Permit was 1000 Btu/CF
(h) BASED ON 59oFBASE LOAD (FOR ANNUAL ANALYSIS) (execpt CO and VOC which is based on 59oF 19% of time at 50% load and 81% of time at 100% load)
(i) VOC as methane
(j) Total Organic Compounds (TOC) emission factor adjusted for 52% methane (see ref 9 table 1.4-3 footnote g)
(k) TOC emission factor adjusted for 17% methane (see ref 9 table 1.4-3 footnote f)
(l) Operating at 100% load
(m) Operating at 100% load Site conditions (80oF)

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

| | | |
|---|---|---|
| By: Mike Bilello | Date: 11/25/96 | OFS No.: 1584.0005.0008 |
| Ckd. By: D. Graziani DJD 3/4/97 | Date: 1/9/97 | File: P8EMISS.XLS |
| Rvd. By: M. Bilello | Date: 03/04/97 | Sheet: Current LT Rates |
| Client: City of Tallahassee | | |
| Project: Purdom Unit 8 | | |

Description: This calculation provides the CURRENT (1995,96) LONG term emission rates for Units 5, 6, and 7, GTs 1 & 2

References:

| | |
|---|---|
| No. 1 | AP-42, Section 1.3 |
| No. 2 | 62-296.405(1)(c), F.A.C. |
| No. 3 | 0.125 lb/mmBtu per 62-296.405(1)(b) & 62-210.700(3) F.A.C. (assumes 3 hrs/day soot blowing) |
| No. 4 | AP-42, Appendix A |
| No. 5 | Title V Application (11/04/96) |
| No. 7 | AP-42, Section 3.1 |
| No. 8 | Letter from Kennard F. Kosky (KBN) to Howard Rhodes (FDEP) 4-28-95Re: Florida [Electric Power] Coordinating Group Emission Factors for Title [V] Permit Applications dated 4-28-95 |
| No.9 | FGT average S content of Natural Gas (0.32 gr/100CF) |
| No. 10 | Calcs. 961007CJT001, 961007CJT003, EMISS.XLS- UNIT7-GT1-GT2 |
| No. 11 | Analysis of City of Tallahassee Oil |

(b) Unit 7 NO2 emission factor from CEM data (0.23 lb/mmBtu Gas) (0.33 lb/mmBtu Oil)
(e) heat inputs for Units 5,6&7 are from Ref.5
(f) includes only filterable fraction of particulates
(g) NO2 emissions for Unit 7 are from CEM data which did not separate oil and gas Total oil + gas is presented in the natural gas table..
(h) Table 1-1 of the Plan of Study presents the sum of GT1 & GT2 this SUM is shown as GT2

Assume 150000 Btu/gal heat content for #6 Oil or 0.15 mmBtu/gal
Assume 132000 Btu/gal heat content for #2 Oil or 0.132 mmBtu/gal
Assume 1040 Btu/scf heat content for natural gas, or 0.00104 mmBtu/scf

**Operating Data**

| | Unit 5 | | Unit 6 | | Unit 7 | | GT1 | | GT2 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nat. Gas CFx10^3 | Oil bbls | Nat. Gas CFx10^3 | Oil bbls | Nat. Gas CFx10^3 | Oil bbls | Nat. Gas CFx10^3 | Oil gal | Nat. Gas CFx10^3 | Oil gal |
| Aug-94 | 3260 | 0 | 82494 | 183 | 120125 | 2994 | 1646 | 0 | 2359 | 0 |
| Sep-94 | 23090 | 0 | 8430 | 0 | 150492 | 6474 | 150 | 0 | 122 | 0 |
| Oct-94 | 62290 | 0 | 59683 | 0 | 127718 | 2466 | 158 | 0 | 205 | 0 |
| Nov-94 | 0 | 0 | 0 | 0 | 167291 | 4502 | 0 | 0 | 0 | 0 |
| Dec-94 | 0 | 0 | 0 | 0 | 139865 | 5469 | 86 | 0 | 41 | 0 |
| Jan-95 | 0 | 0 | 0 | 0 | 148227 | 90 | 432 | 0 | 464 | 0 |
| Feb-95 | 0 | 0 | 0 | 0 | 138958 | 2912 | 455 | 0 | 528 | 0 |
| Mar-95 | 2704 | 0 | 0 | 0 | 79162 | 0 | 148 | 0 | 112 | 0 |
| Apr-95 | 31730 | 0 | 39050 | 0 | 155279 | 127 | 134 | 0 | 134 | 0 |
| May-95 | 17517 | 0 | 10897 | 0 | 207271 | 300 | 205 | 0 | 140 | 0 |
| Jun-95 | 0 | 0 | 0 | 0 | 153582 | 0 | 1978 | 0 | 536 | 0 |
| Jul-95 | 72792 | 0 | 88809 | 770 | 201694 | 710 | 423 | 0 | 832 | 0 |
| Aug-95 | 96088 | 0 | 104573 | 163 | 199229 | 4347 | 6020 | 0 | 6613 | 0 |
| Sep-95 | 24548 | 0 | 27249 | 253 | 82389 | 589 | 183 | 0 | 140 | 0 |
| Oct-95 | 7219 | 0 | 3152 | 0 | 203212 | 0 | 733 | 0 | 462 | 0 |
| Nov-95 | 82087 | 0 | 44200 | 0 | 169909 | 237 | 3424 | 2782 | 3275 | 0 |
| Dec-95 | 74483 | 0 | 50463 | 0 | 198234 | 3003 | 1377 | 2415 | 788 | 4082 |
| Jan-96 | 85785 | 0 | 80979 | 295 | 231836 | 861 | 1010 | 12501 | 2188 | 0 |
| Feb-96 | 42865 | 0 | 42509 | 299 | 171262 | 3909 | 4280 | 0 | 4169 | 0 |
| Mar-96 | 87763 | 0 | 77917 | 85 | 212566 | 1136 | 883 | 0 | 643 | 0 |
| Apr-96 | 3323 | 0 | 13354 | 0 | 160524 | 1087 | 1316 | 0 | 1908 | 0 |
| May-96 | 96317 | 107 | 103368 | 0 | 187689 | 1715 | 1887 | 0 | 1841 | 0 |
| Jun-96 | 35758 | 0 | 66899 | 0 | 223591 | 0 | 2168 | 0 | 1934 | 0 |
| Jul-96 | 103506 | 0 | 70225 | 0 | 231499 | 0 | 869 | 0 | 748 | 0 |
| Total | 953125 | 107 | 974251 | 2048 | 4061604 | 42928 | 29965 | 17698 | 30182 | 4082 |
| Annual average | 476562.5 | 53.5 | 487125.5 | 1024 | 2030802 | 21464 | 14982.5 | 8849 | 15091 | 2041 |
| Annual Average mmBtu(1,2,3) | 495625 | 337.05 | 506610.52 | 6451.2 | 2112034.08 | 135223.2 | 15581.8 | 1168.068 | 15694.64 | 269.412 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

By: Mike Bilello — Date: 11/25/96 — OFS No.: 1584.0005.0008
Ckd. By: D. Graziani DJG 3/4/97 — Date: 1/9/97 — File: P8EMISS.XLS
Rvd. By: M. Bilello — Date: 03/04/97 — Sheet: Current LT Rates
Client: City of Tallahassee
Project: Purdom Unit 8

**Calculations Oil Fired**

| Pollutant | UNIT 5 em. factor | | 5 TPY | 6 em. factor | | 6 TPY |
|---|---|---|---|---|---|---|
| SO2 | Ref (10) | | 3.00E-01 | Ref (10) | | 3.53E+00 |
| NO2 | Ref (10) | | 5.00E-02 | Ref (10) | | 1.44E+00 |
| PM | Ref (10) | | 1.00E-02 | Ref (10) | | 1.70E-01 |
| CO | Ref (10) | | 1.00E-02 | Ref (10) | | 1.10E-01 |
| Be | 4.2 | lb/10^12Btu(1) | 7.08E-07 | 4.2 | lb/10^12Btu(1) | 1.35E-05 |
| Pb | 194.0 | lb/10^12Btu(1) | 3.27E-05 | 194.0 | lb/10^12Btu(1) | 6.26E-04 |
| Hg | 32.0 | lb/10^12Btu(1) | 5.39E-06 | 32.0 | lb/10^12Btu(1) | 1.03E-04 |
| Fl | 0.00016 | lb/gal (11) | 1.80E-04 | 0.00016 | lb/gal (11) | 3.44E-03 |

**Calculations Oil Fired**

| Pollutant | UNIT 7 em. factor | | 7 TPY | GT1 em. factor | | GT1 TPY | GT2 em. factor | | GT2 TPY |
|---|---|---|---|---|---|---|---|---|---|
| SO2 | Ref (10) | | 7.46E+01 | Ref (10) | | (h) | Ref (10) | | 2.30E-01 |
| NO2 | Ref (10) | | (g) | Ref (10) | | (h) | Ref (10) | | 5.00E-01 |
| PM | Ref (10) | | 2.30E+00 | Ref (10) | | (h) | Ref (10) | | 4.40E-02 |
| CO | Ref (10) | | 2.26E+00 | Ref (10) | | (h) | Ref (10) | | 3.00E-02 |
| Be | 4.2 | lb/10^12Btu(1) | 2.84E-04 | 3.30E-07 | lb/mmBtu(7) | 1.93E-13 | 3.30E-07 | lb/mmBtu(7) | 4.45E-14 |
| Pb | 194.0 | lb/10^12Btu(1) | 1.31E-02 | 5.80E-05 | lb/mmBtu(7) | 3.39E-11 | 5.80E-05 | lb/mmBtu(7) | 7.81E-12 |
| Hg | 32.0 | lb/10^12Btu(1) | 2.16E-03 | 9.10E-07 | lb/mmBtu(7) | 5.31E-13 | 9.10E-07 | lb/mmBtu(7) | 1.23E-13 |
| Fl | 0.00016 | lb/gal (11) | 1.72E+00 | 0.00014 | lb/gal (11) | 6.19E-04 | 0.00014 | lb/gal (11) | 1.43E-04 |

**Calculations Natural Gas Fired**

| Pollutant | UNIT 5 em. factor | | 5 TPY | 6 em. factor | | 6 TPY |
|---|---|---|---|---|---|---|
| SO2 | Ref (10) | | 2.20E-01 | Ref (10) | | 2.20E-01 |
| NO2 | Ref (10) | | 6.81E+01 | Ref (10) | | 1.39E+02 |
| PM | Ref (10) | | 1.24E+00 | Ref (10) | | 1.22E+00 |
| CO | Ref (10) | | 9.90E+00 | Ref (10) | | 1.01E+01 |
| Be | | | na | | | na |
| Pb | | | na | | | na |
| Hg | 0.00078 | lb/tbtu (8) | | 0.00078 | lb/tbtu (8) | |
| Fl | | | na | | | na |

**Calculations Natural Gas Fired**

| Pollutant | UNIT 7 em. factor | | 7 TPY | GT1 em. factor | | GT1 TPY | GT2 em. factor | | GT2 TPY |
|---|---|---|---|---|---|---|---|---|---|
| SO2 | Ref (10) | | 9.30E-01 | Ref (10) | | (h) | Ref (10) | | 1.30E-02 |
| NO2 | Ref (10)(g) | | 2.51E+02 | Ref (10) | | (h) | Ref (10) | | 5.96E+00 |
| PM | Ref (10) | | 5.28E+00 | Ref (10) | | (h) | Ref (10) | | 3.90E-01 |
| CO | Ref (10) | | 4.22E+01 | Ref (10) | | (h) | Ref (10) | | 1.49E+00 |
| Be | | | na | | | na | | | 0.00E+00 |
| Pb | | | na | | | na | | | 0.00E+00 |
| Hg | 0.00078 | lb/tbtu (8) | | 0.00078 | lb/tbtu (8) | | 0.00078 | lb/tbtu (8) | |
| Fl | | | na | | | na | | | 0.00E+00 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

By: Mike Bilello | Date: 11/25/96 | OFS No.: 1584.0005.0008
Ckd. By: D. Graziani DJD 3/4/97 | Date: 1/9/97 | File: P8EMISS.XLS
Rvd. By: M. Bilello | Date: 03/04/97 | Sheet: Current LT Rates
Client: City of Tallahassee
Project: Purdom Unit 8

Annualized Emission Rates =[Oil (tpy) + Gas(tpy)] x 2000lb/ton x 454gr/lb /8760hr/yr / 3600sec/hr

| | UNIT | | | | | |
|---|---|---|---|---|---|---|
| | 5 | | 5 | 6 | | 6 |
| Pollutant | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 3.00E-01 | 2.20E-01 | 1.50E-02 | 3.53E+00 | 2.20E-01 | 1.08E-01 |
| NO2 | 5.00E-02 | 6.81E+01 | 1.96E+00 | 1.44E+00 | 1.39E+02 | 4.05E+00 |
| PM | 1.00E-02 | 1.24E+00 | 3.60E-02 | 1.70E-01 | 1.22E+00 | 4.00E-02 |
| CO | 1.00E-02 | 9.90E+00 | 2.85E-01 | 1.10E-01 | 1.01E+01 | 2.95E-01 |
| Be | 7.08E-07 | na | 2.04E-08 | 1.35E-05 | na | 3.90E-07 |
| Pb | 3.27E-05 | na | 9.41E-07 | 6.26E-04 | na | 1.80E-05 |
| Hg | 5.39E-06 | 0.00E+00 | 1.55E-07 | 1.03E-04 | 0.00E+00 | 2.97E-06 |
| Fl | 1.80E-04 | na | 5.18E-06 | 3.44E-03 | na | 9.91E-05 |

Annualized Emission Rates

| | UNIT | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 7 | | 7 | GT1 | | GT1 | GT2 | | GT2 |
| Pollutant | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s | OIL(TPY) | Gas TPY | g/s |
| SO2 | 7.46E+01 | 9.30E-01 | 2.17E+00 | Ref (10) | | (h) | 2.30E-01 | 1.30E-02 | 7.00E-03 |
| NO2 | (g) | 2.51E+02 | 7.23E+00 | Ref (10) | | (h) | 5.00E-01 | 5.96E+00 | 1.86E-01 |
| PM | 2.30E+00 | 5.28E+00 | 2.18E-01 | Ref (10) | | (h) | 4.40E-02 | 3.90E-01 | 1.25E-02 |
| CO | 2.26E+00 | 4.22E+01 | 1.28E+00 | Ref (10) | | (h) | 3.00E-02 | 1.49E+00 | 4.38E-02 |
| Be | 2.84E-04 | na | 8.18E-06 | 1.93E-13 | na | 5.55E-15 | 4.45E-14 | 0.00E+00 | 1.28E-15 |
| Pb | 1.31E-02 | na | 3.78E-04 | 3.39E-11 | na | 9.75E-13 | 7.81E-12 | 0.00E+00 | 2.25E-13 |
| Hg | 2.16E-03 | 0.00E+00 | 6.23E-05 | 5.31E-13 | 0.00E+00 | 1.53E-14 | 1.23E-13 | 0.00E+00 | 3.53E-15 |
| Fl | 1.72E+00 | na | 4.94E-02 | 6.19E-04 | na | 1.78E-05 | 1.43E-04 | 0.00E+00 | 4.11E-06 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** Mike Bilello **Date:** 11/25/96 **OFS No.:** 1584.0005.0008
**Ckd. By:** D. Graziani, PE DJG 3/4/97 **Date:** 1/9/97 **File:** P8EMISS.XLS
**Rvd. By:** M. Bilello **Date:** 03/04/97 **Sheet:** Current ST Rates

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

**Description:** This calculation provides the CURRENT (1995,96) short term emission rates for Units 5, 6, and 7, GTs 1 & 2

**References:**

| | |
|---|---|
| No. 1 | AP-42, Section 1.3 |
| No. 3 | 0.125 lb/mmBtu per 62-296.405(1)(b) & 62-210.700(3) F.A.C. (assumes 3 hrs/day soot blowing) |
| No. 4 | Typical densities of oil (#2 and #6) at Purdom site (from analytical data). |
| No. 5 | Title V Application (11/04/96) |
| No. 7 | AP-42, Section 3.1 |
| No. 8 | Letter from Kennard F. Kosky (KBN) to Howard Rhodes (FDEP) 4-28-95Re: Florida [Electric Power] Coordinating Group [,Inc.]Emission Factors for Title [V] Permit Applications dated 4-28-95 |
| No.9 | Analysis of City of Tallahasse oil |

**General Information**

| | Unit No. | | | Unit No. | |
|---|---|---|---|---|---|
| | 5 | 6 | 7 | GT 1 | GT 2 |
| mmBTU/hr (e) | 300 | 300 | 621 | 228.0 | 228.0 |
| gal/hr | 2,000 | 2000 | 4140 | 1727 | 1727.0 |
| oil density(4) | 8.05 | 8.05 | 8.05 | 6.75 | 6.75 |
| lb Oil/hr | 16100 | 16100 | 33327 | 11657 | 11657 |

**Calculations**

| Pollutant | UNIT 5 em. factor | | 5 (g/s) | 6 em. factor | | 6 (g/s) |
|---|---|---|---|---|---|---|
| SO2 | 1.3 | lb/mmBtu (5) | **49.18** | 1.3 | lb/mmBtu (5) | **49.18** |
| NO2 | 42 | lb/Kgal (1) | **10.59** | 67 | lb/Kgal (1) | **16.90** |
| PM | 0.125 | lb/mmBtu(3) | **4.73** | 0.125 | lb/mmBtu(3) | **4.73** |
| CO | 5 | lb/Kgal (1) | **1.26** | 5 | lb/Kgal (1) | **1.26** |
| Be | 4.2 | lb/10^12Btu(1) | **0.0002** | 4.2 | lb/10^12Btu(1) | **0.0002** |
| Pb | 194.0 | lb/10^12Btu(1) | **0.0073** | 194.0 | lb/10^12Btu(1) | **0.0073** |
| Hg | 32.0 | lb/10^12Btu(1) | **0.0012** | 32.0 | lb/10^12Btu(1) | **0.0012** |
| Fl | 0.00016 | lb/gal (9) | **0.0404** | 0.00016 | lb/gal (9) | **0.0404** |

**Calculations**

| Pollutant | UNIT 7 em. factor | | 7 (g/s) | GT1 em. factor | | GT1 (g/s) | GT2 em. factor | | GT2 (g/s) |
|---|---|---|---|---|---|---|---|---|---|
| SO2 | 1.87 | lb/mmBtu (5) | **146.45** | 0.4 | %S (5) | **11.76** | 0.4 | %S (5) | **11.76** |
| NO2 | 0.33 | lb/mmBtu(b) | **25.84** | 0.698 | lb/mmBtu(7) | **20.07** | 0.698 | lb/mmBtu(7) | **20.07** |
| PM | 0.125 | lb/mmBtu(3) | **9.79** | 0.038 | lb/mmBtu(7)(f) | **1.09** | 0.038 | lb/mmBtu(7)(f) | **1.09** |
| CO | 5 | lb/Kgal (1) | **2.61** | 0.048 | lb/mmBtu(7) | **1.38** | 0.048 | lb/mmBtu(7) | **1.38** |
| Be | 4.2 | lb/10^12Btu(1) | **0.0003** | 3.30E-07 | lb/mmBtu(7) | **0.00001** | 3.30E-07 | lb/mmBtu(7) | **0.00001** |
| Pb | 194.0 | lb/10^12Btu(1) | **0.0152** | 5.80E-05 | lb/mmBtu(7) | **0.00167** | 5.80E-05 | lb/mmBtu(7) | **0.00167** |
| Hg | 32.0 | lb/10^12Btu(1) | **0.0025** | 9.10E-07 | lb/mmBtu(7) | **0.00003** | 9.10E-07 | lb/mmBtu(7) | **0.00003** |
| Fl | 0.00016 | lb/gal (9) | **0.0835** | 0.00014 | lb/gal (9) | **0.0305** | 0.00014 | lb/gal (9) | **0.0305** |

all emission rates based on firing oil

(b) Unit 7 NO2 emission factor from CEM data
(e) heat inputs for Units 5,6&7 are from Ref.5
(f) includes only filterable fraction of particulates

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| | gal/hr x | lb/gal x | gm/lb * | S in SO2 | / sec/hr | *fuel S | =g/s | | | | | | | |
| calc for unit 7 SO2 firing 1% S Fuel | 4140 | 8.05 | 454 | 2 | 3600 | 0.01 | 84.1 | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | (1) Facitlity cap TPY from Calcs. 961007CJT001, 961007CJT003, EMISS.XLS- UNIT7-GT1-GT2 (CT 1 and CT2 TPY subtracted) | | | | | | | | | | | | |
| | | (2) Unit 7 emission rate based on FGT average S content of 0.32 grain/100CF | | | | | | | | | | | | |
| | | (3) Unit 7 emission rate based on AP-42 Emission Factor for Natural Gas ( high end of range) | | | | | | | | | | | | |
| | | (4) Unit 7 emission rate based on CEM data (0.23 lb/mmBtu NO2) Emission Rate for Natural Gas | | | | | | | | | | | | |
| | | (5) Unit 7 emission rate based on 1.87 lb/mmBtu SO2 | | | | | | | | | | | | |
| | | (6) Unit 7 emission ratebased on 0.125 lb/mmBtu PM Emission Rate for Fuel Oil | | | | | | | | | | | | |
| | | (7) Unit 7 emission ratebased on CEM data (0.33 lb/mmBtu NO2) Emission Rate for Fuel Oil | | | | | | | | | | | | |
| | | (8) Unit 7 emission rate based on typical #6 fuel oil currently in use. (1% S) | | | | | | | | | | | | |
| | | Note: Shaded hours denote pollutant (NO2 or SO2) which limits hours based on faciltiy cap. | | | | | | | | | | | | |
| | | ALL CALCULATIONS BASED ON UNITS OPERATING AT 100% LOAD | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 FIRING #6 OIL SO2 LIMIT 1.37 lb/mmBtu | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 1 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(5) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 125.51 | 146.45 | 72.8753 | xxx | 9.79 | xxx | 1987.9 | 25.84 | 203.7 | 2.61 | 1.3 | 0.40 | 0.20 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 2.10 | | | 0.14 | | | 0.37 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| ACCURACY | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 8760 | 0.20 | 6.92472 | 8760 | 1.14 | 39.4 | 8760.0 | 7.31 | 254.0 | 4.23 | 147.0 | 0.35 | 12.26 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 72.9 | | | 4.9 | | | 12.9 | | 1.3 | | 0.20 |
| based on limiting unit | | Unit 8 | | 6.9 | | | 39.4 | | | 254.0 | | 147.0 | | 12.26 |
| TPY | | Total | | 79.8 | | | 44.3 | | | 266.9 | | 148.3 | | 12.46 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.73 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | 34.2 | | | -190.8 | | 148.2 | | 12.35 |
| | | | | | | | | | | | | | | |
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3/4/97

P8EMIS10.XLS
annual scenarios

| | | UNIT 8 AS CONTROLLING UNIT OPERATING MAX HOURS ON #2 FUEL OIL / NO OPERATION OF UNIT 7 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 2 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(5) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 0 | 146.45 | 0 | xxx | 9.79 | xxx | 0.0 | 25.84 | 0.0 | 2.61 | 0.0 | 0.40 | 0.00 |
| UNIT 7 ANNUALIZED | | 0 | 0 | 0 | 0 | 0.00 | 0.0 | 0.0 | 0.00 | 0.0 | | | | |
| Unit 8 | #2 Fuel | 1734.78 | 11.60 | 79.8 | 1734.78 | 2.14 | 14.7 | 2843.0 | 40.61 | 457.7 | 14.34 | 98.6 | 1.15 | 7.91 |
| UNIT 8 ANNUALIZED | | | 2.30 | | | 0.42 | | | 8.04 | | | | | |
| facitlity cap(1`) | | | | 79.8 | | | na | | | 457.7 | | | | |
| Facility annual emissions | | Unit 7 | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | 0.00 |
| based on limiting unit | | Unit 8 | | 79.8 | | | 14.7 | | | 279.3 | | 98.6 | | 7.91 |
| TPY | | Total | | 79.8 | | | 14.7 | | | 279.3 | | 98.6 | | 7.91 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.73 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | 4.7 | | | -178.4 | | 98.5 | | 7.80 |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | UNIT 7 AS CONTROLLING UNIT MAX HOURS ON #6 FUEL OIL / NO OPERATION OF UNIT 8 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 3 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(5) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 137.436 | 146.45 | 79.8 | xxx | 9.79 | xxx | 4467.2 | 25.84 | 457.7 | 2.61 | 1.4 | 0.40 | 0.22 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 2.30 | | | 0.15 | | | 0.41 | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.20 | 0 | 0 | 1.14 | 0.0 | 0.0 | 7.31 | 0.0 | 4.23 | 0.0 | 0.35 | 0.00 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 79.8 | | | 5.3 | | | 14.1 | | 1.4 | | 0.22 |
| based on limiting unit | | Unit 8 | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | 0.00 |
| TPY | | Total | | 79.8 | | | 5.3 | | | 14.1 | | 1.4 | | 0.22 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | -4.7 | | | -443.6 | | 1.3 | | 0.11 |
| | | | | | | | | | | | | | | |
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| | | UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 OPERATING ON # 6 OIL ASSUME TYPICAL S C | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 4 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(8) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 218.667 | 84.1 | 72.8753 | xxx | 9.79 | xxx | 1987.9 | 25.84 | 203.7 | 2.61 | 2.3 | 0.40 | 0.34 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 2.10 | | | 0.24 | | | 0.65 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 8760 | 0.20 | 6.92472 | 8760 | 1.14 | 39.4 | 8760.0 | 7.31 | 254.0 | 4.23 | 147.0 | 0.35 | 12.26 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 72.9 | | | 8.5 | | | 22.4 | | 2.3 | | 0.34 |
| based on limiting unit | | Unit 8 | | 6.9 | | | 39.4 | | | 254.0 | | 147.0 | | 12.26 |
| TPY | | Total | | 79.8 | | | 47.9 | | | 276.4 | | 149.3 | | 12.61 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | 37.8 | | | -181.3 | | 149.1 | | 12.50 |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJB 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | UNIT 8 AS CONTROLLING UNIT OPERATING 8760 HOURS ON NATURAL GAS / UNIT 7 OPERATION ON NATURAL GAS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 5 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(2) | TPY | HOURS | g/s(3) | TPY | HOURS | g/s(4) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | NAT. GAS | 8760 | 0.0688 | 72.8753 | xxx | 0.39 | xxx | 2852.2 | 18.01 | 203.7 | 3.13 | 35.4 | 0.11 | 1.20 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 0.02 | | | 0.13 | | | 5.86 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 8760 | 0.20 | 6.92472 | 8760 | 1.14 | 39.4 | 8760.0 | 7.31 | 254.0 | 4.23 | 147.0 | 0.35 | 12.26 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 0.8 | | | 4.4 | | | 203.7 | | 35.4 | | 1.20 |
| based on limiting unit | | Unit 8 | | 6.9 | | | 39.4 | | | 254.0 | | 147.0 | | 12.26 |
| TPY | | Total | | 7.7 | | | 43.8 | | | 457.7 | | 182.4 | | 13.47 |
| *Recent actuals Units 5,6,7 (1)* | *minus aux boiler emissions* | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | -72.1 | | | 33.8 | | | 0.0 | | 182.3 | | 13.36 |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNIT 7 AS CONTROLLING UNIT MAX HOURS ON #6 FUEL OIL ASSUME TYPICAL S CONTENT | | | | | | | | | | | | |
| SCENARIO 6 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(8) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 239.445 | 84.1 | 79.8 | xxx | 9.79 | xxx | 4487.2 | 25.84 | 457.7 | 2.61 | 2.5 | 0.40 | 0.38 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 2.30 | | | 0.27 | | | 0.71 | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.20 | 0 | 0 | 1.14 | 0.0 | 0.0 | 7.31 | 0.0 | 4.23 | 0.0 | 0.35 | 0.00 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 79.8 | | | 9.3 | | | 24.5 | | 2.5 | | 0.38 |
| based on limiting unit | | Unit 8 | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | 0.00 |
| TPY | | Total | | 79.8 | | | 9.3 | | | 24.5 | | 2.5 | | 0.38 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | -0.8 | | | -433.2 | | 2.4 | | 0.27 |

By. M. Bilello Date: 11/21/96 DJB 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNIT 7 AS CONTROLLING UNIT MAX HOURS ON NATURAL GAS | | | | | | | | | | | | |
| SCENARIO 7 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(2) | TPY | HOURS | g/s(3) | TPY | HOURS | g/s(4) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 8760 | 0.0688 | 79.8 | xxx | 0.39 | xxx | 6409.4 | 18.01 | 457.7 | 3.13 | 79.6 | 0.11 | 2.70 |
| UNIT 7 ANNUALIZED | | | 0.05 | | | 0.29 | | | 13.18 | | | | | |
| Unit 8 | Natural Gas | 0 | 0.20 | 0 | 0 | 1.14 | 0.0 | 0.0 | 7.31 | 0.0 | 4.23 | 0.0 | 0.35 | 0.00 |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| Facility annual emissions | | Unit 7 | | 1.7 | | | 10.0 | | | 457.7 | | 79.6 | | 2.70 |
| based on limiting unit | | Unit 8 | | 0.0 | | | 0.0 | | | 0.0 | | 0.0 | | 0.00 |
| TPY | | Total | | 1.7 | | | 10.0 | | | 457.7 | | 79.6 | | 2.70 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | -78.1 | | | -0.1 | | | 0.0 | | 79.5 | | 2.59 |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | UNIT 8 AS CONTROLLING UNIT OPERATING 8260 HOURS ON NATURAL GAS & 500 HR ON #2 OIL / UNIT 7 ON #6 OIL ASSUME TYPIC | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 8 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(8) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 150.84 | 84.1 | 50.2705 | xxx | 9.79 | xxx | 1343.8 | 25.84 | 137.7 | 2.61 | 1.6 | 0.40 | 0.24 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 1.20 | | | 0.14 | | | 0.37 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 8260 | 0.20 | 6.52947 | 8260 | 1.14 | 37.2 | 8260.0 | 7.31 | 239.5 | 4.23 | 138.6 | 0.35 | 11.56 |
| Unit 8 | #2 Oil | 500 | 11.60 | 23 | 500 | 2.14 | 4.3 | 500.0 | 40.61 | 80.5 | 14.34 | 28.4 | 1.15 | 2.28 |
| Unit 8 | Total | | | 29.5295 | | | 41.4 | | | 320.0 | | 167.0 | | 13.84 |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | 0.19 | | | 1.07 | | | 6.90 | | | | | |
| Unit 8 Annualized #2 Oil | | | 0.66 | | | 0.12 | | | 2.32 | | | | | |
| Unit 8 Annualized Total | | | 0.85 | | | 1.19 | | | 9.21 | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 50.3 | | | 5.9 | | | 15.5 | | 1.6 | | 0.24 |
| based on limiting unit | | Unit 8 | | 29.5 | | | 41.4 | | | 320.0 | | 167.0 | | 13.84 |
| TPY | | Total | | 79.8 | | | 47.3 | | | 335.5 | | 168.6 | | 14.08 |
| Recent actuals Units 5,6,7 (1) minus aux boiler emissions | | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | 37.2 | | | -122.2 | | 168.5 | | 13.97 |
| | | | | | | | | | | | | | | |

3/4/97

P8EMS10.XLS
annual scenarios

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DLG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | UNIT 8 AS CONTROLLING UNIT OPERATING 8260 HOURS ON NATURAL GAS & 500 HR ON #2 OIL / UNIT 7 ON NATURAL GAS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 9 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(2) | TPY | HOURS | g/s(3) | TPY | HOURS | g/s(4) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 8760 | 0.0688 | 50.2705 | xxx | 0.39 | xxx | 1928.0 | 18.01 | 137.7 | 3.13 | 23.9 | 0.11 | 0.81 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 0.00 | | | 0.01 | | | 0.26 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 8260 | 0.20 | 6.52947 | 8260 | 1.14 | 37.2 | 8260.0 | 7.31 | 239.5 | 4.23 | 138.6 | 0.35 | 11.56 |
| Unit 8 | #2 Oil | 500 | 11.60 | 23 | 500 | 2.14 | 4.3 | 500.0 | 40.61 | 80.5 | 14.34 | 28.4 | 1.15 | 2.28 |
| Unit 8 | Total | | | 29.5295 | | | 41.4 | | | 320.0 | | 167.0 | | 13.84 |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | 0.19 | | | 1.07 | | | 6.90 | | | | | |
| Unit 8 Annualized #2 Oil | | | 0.66 | | | 0.12 | | | 2.32 | | | | | |
| Unit 8 Annualized Total | | | 0.85 | | | 1.19 | | | 9.21 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 0.5 | | | 3.0 | | | 137.7 | | 23.9 | | 0.81 |
| based on limiting unit | | Unit 8 | | 29.5 | | | 41.4 | | | 320.0 | | 167.0 | | 13.84 |
| TPY | | Total | | 30.1 | | | 44.4 | | | 457.7 | | 191.0 | | 14.66 |
| Recent actuals Units 5,6,7 (1) minus aux boiler emissions | | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| Change from recent actuals | | | | -49.7 | | | 34.3 | | | 0.0 | | 190.9 | | 14.55 |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DWB 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNIT 8 AS CONTROLLING UNIT OPERATING 7021 HRS ON NATURAL GAS & 425 HR ON #2 OIL / UNIT 7 ON #6 OIL ASSUME typical S | | | | | | | | | | | | |
| SCENARIO 10 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(8) | TPY | HOURS | g/s(6) | TPY | HOURS | g/s (7) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 164.131 | 84.1 | 54.6999 | xxx | 9.79 | xxx | 1812.3 | 25.84 | 185.7 | 2.61 | 1.7 | 0.40 | 0.26 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | 1.20 | | | 0.14 | | | 0.37 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 7021 | 0.20 | 5.55005 | 7021 | 1.14 | 31.6 | 7021.0 | 7.31 | 203.6 | 4.23 | 117.8 | 0.35 | 9.83 |
| Unit 8 | #2 Oil | 425 | 11.60 | 19.55 | 425 | 2.14 | 3.6 | 425.0 | 40.61 | 68.4 | 14.34 | 24.2 | 1.15 | 1.94 |
| Unit 8 | Total | | | 25.1001 | | | 35.2 | | | 272.0 | | 142.0 | | 11.77 |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | 0.16 | | | 0.91 | | | 5.86 | | | | | |
| Unit 8 Annualized #2 Oil | | | 0.56 | | | 0.10 | | | 1.97 | | | | | |
| Unit 8 Annualized Total | | | 0.72 | | | 1.01 | | | 7.83 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | 79.8 | | | na | | | 457.7 | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | Unit 7 | | 54.7 | | | 6.4 | | | 16.8 | | 1.7 | | 0.26 |
| *based on limiting unit* | | Unit 8 | | 25.1 | | | 35.2 | | | 272.0 | | 142.0 | | 11.77 |
| TPY | | Total | | 79.8 | | | 41.6 | | | 288.9 | | 143.7 | | 12.03 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | 0.0 | | | 31.5 | | | -168.9 | | 143.6 | | 11.92 |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | UNIT 8 AS CONTROLLING UNIT (85% CAP.) OPERATING 7201 HOURS ON NATURAL GAS & 425 HR ON #2 OIL / UNIT 7 ON NATURAL | | | | | | | | | | | | |
| SCENARIO 11 | | | | | | | | | | | | | | |
| | FUEL | | SO2 | | | PM | | | NO2 | | CO | | VOC | |
| | | HOURS | g/s(2) | TPY | HOURS | g/s(3) | TPY | HOURS | g/s(4) | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 8760 | 0.0688 | 54.6999 | xxx | 0.39 | xxx | 2600.2 | 18.01 | 185.7 | 3.13 | 32.3 | 0.11 | 1.10 |
| UNIT 7 ANNUALIZED | | | 0.001 | | | 0.01 | | | 0.26 | | | | | |
| Unit 8 | Natural Gas | 7021 | 0.20 | 5.55005 | 7021 | 1.14 | 31.6 | 7021.0 | 7.31 | 203.6 | 4.23 | 117.8 | 0.35 | 9.83 |
| Unit 8 | #2 Oil | 425 | 11.60 | 19.55 | 425 | 2.14 | 3.6 | 425.0 | 40.61 | 68.4 | 14.34 | 24.2 | 1.15 | 1.94 |
| Unit 8 | Total | | | 25.1001 | | | 35.2 | | | 272.0 | | 142.0 | | 11.77 |
| Unit 8 Annualized Nat. Gas | | | 0.16 | | | 0.91 | | | 5.86 | | | | | |
| Unit 8 Annualized #2 Oil | | | 0.56 | | | 0.10 | | | 1.97 | | | | | |
| Unit 8 Annualized Total | | | 0.72 | | | 1.01 | | | 7.83 | | | | | |
| *facitlity cap(1)* | | | | 79.8 | | | *na* | | | 457.7 | | | | |
| Facility annual emissions | | Unit 7 | | 0.7 | | | 4.0 | | | 185.7 | | 32.3 | | 1.10 |
| based on limiting unit | | Unit 8 | | 25.1 | | | 35.2 | | | 272.0 | | 142.0 | | 11.77 |
| TPY | | Total | | 25.8 | | | 39.2 | | | 457.7 | | 174.3 | | 12.86 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler emissions | | | 79.8 | | | 10.1 | | | 457.7 | | 0.1 | | 0.11 |
| | Change from recent actuals | | | -54.0 | | | 29.2 | | | 0.0 | | 174.2 | | 12.75 |

3/4/97

P8EMIS10.XLS
annual scenarios

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| SCENARIO 1 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 7.56E-03 | 6.78 | 3.37E+00 | 8.35E-02 | 4.16E-02 | 2.51E-03 | 1.25E-03 | 3.29E-04 | 1.64E-04 | 8.93E-03 | 4.44E-03 | 3.62E-03 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| ACCURACY | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 5.34E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| facitlity cap(1) | | | | | | | | | | | | | | |
| Facility annual emissions | | | 7.56E-03 | | 3.37E+00 | | 4.16E-02 | | 1.25E-03 | | 1.64E-04 | | 4.44E-03 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 5.34E-06 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 7.56E-03 | | 3.37E+00 | | 4.16E-02 | | 1.25E-03 | | 1.64E-04 | | 4.44E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | -2.44E-03 | | 8.04E-01 | | -2.68E-01 | | -7.47E-04 | | -1.36E-04 | | na | |

By. M. Bilello Date: 11/21/96 DJB 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 2 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 0.00E+00 | 6.78 | 0.00E+00 | 8.35E-02 | 0.00E+00 | 2.51E-03 | 0.00E+00 | 3.29E-04 | 0.00E+00 | 8.93E-03 | 0.00E+00 | 3.62E-03 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | #2 Fuel | 1.30E-02 | 8.95E-02 | 1.26 | 8.67E+00 | 2.38E-01 | 1.64E+00 | 2.04E-04 | 1.40E-03 | 7.41E-05 | 5.09E-04 | 1.10E-03 | 7.56E-03 | 9.43E-04 |
| | | | | | | | | | | | | | | |
| UNIT 8 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1`) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | |
| based on limiting unit | | | 8.95E-02 | | 8.67E+00 | | 1.64E+00 | | 1.40E-03 | | 5.09E-04 | | 7.56E-03 | |
| TPY | | | 8.95E-02 | | 8.67E+00 | | 1.64E+00 | | 1.40E-03 | | 5.09E-04 | | 7.56E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 7.95E-02 | | 6.10E+00 | | 1.33E+00 | | -5.95E-04 | | 2.09E-04 | | na | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJB 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| SCENARIO 3 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 8.28E-03 | 6.78 | 3.69E+00 | 8.35E-02 | 4.55E-02 | 2.51E-03 | 1.37E-03 | 3.29E-04 | 1.79E-04 | 8.93E-03 | 4.86E-03 | 3.62E-03 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 8.28E-03 | | 3.69E+00 | | 4.55E-02 | | 1.37E-03 | | 1.79E-04 | | 4.86E-03 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 8.28E-03 | | 3.69E+00 | | 4.55E-02 | | 1.37E-03 | | 1.79E-04 | | 4.86E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | -1.72E-03 | | 1.12E+00 | | -2.64E-01 | | -6.34E-04 | | -1.21E-04 | | na | |

By. M. Bilello Date: 11/21/96 DJB 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NTENT | | | | | | | | | | | | |
| SCENARIO 4 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 1.32E-02 | 6.78 | 5.88E+00 | 8.35E-02 | 7.24E-02 | 2.51E-03 | 2.17E-03 | 3.29E-04 | 2.85E-04 | 8.93E-03 | 7.74E-03 | 3.62E-03 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.54E-07 | 5.34E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 1.32E-02 | | 5.88E+00 | | 7.24E-02 | | 2.17E-03 | | 2.85E-04 | | 7.74E-03 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 5.34E-06 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 1.32E-02 | | 5.88E+00 | | 7.24E-02 | | 2.18E-03 | | 2.85E-04 | | 7.74E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 3.17E-03 | | 3.31E+00 | | -2.38E-01 | | 1.78E-04 | | -1.48E-05 | | na | |
| | | | | | | | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 5 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | NAT. GAS | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 6.1E-08 | 6.91E-07 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.54E-07 | 5.34E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 6.91E-07 | | 0.00E+00 | | 0.00E+00 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 5.34E-06 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 6.03E-06 | | 0.00E+00 | | 0.00E+00 | |
| *Recent actuals Units 5,6,7 (1)* | *minus aux boiler* | | 1.00E-02 | | 5.70E-01 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | -1.00E-02 | | -5.70E-01 | | -3.10E-01 | | -1.99E-03 | | -3.00E-04 | | na | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 6 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 1.44E-02 | 6.78 | 6.44E+00 | 8.35E-02 | 7.93E-02 | 2.51E-03 | 2.38E-03 | 3.29E-04 | 3.12E-04 | 8.93E-03 | 8.48E-03 | 3.62E-03 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| facitlity cap(1) | | | | | | | | | | | | | | |
| Facility annual emissions | | | 1.44E-02 | | 6.44E+00 | | 7.93E-02 | | 2.38E-03 | | 3.12E-04 | | 8.48E-03 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 1.44E-02 | | 6.44E+00 | | 7.93E-02 | | 2.38E-03 | | 3.12E-04 | | 8.48E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 4.42E-03 | | 3.87E+00 | | -2.31E-01 | | 3.79E-04 | | 1.23E-05 | | na | |

3/4/97

P8EMIS10.XLS
annual scenarios

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 7 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 6.1E-08 | 1.55E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| facitlity cap(1) | | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 1.55E-06 | | 0.00E+00 | | 0.00E+00 | |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | |
| TPY | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 1.55E-06 | | 0.00E+00 | | 0.00E+00 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | -1.00E-02 | | -2.57E+00 | | -3.10E-01 | | -2.00E-03 | | -3.00E-04 | | na | |

| | | L S CONTENT | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 8 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 9.09E-03 | 6.78 | 4.06E+00 | 8.35E-02 | 5.00E-02 | 2.51E-03 | 1.50E-03 | 3.29E-04 | 1.97E-04 | 8.93E-03 | 5.34E-03 | 3.62E-03 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 5.04E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| Unit 8 | #2 Oil | 1.30E-02 | 2.58E-02 | 1.26 | 2.50E+00 | 2.38E-01 | 4.72E-01 | 2.04E-04 | 4.05E-04 | 7.41E-05 | 1.47E-04 | 1.10E-03 | 2.18E-03 | 9.43E-04 |
| Unit 8 | Total | | 2.58E-02 | | 2.50E+00 | | 4.72E-01 | | 4.10E-04 | | 1.47E-04 | | 2.18E-03 | |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 9.09E-03 | | 4.06E+00 | | 5.00E-02 | | 1.50E-03 | | 1.97E-04 | | 5.34E-03 | |
| based on limiting unit | | | 2.58E-02 | | 2.50E+00 | | 4.72E-01 | | 4.10E-04 | | 1.47E-04 | | 2.18E-03 | |
| TPY | | | 3.49E-02 | | 6.56E+00 | | 5.22E-01 | | 1.91E-03 | | 3.44E-04 | | 7.52E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 2.49E-02 | | 3.99E+00 | | 2.12E-01 | | -9.11E-05 | | 4.35E-05 | | na | |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 9 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 6.1E-08 | 4.67E-07 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 5.04E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| Unit 8 | #2 Oil | 1.30E-02 | 2.58E-02 | 1.26 | 2.50E+00 | 2.38E-01 | 4.72E-01 | 2.04E-04 | 4.05E-04 | 7.41E-05 | 1.47E-04 | 1.10E-03 | 2.18E-03 | 9.43E-04 |
| Unit 8 | Total | | 2.58E-02 | | 2.50E+00 | | 4.72E-01 | | 4.10E-04 | | 1.47E-04 | | 2.18E-03 | |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 4.67E-07 | | 0.00E+00 | | 0.00E+00 | |
| based on limiting unit | | | 2.58E-02 | | 2.50E+00 | | 4.72E-01 | | 4.10E-04 | | 1.47E-04 | | 2.18E-03 | |
| TPY | | | 2.58E-02 | | 2.50E+00 | | 4.72E-01 | | 4.10E-04 | | 1.47E-04 | | 2.18E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 1.58E-02 | | -7.00E-02 | | 1.62E-01 | | -1.59E-03 | | -1.53E-04 | | na | |
| | | | | | | | | | | | | | | |

3/4/97

P8EMS10.XLS
annual scenarios

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ontent | | | | | | | | | | | | |
| SCENARIO 10 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | #6 Fuel | 1.52E-02 | 9.89E-03 | 6.78 | 4.41E+00 | 8.35E-02 | 5.44E-02 | 2.51E-03 | 1.63E-03 | 3.29E-04 | 2.14E-04 | 8.93E-03 | 5.81E-03 | 3.62E-03 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 4.28E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| Unit 8 | #2 Oil | 1.30E-02 | 2.19E-02 | 1.26 | 2.13E+00 | 2.38E-01 | 4.01E-01 | 2.04E-04 | 3.44E-04 | 7.41E-05 | 1.25E-04 | 1.10E-03 | 1.85E-03 | 9.43E-04 |
| Unit 8 | Total | | 2.19E-02 | | 2.13E+00 | | 4.01E-01 | | 3.48E-04 | | 1.25E-04 | | 1.85E-03 | |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| *facitlity cap(1)* | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 9.89E-03 | | 4.41E+00 | | 5.44E-02 | | 1.63E-03 | | 2.14E-04 | | 5.81E-03 | |
| based on limiting unit | | | 2.19E-02 | | 2.13E+00 | | 4.01E-01 | | 3.48E-04 | | 1.25E-04 | | 1.85E-03 | |
| TPY | | | 3.18E-02 | | 6.54E+00 | | 4.55E-01 | | 1.98E-03 | | 3.39E-04 | | 7.66E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 2.18E-02 | | 3.97E+00 | | 1.45E-01 | | -2.05E-05 | | 3.88E-05 | | na | |
| | | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | AS | | | | | | | | | | | | |
| SCENARIO 11 | | | | | | | | | | | | | | |
| | FUEL | Pb | | H2SO4 | | Fl | | Hg | | Be | | As | | Cd |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 6.1E-08 | 6.30E-07 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| | | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0.00 | 0.00E+00 | 0 | 0.00E+00 | 1.5E-07 | 4.28E-06 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 |
| Unit 8 | #2 Oil | 1.30E-02 | 2.19E-02 | 1.26 | 2.13E+00 | 2.38E-01 | 4.01E-01 | 2.04E-04 | 3.44E-04 | 7.41E-05 | 1.25E-04 | 1.10E-03 | 1.85E-03 | 9.43E-04 |
| Unit 8 | Total | | 2.19E-02 | | 2.13E+00 | | 4.01E-01 | | 3.48E-04 | | 1.25E-04 | | 1.85E-03 | |
| | | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 6.30E-07 | | 0.00E+00 | | 0.00E+00 | |
| based on limiting unit | | | 2.19E-02 | | 2.13E+00 | | 4.01E-01 | | 3.48E-04 | | 1.25E-04 | | 1.85E-03 | |
| TPY | | | 2.19E-02 | | 2.13E+00 | | 4.01E-01 | | 3.49E-04 | | 1.25E-04 | | 1.85E-03 | |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | 1.00E-02 | | 2.57E+00 | | 3.10E-01 | | 2.00E-03 | | 3.00E-04 | | na | |
| | Change from rec | | 1.19E-02 | | -4.45E-01 | | 9.11E-02 | | -1.65E-03 | | -1.75E-04 | | na | |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | gal/hr x | | | | | | | |
| calc for unit 7 SO2 firing 1% S Fuel | 4140 | | | | | | | |
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|---|---|---|---|---|---|---|---|---|
| SCENARIO 1 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 1.80E-03 | 1.00E-02 | 4.99E-03 | 5.80E-03 | 2.88E-03 | 1.82E-01 | 9.08E-02 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ACCURACY | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 1.80E-03 | | 4.99E-03 | | 2.88E-03 | | 9.08E-02 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 1.80E-03 | | 4.99E-03 | | 2.88E-03 | | 9.08E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|
| SCENARIO 2 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY. |
| Unit 7 | #6 Fuel | 0.00E+00 | 1.00E-02 | 0.00E+00 | 5.80E-03 | 0.00E+00 | 1.82E-01 | 0.00E+00 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | #2 Fuel | 6.48E-03 | 1.05E-02 | 7.25E-02 | 7.41E-02 | 5.09E-01 | 2.69E-01 | 1.85E+00 |
| | | | | | | | | |
| UNIT 8 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| facitlity cap(1`) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | 6.48E-03 | | 7.25E-02 | | 5.09E-01 | | 1.85E+00 |
| TPY | | 6.48E-03 | | 7.25E-02 | | 5.09E-01 | | 1.85E+00 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 3 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 1.97E-03 | 1.00E-02 | 5.46E-03 | 5.80E-03 | 3.16E-03 | 1.82E-01 | 9.08E-02 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 1.97E-03 | | 5.46E-03 | | 3.16E-03 | | 9.08E-02 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 1.97E-03 | | 5.46E-03 | | 3.16E-03 | | 9.08E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 4 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 3.14E-03 | 1.00E-02 | 8.69E-03 | 5.80E-03 | 5.02E-03 | 1.82E-01 | 1.58E-01 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 3.14E-03 | | 8.69E-03 | | 5.02E-03 | | 1.58E-01 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 3.14E-03 | | 8.69E-03 | | 5.02E-03 | | 1.58E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 5 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | NAT. GAS | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

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|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| SCENARIO 6 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 3.43E-03 | 1.00E-02 | 9.52E-03 | 5.80E-03 | 5.50E-03 | 1.82E-01 | 1.73E-01 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 3.43E-03 | | 9.52E-03 | | 5.50E-03 | | 1.73E-01 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 3.43E-03 | | 9.52E-03 | | 5.50E-03 | | 1.73E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| SCENARIO 7 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 8 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 2.16E-03 | 1.00E-02 | 5.99E-03 | 5.80E-03 | 3.47E-03 | 1.82E-01 | 1.09E-01 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 1.87E-03 | 1.05E-02 | 2.09E-02 | 7.41E-02 | 1.47E-01 | 2.69E-01 | 5.34E-01 |
| Unit 8 | Total | 1.87E-03 | | 2.09E-02 | | 1.47E-01 | | 5.34E-01 |
| | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 2.16E-03 | | 5.99E-03 | | 3.47E-03 | | 1.09E-01 |
| based on limiting unit | | 1.87E-03 | | 2.09E-02 | | 1.47E-01 | | 5.34E-01 |
| TPY | | 4.03E-03 | | 2.69E-02 | | 1.50E-01 | | 6.43E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 9 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 1.87E-03 | 1.05E-02 | 2.09E-02 | 7.41E-02 | 1.47E-01 | 2.69E-01 | 5.34E-01 |
| Unit 8 | Total | 1.87E-03 | | 2.09E-02 | | 1.47E-01 | | 5.34E-01 |
| | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | 1.87E-03 | | 2.09E-02 | | 1.47E-01 | | 5.34E-01 |
| TPY | | 1.87E-03 | | 2.09E-02 | | 1.47E-01 | | 5.34E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 10 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 2.35E-03 | 1.00E-02 | 6.52E-03 | 5.80E-03 | 3.77E-03 | 1.82E-01 | 1.19E-01 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 1.59E-03 | 1.05E-02 | 1.78E-02 | 7.41E-02 | 1.25E-01 | 2.69E-01 | 4.54E-01 |
| Unit 8 | Total | 1.59E-03 | | 1.78E-02 | | 1.25E-01 | | 4.54E-01 |
| | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 2.35E-03 | | 6.52E-03 | | 3.77E-03 | | 1.19E-01 |
| based on limiting unit | | 1.59E-03 | | 1.78E-02 | | 1.25E-01 | | 4.54E-01 |
| TPY | | 3.94E-03 | | 2.43E-02 | | 1.29E-01 | | 5.73E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SCENARIO 11 | | | | | | | | |
| | FUEL | | Cr | | Mn | | Ni | |
| | | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 1.59E-03 | 1.05E-02 | 1.78E-02 | 7.41E-02 | 1.25E-01 | 2.69E-01 | 4.54E-01 |
| Unit 8 | Total | 1.59E-03 | | 1.78E-02 | | 1.25E-01 | | 4.54E-01 |
| | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | |
| | | | | | | | | |
| facitlity cap(1) | | | | | | | | |
| | | | | | | | | |
| Facility annual emissions | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | 1.59E-03 | | 1.78E-02 | | 1.25E-01 | | 4.54E-01 |
| TPY | | 1.59E-03 | | 1.78E-02 | | 1.25E-01 | | 4.54E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | na | | na | | na | | na |
| | Change from rec | na | | na | | na | | na |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 1 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 4.72E-03 | 3.60E-03 | 1.79E-03 | 1.39E-01 | 6.90E-02 | 3.21E-04 | 1.60E-04 | 2.98E-07 | 1.48E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| ACCURACY | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 4.72E-03 | | 1.79E-03 | | 6.90E-02 | | 1.60E-04 | | 1.48E-07 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 4.72E-03 | | 1.79E-03 | | 6.90E-02 | | 1.60E-04 | | 1.48E-07 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 2 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 0.00E+00 | 3.60E-03 | 0.00E+00 | 1.39E-01 | 0.00E+00 | 3.21E-04 | 0.00E+00 | 2.98E-07 | 0.00E+00 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| Unit 8 | #2 Fuel | 2.04E-03 | 1.40E-02 | 4.94E-03 | 3.40E-02 | 9.87E-04 | 6.79E-03 | 5.39E-03 | 3.71E-02 | 9.11E-07 | 6.27E-06 |
| UNIT 8 ANNUALIZED | | | | | | | | | | | |
| facitlity cap(1`) | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 1.40E-02 | | 3.40E-02 | | 6.79E-03 | | 3.71E-02 | | 6.27E-06 |
| TPY | | | 1.40E-02 | | 3.40E-02 | | 6.79E-03 | | 3.71E-02 | | 6.27E-06 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 3 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 4.72E-03 | 3.60E-03 | 1.96E-03 | 1.39E-01 | 7.56E-02 | 3.21E-04 | 1.75E-04 | 2.98E-07 | 1.62E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 4.72E-03 | | 1.96E-03 | | 7.56E-02 | | 1.75E-04 | | 1.62E-07 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 4.72E-03 | | 1.96E-03 | | 7.56E-02 | | 1.75E-04 | | 1.62E-07 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 4 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 8.22E-03 | 3.60E-03 | 3.12E-03 | 1.39E-01 | 1.20E-01 | 3.21E-04 | 2.78E-04 | 2.98E-07 | 2.58E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 8.22E-03 | | 3.12E-03 | | 1.20E-01 | | 2.78E-04 | | 2.58E-07 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 8.22E-03 | | 3.12E-03 | | 1.20E-01 | | 2.78E-04 | | 2.58E-07 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |

3/4/97

P8EMS10.XLS
annual scenarios

By. M. Bilello Date: 11/21/96 DJM 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 5 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | NAT. GAS | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 6 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 9.00E-03 | 3.60E-03 | 3.42E-03 | 1.39E-01 | 1.32E-01 | 3.21E-04 | 3.05E-04 | 2.98E-07 | 2.83E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 9.00E-03 | | 3.42E-03 | | 1.32E-01 | | 3.05E-04 | | 2.83E-07 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 9.00E-03 | | 3.42E-03 | | 1.32E-01 | | 3.05E-04 | | 2.83E-07 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 7 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| SCENARIO 8 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 5.67E-03 | 3.60E-03 | 2.15E-03 | 1.39E-01 | 8.29E-02 | 3.21E-04 | 1.92E-04 | 2.98E-07 | 1.78E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 2.04E-03 | 4.05E-03 | 4.94E-03 | 9.79E-03 | 9.87E-04 | 1.96E-03 | 5.39E-03 | 1.07E-02 | 9.11E-07 | 1.81E-06 |
| Unit 8 | Total | | 4.05E-03 | | 9.79E-03 | | 1.96E-03 | | 1.07E-02 | | 1.81E-06 |
| | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 5.67E-03 | | 2.15E-03 | | 8.29E-02 | | 1.92E-04 | | 1.78E-07 |
| based on limiting unit | | | 4.05E-03 | | 9.79E-03 | | 1.96E-03 | | 1.07E-02 | | 1.81E-06 |
| TPY | | | 9.72E-03 | | 1.19E-02 | | 8.49E-02 | | 1.09E-02 | | 1.98E-06 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 9 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 2.04E-03 | 4.05E-03 | 4.94E-03 | 9.79E-03 | 9.87E-04 | 1.96E-03 | 5.39E-03 | 1.07E-02 | 9.11E-07 | 1.81E-06 |
| Unit 8 | Total | | 4.05E-03 | | 9.79E-03 | | 1.96E-03 | | 1.07E-02 | | 1.81E-06 |
| | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 4.05E-03 | | 9.79E-03 | | 1.96E-03 | | 1.07E-02 | | 1.81E-06 |
| TPY | | | 4.05E-03 | | 9.79E-03 | | 1.96E-03 | | 1.07E-02 | | 1.81E-06 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 10 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 9.48E-03 | 6.17E-03 | 3.60E-03 | 2.34E-03 | 1.39E-01 | 9.02E-02 | 3.21E-04 | 2.09E-04 | 2.98E-07 | 1.94E-07 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 2.04E-03 | 3.44E-03 | 4.94E-03 | 8.32E-03 | 9.87E-04 | 1.66E-03 | 5.39E-03 | 9.08E-03 | 9.11E-07 | 1.53E-06 |
| Unit 8 | Total | | 3.44E-03 | | 8.32E-03 | | 1.66E-03 | | 9.08E-03 | | 1.53E-06 |
| | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 6.17E-03 | | 2.34E-03 | | 9.02E-02 | | 2.09E-04 | | 1.94E-07 |
| based on limiting unit | | | 3.44E-03 | | 8.32E-03 | | 1.66E-03 | | 9.08E-03 | | 1.53E-06 |
| TPY | | | 9.61E-03 | | 1.07E-02 | | 9.19E-02 | | 9.29E-03 | | 1.73E-06 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 11 | | | | | | | | | | | |
| | FUEL | Co | | Sb | | V | | POM | | Ben(a)P | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 |
| Unit 8 | #2 Oil | 2.04E-03 | 3.44E-03 | 4.94E-03 | 8.32E-03 | 9.87E-04 | 1.66E-03 | 5.39E-03 | 9.08E-03 | 9.11E-07 | 1.53E-06 |
| Unit 8 | Total | | 3.44E-03 | | 8.32E-03 | | 1.66E-03 | | 9.08E-03 | | 1.53E-06 |
| | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | |
| | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | |
| | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 3.44E-03 | | 8.32E-03 | | 1.66E-03 | | 9.08E-03 | | 1.53E-06 |
| TPY | | | 3.44E-03 | | 8.32E-03 | | 1.66E-03 | | 9.08E-03 | | 1.53E-06 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJZ 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 1 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 4.29E-05 | 7.75E-04 | 3.86E-04 | 2.98E-03 | 1.48E-03 | 4.40E-01 | 2.19E-01 | 6.53E-10 | 3.25E-10 | 3.17E-02 | 1.58E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| ACCURACY | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 5.48E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 2.33E-01 |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 4.29E-05 | | 3.86E-04 | | 1.48E-03 | | 2.19E-01 | | 3.25E-10 | | 1.58E-02 |
| based on limiting unit | | | 5.48E-03 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 2.33E-01 |
| TPY | | | 5.52E-03 | | 3.86E-04 | | 1.48E-03 | | 2.19E-01 | | 3.25E-10 | | 2.49E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 2 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 0.00E+00 | 7.75E-04 | 0.00E+00 | 2.98E-03 | 0.00E+00 | 4.40E-01 | 0.00E+00 | 6.53E-10 | 0.00E+00 | 3.17E-02 | 0.00E+00 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | #2 Fuel | 2.64E-04 | 1.81E-03 | 2.37E-03 | 1.63E-02 | 1.19E-03 | 8.18E-03 | 1.70E+00 | 1.17E+01 | 1.99E-09 | 1.37E-08 | 4.79E-03 | 3.30E-02 |
| | | | | | | | | | | | | | |
| UNIT 8 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| facitlity cap(1`) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| based on limiting unit | | | 1.81E-03 | | 1.63E-02 | | 8.18E-03 | | 1.17E+01 | | 1.37E-08 | | 3.30E-02 |
| TPY | | | 1.81E-03 | | 1.63E-02 | | 8.18E-03 | | 1.17E+01 | | 1.37E-08 | | 3.30E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 3 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 4.69E-05 | 7.75E-04 | 4.22E-04 | 2.98E-03 | 1.62E-03 | 4.40E-01 | 2.40E-01 | 6.53E-10 | 3.56E-10 | 3.17E-02 | 1.73E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 0.00E+00 |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 4.69E-05 | | 4.22E-04 | | 1.62E-03 | | 2.40E-01 | | 3.56E-10 | | 1.73E-02 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 4.69E-05 | | 4.22E-04 | | 1.62E-03 | | 2.40E-01 | | 3.56E-10 | | 1.73E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 4 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 7.47E-05 | 7.75E-04 | 6.72E-04 | 2.98E-03 | 2.58E-03 | 4.40E-01 | 3.81E-01 | 6.53E-10 | 5.66E-10 | 3.17E-02 | 2.75E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 5.48E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 2.33E-01 |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 7.47E-05 | | 6.72E-04 | | 2.58E-03 | | 3.81E-01 | | 5.66E-10 | | 2.75E-02 |
| based on limiting unit | | | 5.48E-03 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 2.33E-01 |
| TPY | | | 5.55E-03 | | 6.72E-04 | | 2.58E-03 | | 3.81E-01 | | 5.66E-10 | | 2.60E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 5 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | NAT. GAS | 6.27E-05 | 7.08E-04 | 0.000783 | 8.86E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 9.398E-11 | 1.06E-09 | 0 | 0.00E+00 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 5.48E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 2.33E-01 |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 7.08E-04 | | 8.86E-03 | | 0.00E+00 | | 0.00E+00 | | 1.06E-09 | | 0.00E+00 |
| based on limiting unit | | | 5.48E-03 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 2.33E-01 |
| TPY | | | 6.19E-03 | | 8.86E-03 | | 0.00E+00 | | 0.00E+00 | | 1.06E-09 | | 2.33E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| SCENARIO 6 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 8.18E-05 | 7.75E-04 | 7.36E-04 | 2.98E-03 | 2.83E-03 | 4.40E-01 | 4.18E-01 | 6.53E-10 | 6.20E-10 | 3.17E-02 | 3.01E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 0.00E+00 |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 8.18E-05 | | 7.36E-04 | | 2.83E-03 | | 4.18E-01 | | 6.20E-10 | | 3.01E-02 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 8.18E-05 | | 7.36E-04 | | 2.83E-03 | | 4.18E-01 | | 6.20E-10 | | 3.01E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |
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By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 7 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 6.27E-05 | 1.59E-03 | 0.000783 | 1.99E-02 | 0 | 0.00E+00 | 0 | 0.00E+00 | 9.398E-11 | 2.39E-09 | 2.66E-03 | 6.77E-02 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 0.00E+00 |
| facitlity cap(1) | | | | | | | | | | | | | |
| Facility annual emissions | | | 1.59E-03 | | 1.99E-02 | | 0.00E+00 | | 0.00E+00 | | 2.39E-09 | | 6.77E-02 |
| based on limiting unit | | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 | | 0.00E+00 |
| TPY | | | 1.59E-03 | | 1.99E-02 | | 0.00E+00 | | 0.00E+00 | | 2.39E-09 | | 6.77E-02 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96 DJD 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

## SCENARIO 8

| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 5.15E-05 | 7.75E-04 | 4.64E-04 | 2.98E-03 | 1.78E-03 | 4.40E-01 | 2.63E-01 | 6.53E-10 | 3.90E-10 | 3.17E-02 | 1.90E-02 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 5.16E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 2.20E-01 |
| Unit 8 | #2 Oil | 2.64E-04 | 5.22E-04 | 2.37E-03 | 4.70E-03 | 1.19E-03 | 2.36E-03 | 1.70E+00 | 3.36E+00 | 1.99E-09 | 3.94E-09 | 4.79E-03 | 9.50E-03 |
| Unit 8 | Total | | 5.69E-03 | | 4.70E-03 | | 2.36E-03 | | 3.36E+00 | | 3.94E-09 | | 2.29E-01 |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| Facility annual emissions | | | 5.15E-05 | | 4.64E-04 | | 1.78E-03 | | 2.63E-01 | | 3.90E-10 | | 1.90E-02 |
| based on limiting unit | | | 5.69E-03 | | 4.70E-03 | | 2.36E-03 | | 3.36E+00 | | 3.94E-09 | | 2.29E-01 |
| TPY | | | 5.74E-03 | | 5.17E-03 | | 4.14E-03 | | 3.63E+00 | | 4.33E-09 | | 2.48E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJG 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | |
| SCENARIO 9 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 6.27E-05 | 4.79E-04 | 0.000783 | 5.99E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 9.398E-11 | 7.18E-10 | 0.0026627 | 2.04E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 5.16E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 2.20E-01 |
| Unit 8 | #2 Oil | 2.64E-04 | 5.22E-04 | 2.37E-03 | 4.70E-03 | 1.19E-03 | 2.36E-03 | 1.70E+00 | 3.36E+00 | 1.99E-09 | 3.94E-09 | 4.79E-03 | 9.50E-03 |
| Unit 8 | Total | | 5.69E-03 | | 4.70E-03 | | 2.36E-03 | | 3.36E+00 | | 3.94E-09 | | 2.29E-01 |
| | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 4.79E-04 | | 5.99E-03 | | 0.00E+00 | | 0.00E+00 | | 7.18E-10 | | 2.04E-02 |
| based on limiting unit | | | 5.69E-03 | | 4.70E-03 | | 2.36E-03 | | 3.36E+00 | | 3.94E-09 | | 2.29E-01 |
| TPY | | | 6.17E-03 | | 1.07E-02 | | 2.36E-03 | | 3.36E+00 | | 4.66E-09 | | 2.49E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | *Change from rec* | | *na* | | *na* | | *na* | | *na* | | *na* | | *na* |
| | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96
Ckd By:D.Graziani Date:1/9/97 DJD 3/4/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 10 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | #6 Fuel | 8.61E-05 | 5.61E-05 | 7.75E-04 | 5.05E-04 | 2.98E-03 | 1.94E-03 | 4.40E-01 | 2.86E-01 | 6.53E-10 | 4.25E-10 | 3.17E-02 | 2.06E-02 |
| | | | | | | | | | | | | | |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 4.39E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 1.87E-01 |
| Unit 8 | #2 Oil | 2.64E-04 | 4.44E-04 | 2.37E-03 | 4.00E-03 | 1.19E-03 | 2.00E-03 | 1.70E+00 | 2.86E+00 | 1.99E-09 | 3.35E-09 | 4.79E-03 | 8.08E-03 |
| Unit 8 | Total | | 4.83E-03 | | 4.00E-03 | | 2.00E-03 | | 2.86E+00 | | 3.35E-09 | | 1.95E-01 |
| | | | | | | | | | | | | | |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| facitiity cap(1) | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Facility annual emissions | | | 5.61E-05 | | 5.05E-04 | | 1.94E-03 | | 2.86E-01 | | 4.25E-10 | | 2.06E-02 |
| based on limiting unit | | | 4.83E-03 | | 4.00E-03 | | 2.00E-03 | | 2.86E+00 | | 3.35E-09 | | 1.95E-01 |
| TPY | | | 4.89E-03 | | 4.50E-03 | | 3.94E-03 | | 3.15E+00 | | 3.78E-09 | | 2.15E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |
| | | | | | | | | | | | | | |

By. M. Bilello Date: 11/21/96 DJG 3/4/97
Ckd By:D.Graziani Date:1/9/97
Rvd By:M. Bilello Date:03/04/97

FOSTER WHEELER ENVIRONMENTAL CORPORATION

OFS No. 1584.0005.0008

Client: City of Tallahassee
Project:Purdom Unit 8

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCENARIO 11 | | | | | | | | | | | | | |
| | FUEL | Benzene | | Toluene | | Se | | HCl | | 2378 TCDD | | HCOH | |
| | | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY | g/s | TPY |
| Unit 7 | Natural Gas | 6.27E-05 | 6.46E-04 | 0.000783 | 8.07E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 9.398E-11 | 9.69E-10 | 2.66E-03 | 2.75E-02 |
| UNIT 7 ANNUALIZED | | | | | | | | | | | | | |
| Unit 8 | Natural Gas | 0.000158 | 4.39E-03 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0 | 0.00E+00 | 0.0067027 | 1.87E-01 |
| Unit 8 | #2 Oil | 2.64E-04 | 4.44E-04 | 2.37E-03 | 4.00E-03 | 1.19E-03 | 2.00E-03 | 1.70E+00 | 2.86E+00 | 1.99E-09 | 3.35E-09 | 4.79E-03 | 8.08E-03 |
| Unit 8 | Total | | 4.83E-03 | | 4.00E-03 | | 2.00E-03 | | 2.86E+00 | | 3.35E-09 | | 1.95E-01 |
| Unit 8 Annualized Nat. Gas | | | | | | | | | | | | | |
| Unit 8 Annualized #2 Oil | | | | | | | | | | | | | |
| Unit 8 Annualized Total | | | | | | | | | | | | | |
| facitlity cap(1) | | | | | | | | | | | | | |
| Facility annual emissions | | | 6.46E-04 | | 8.07E-03 | | 0.00E+00 | | 0.00E+00 | | 9.69E-10 | | 2.75E-02 |
| based on limiting unit | | | 4.83E-03 | | 4.00E-03 | | 2.00E-03 | | 2.86E+00 | | 3.35E-09 | | 1.95E-01 |
| TPY | | | 5.48E-03 | | 1.21E-02 | | 2.00E-03 | | 2.86E+00 | | 4.32E-09 | | 2.22E-01 |
| Recent actuals Units 5,6,7 (1) | minus aux boiler | | na | | na | | na | | na | | na | | na |
| | Change from rec | | na | | na | | na | | na | | na | | na |

KBN

April 28, 1995

Mr. Howard L. Rhodes, Director
Division of Air Resources Management
Florida Department of Environmental Protection
2600 Blair Stone Road, M.S. 5505
Tallahassee, FL 32399-2400

RE: Florida Electric Power Coordinating Group (FCG)
Emission Factors for Title Permit Applications

Dear Howard:

This correspondence is being submitted on behalf of the FCG to obtain FDEP concurrence with proposed emission factors that would be used in the preparation of Title V permit applications. This submittal is consistent with your letter dated September 27, 1993, in which the division has agreed to consider industry proposals for industry-specific emission factors in the absence of EPA-approved factors and encourages facilities to submit new or updated air pollutant emission information that become available. The emission factors in this correspondence were developed based on the latest information available for the various types of air emission sources at electric generating utilities. It is the intent that the proposed emission factors and referenced material be used in determining emissions for Item 5. of Section E. Pollutant Information in FDEP Form No.62.62-210.900(1). The exception will be if the utility has more direct information on emissions or there is an applicable air construction or operating permit requirement.

EPA emission factors from AP-42 are proposed for many of the criteria pollutants where permit limits are not in the specific conditions of the air construction or operating permit. Many of the emission factors for trace emissions were based on the Electric Power Research Institute's (EPRI) Electric Utility Trace Substances Synthesis Report, November, 1994. This report which was submitted to EPA at the end of last year will be used in EPA's report to Congress later this year on estimated toxic air emissions from electric utility units. Where information is not available from AP-42 or EPRI, other utility data or EPA information were used.

The emission factors and/or references are in the form of tables which list the type of emission sources, the pollutants, the emission factor units, the proposed emission factor and the basis for the emission factor or present the reference to existing emission factors. The tables presented in this correspondence include emission factors for utility and industrial boilers which fire coal, natural gas, or oil (see Tables SUM-1 through SUM-4). References for emission factors are also presented for combustion turbines as well as particulate and volatile organic compound emissions from sources which are generally considered as fugitive. A general summary of recommended emission factors for these emission sources is presented in Table SUM-5.



KBN ENGINEERING AND APPLIED SCIENCES, INC.

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Gainesville, Florida 32653-1500
904-336-5600 FAX 904-336-6603

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Tampa, Florida 33607
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Boca Raton, Florida 33487
407-994-9910
FAX 407-994-8393

7785 Baymeadows Way, Suite 105
Jacksonville, Florida 32256
904-739-5600 FAX 904-739-7777

1616 "P" Street N.W., Suite 480
Washington, D.C. 20036
202-462-1100
FAX 202-462-2270

I have provided a general certification regarding the overall use of these emissions factors. If there are any questions, Dwain Waters and I can meet with your staff or have a conference call to address any comments. Mr. Dwain Waters of Gulf Power Company is the FCG representative on this issue.

Your consideration in this matter is appreciated.

Sincerely,

Kennard F. Kosky

Kennard F. Kosky, P.E.
President

cc: Dwain Waters, FCG
Bob McCann, KBN
Clair Fancy, FDEP
John Brown, FDEP

**PROFESSIONAL ENGINEER STATEMENT**

I, the undersigned, hereby certify that:

To the best of my knowledge, the emission factors presented herein are true, accurate, and complete and are based upon available techniques and information for calculating reasonable estimates of emissions from electric utility emission units.

Kennard F. Kosky, P.E. — Date: 4/27/95

**Table SUM-1. Coal Combustion for Utility Boilers- Summary of Recommended Emission Factors, Uncontrolled and Controlled**

| Pollutant | Units | PC/ DB-WF | | | PC/ DB-TF | | | PC/ WB | | | Basis |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Equation | | | Equation | | | Equation | | |
| | | Value | a | b | Value | a | b | Value | a | b | |
| **Criteria And Precursor Pollutants** | | | | | | | | | | | |
| Sulfur Dioxide | lb/ton | 38(S%).95 | | | 38(S%).95 | | | 38(S%).95 | | | AP-42 |
| Particulate Matter | lb/ton | 10(A%) | | | 10(A%) | | | 7(A%) | | | AP-42 |
| Particulate Matter (PM10) | lb/ton | 2.3(A%) | | | 2.3(A%) | | | 2.6(A%) | | | AP-42 |
| Nitrogen Oxides | lb/ton | 21.7 | | | 14.4 | | | 34 | | | AP-42 |
| Carbon Monoxide | lb/ton | 0.5 | | | 0.5 | | | 0.5 | | | AP-42 |
| Volatile Organic Compounds | lb/ton | 0.06 | | | 0.06 | | | 0.04 | | | AP-42 |
| Lead | lb/10^12 Btu | EQN | 3.4 | 0.8 | EQN | 3.4 | 0.8 | EQN | 3.4 | 0.8 | EPRI |
| **NSPS/NESHAP Pollutants** | | | | | | | | | | | |
| Arsenic | lb/10^12 Btu | EQN | 3.1 | 0.85 | EQN | 3.1 | 0.85 | EQN | 3.1 | 0.85 | EPRI |
| Beryllium | lb/10^12 Btu | EQN | 1.2 | 1.1 | EQN | 1.2 | 1.1 | EQN | 1.2 | 1.1 | EPRI |
| Fluorides (as HF) | lb/10^12 Btu | CON | | | CON | | | CON | | | EPRI |
| Hydrogen Chloride | lb/10^12 Btu | CON | | | CON | | | CON | | | EPRI |
| Mercury | lb/10^12 Btu | 8.33 | | | 8.33 | | | 8.33 | | | FCG (1) |
| Radionuclides | pCi/gram PM | 52.75 | | | 52.75 | | | 52.75 | | | EPRI |
| Sulfuric Acid Mist | lb/ton | 38(S%)x.00858 | | | 38(S%)x.00858 | | | 38(S%)x.00858 | | | AP-42 (2) |
| 2,3,7,8-TCDD equiv. (dioxin/furan) | lb/10^12 Btu | 2.00E-06 | | | 2.00E-06 | | | 2.00E-06 | | | EPRI |
| **Other Regulated Air Pollutants** | | | | | | | | | | | |
| Acetaldehyde | lb/10^12 Btu | -- | | | -- | | | -- | | | -- |
| Acrolein | lb/10^12 Btu | -- | | | -- | | | -- | | | -- |
| Antimony | lb/10^12 Btu | EQN | 0.92 | 0.63 | EQN | 0.92 | 0.63 | EQN | 0.92 | 0.63 | EPRI |
| Benzene | lb/10^12 Btu | 3.8 | | | 3.8 | | | 3.8 | | | EPRI |
| Cadmium | lb/10^12 Btu | EQN | 3.3 | 0.5 | EQN | 3.3 | 0.5 | EQN | 3.3 | 0.5 | EPRI |
| Chromium | lb/10^12 Btu | EQN | 3.7 | 0.58 | EQN | 3.7 | 0.58 | EQN | 3.7 | 0.58 | EPRI |
| Cobalt | lb/10^12 Btu | EQN | 1.7 | 0.69 | EQN | 1.7 | 0.69 | EQN | 1.7 | 0.69 | EPRI |
| Formaldehyde | lb/10^12 Btu | 3 | | | 3 | | | 3 | | | EPRI |
| Manganese | lb/10^12 Btu | EQN | 3.8 | 0.6 | EQN | 3.8 | 0.6 | EQN | 3.8 | 0.6 | EPRI |
| Methane | lb/ton | 0.04 | | | 0.04 | | | 0.05 | | | AP-42 |
| Nickel | lb/10^12 Btu | EQN | 4.4 | 0.48 | EQN | 4.4 | 0.48 | EQN | 4.4 | 0.48 | EPRI |
| Phosphorous | lb/10^12 Btu | -- | | | -- | | | -- | | | -- |
| Polycyclic Organic Matter | lb/10^12 Btu | 2.08 | | | 2.4 | | | 2.4 | | | AP-42 |
| Selenium | lb/10^12 Btu | CON | | | CON | | | CON | | | -- |
| Toluene | lb/10^12 Btu | 1.4 | | | 1.4 | | | 1.4 | | | EPRI |

**Table SUM-1. Coal Combustion for Utility Boilers- Summary of Recommended Emission Factors, Uncontrolled and Controlled**

| Pollutant | Units | PC/ DB-WF Value | PC/ DB-WF Equation a | PC/ DB-WF Equation b | PC/ DB-TF Value | PC/ DB-TF Equation a | PC/ DB-TF Equation b | PC/ WB Value | PC/ WB Equation a | PC/ WB Equation b | Basis |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Xylene | lb/10^12 Btu | -- | | | -- | | | -- | | | -- |
| **Non-regulated Pollutants** | | | | | | | | | | | |
| Carbon Dioxide | lb/ton | 73.3(C%) | | | 73.3(C%) | | | 73.3(C%) | | | |
| **Controlled Emission Factors (3)** | | | | | | | | | | | |

Note: PC= pulverized coal; DB-WF= dry bottom- wall-fired; DB-TF= dry bottom, tangentially-fired; WB= wet bottom.
EQN means equation used to calculate factor- a (X) ^b where X= (coal ppm/ash fraction) x PM emissions (lb/10^12 Btu)
CON means concentration in coal input (e.g., mg/kg)
S= sulfur content (%)
C= carbon content (%)

(1) Based on mercury concentration of 0.10 ppm and coal heat content of 12,000 Btu/lb.
(2) Based on SO3 emission factor and adjusting for molecular weight of H2SO4/ SO3 (98/80).
(3) Controlled factors can be obtained by multiplying the following fractions for emission controls (representative of control efficiencies) by the uncontrolled emission factors:

| Pollutant | ESP | Baghouse | Scrubber | |
|---|---|---|---|---|
| SO2/SO3 | 1 | 1 | 0.1 | |
| PM | 0.008 | 0.002 | 0.06 | |
| PM10 | 0.02174 | 0.008698 | 0.1826 | |
| As, Be, Cd, Co, Cr, Mn, Ni, Pb, Sb | 0.1 | 0.1 | 0.1 | (multiply by X in EQN, see note above) |
| Mercury | 0.70 | 0.70 | 0.55 | |
| Selenium | 0.55 | 0.55 | 0.12 | |
| HCl, HF | 1.00 | 1.00 | 0.03 | |
| Formaldehyde | 0.10 | 0.10 | 0.10 | |

| | | LNB | LNB+OFA | LNB(LNC3) | SCR |
|---|---|---|---|---|---|
| NOx | DB-WF | 0.625 | 0.45 | 1.00 | 0.25 |
| | WB | 0.625 | 0.45 | 1.00 | 0.25 |
| | DB-TF | 0.775 | 0.65 | 0.55 | 0.25 |

GASFAC01
4/16/95

Table SUM-2. Natural Gas Combustion for Utility Boilers- Summary of Emission Factors, Uncontrolled and Controlled

| Pollutant | | Units | FCG- Recommendation Heat Input Rate (MMBtu/hr) > 100 | 10-100 | Basis |
|---|---|---|---|---|---|
| **Criteria And Precursor Pollutants** | | | | | |
| Sulfur Dioxide | | lb/Mmcf | 6.00E-01 | 6.00E-01 | AP-42 (1) |
| Particulate Matter | | lb/Mmcf | 3.00E+00 | 1.37E+01 | AP-42 |
| Particulate Matter (PM10) | | lb/Mmcf | 3.00E+00 | 1.37E+01 | AP-42 |
| Nitrogen Oxides | | lb/Mmcf | 5.50E+02 | 1.40E+02 | AP-42 |
| Nitrogen Oxides (tangentially-fired) | | lb/Mmcf | 2.75E+00 | | AP-42 |
| Carbon Monoxide | | lb/Mmcf | 4.00E+01 | 3.50E+01 | AP-42 |
| Volatile Organic Compounds | | lb/Mmcf | 1.41E+00 | 2.78E+00 | AP-42 |
| Lead | | lb/10^12 Btu | NA | NA | EPRI |
| **NSPS/NESHAP Pollutants** | | | | | |
| Arsenic | | lb/10^12 Btu | NA | NA | EPRI |
| Beryllium | | lb/10^12 Btu | NA | NA | EPRI |
| Fluorides (as HF) | | lb/10^12 Btu | NA | NA | NA |
| Hydrogen Chloride | | lb/10^12 Btu | NA | NA | NA |
| Mercury | | lb/10^12 Btu | 7.80E-04 | 7.80E-04 | FCG |
| Radionuclides | | pCi/gram | NA | NA | NA |
| Sulfuric Acid Mist | | lb/10^12 Btu | ?? | ?? | ?? |
| 2,3,7,8-TCDD equiv. (dioxin/furans) | | lb/10^12 Btu | 1.20E-06 | 1.20E-06 | EPRI |
| **Other Regulated Air Pollutants** | | | | | |
| Acetaldehyde | | lb/10^12 Btu | NA | NA | NA |
| Acrolein | | lb/10^12 Btu | NA | NA | NA |
| Antimony | | lb/10^12 Btu | NA | NA | NA |
| Benzene | | lb/10^12 Btu | 8.00E-01 | 8.00E-01 | EPRI |
| Cadmium | | lb/10^12 Btu | NA | NA | EPRI |
| Chromium | | lb/10^12 Btu | NA | NA | EPRI |
| Cobalt | | lb/10^12 Btu | NA | NA | EPRI |
| Formadehyde | | lb/10^12 Btu | 3.40E+01 | 3.40E+01 | EPRI |
| Manganese | | lb/10^12 Btu | NA | NA | EPRI |
| Methane | | lb/10^12 Btu | 2.90E-01 | 2.90E-01 | AP-42 |
| Nickel | | lb/10^12 Btu | NA | NA | EPRI |
| Phosphorous | | lb/10^12 Btu | NA | NA | NA |
| Polycyclic Organic Matter | | lb/10^12 Btu | NA | NA | NA |
| Selenium | | lb/10^12 Btu | NA | NA | EPRI |
| Toluene | | lb/10^12 Btu | 1.00E+01 | 1.00E+01 | EPRI |
| Xylene | | lb/10^12 Btu | NA | NA | NA |
| **Non-regulated Pollutants** | | | | | |
| Carbon dioxide | | lb/10^12 Btu | 1.20E+05 | 1.20E+05 | AP-42 |
| **Controlled Emission Factors** | | | | | |
| Nitrogen Oxides | LNB | lb/Mmcf | 8.10E+01 | 8.10E+01 | AP-42 |
| | FGR | lb/Mmcf | 5.30E+01 | 3.00E+01 | AP-42 |
| | SCR | lb/Mmcf | 1.21E+02 | 1.21E+02 | AP-42 |
| Carbon Monoxide | LNB | lb/Mmcf | NA | 6.10E+01 | AP-42 |
| | FGR | lb/Mmcf | NA | 3.70E+01 | AP-42 |

Note: LNB= low NOx burner; FGR= flue gas recirculation; SCR- selective catalytic reduction.

(1) Based on 0.2 grain sulfur/ 100 cf; sulfur content may be higher if delivered by pipeline (2.86 lb/MMBtu; assuming 1.0 gr/100 cf).

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Table SUM-3. Oil Combustion for Utility Boilers- Summary of Recommended Emission Factors, Uncontrolled and Controlled

| Pollutant | Units | FCG- Recommendation No. 6 | No. 5 | No. 4 | No. 2 | Basis |
|---|---|---|---|---|---|---|
| **Criteria And Precursor Pollutants** | | | | | | |
| Sulfur Dioxide | lb/10^3 gal | 157(S%) | 157(S%) | 150(S%) | 142(S%) | AP-42 |
| Particulate Matter | lb/10^3 gal | 9.19(S%)+3.22 | 10 | 7 | 2 | AP-42 |
| Particulate Matter (PM10) | lb/10^3 gal | [9.19(S%)+3.22] 0.7 | 7.1 | 4.97 | 1 | AP-42 |
| Nitrogen Oxides | lb/10^3 gal | 67 | 67 | 67 | 20 | AP-42 |
| Nitrogen Oxides (tangential-firing) | lb/10^3 gal | 42 | 42 | 42 | 20 | AP-42 |
| Carbon Monoxide | lb/10^3 gal | 5 | 5 | 5 | 5 | AP-42 |
| Volatile Organic Compounds | lb/10^3 gal | 0.76 | 0.76 | 0.76 | 0.2 | AP-42 |
| Lead | lb/10^12 Btu | 7 | 7 | 7 | 8.9 | EPRI/Radian (No. 2 |
| **NSPS/NESHAP Pollutants** | | | | | | |
| Arsenic | lb/10^12 Btu | 5.5 | 5.5 | 5.5 | 4.2 | EPRI/Radian (No. 2 |
| Beryllium | lb/10^12 Btu | 0.2 | 0.2 | 0.2 | 0.2 | EPRI |
| Fluorides (as HF) (1) | lb/10^3 gal | 0.842 | 0.842 | 0.842 | 0.842 | FCG |
| Hydrogen Chloride (2) | lb/10^3 gal | 0.998 | 0.998 | 0.998 | 0.998 | FCG |
| Mercury | lb/10^12 Btu | 1 | 1 | 1 | 1 | FCG |
| Radionuclides | pCi/gram | 1.9 | 1.9 | 1.9 | 1.9 | EPRI |
| Sulfuric Acid Mist (3) | lb/10^3 gal | 6.963(S%) | 6.963(S%) | 6.963(S%) | 2.45(S%) | AP-42 |
| 2,3,7,8-TCDD equiv. (dioxins/furans) | lb/10^12 Btu | 8.300E-06 | 8.3E-06 | 8.3E-06 | 8.3E-06 | EPRI |
| **Other Regulated Air Pollutants** | | | | | | |
| Acetaldehyde | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Acrolein | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Antimony | lb/10^12 Btu | 35 | 35 | 35 | 35 | AP-42 |
| Benzene | lb/10^12 Btu | 1.1 | 1.1 | 1.1 | 1.1 | EPRI |
| Cadmium | lb/10^12 Btu | 1.3 | 1.3 | 1.3 | 1.3 | EPRI |
| Chromium | lb/10^12 Btu | 5.2 | 4 | 4 | 4 | EPRI |
| Cobalt | lb/10^12 Btu | 37 | 37 | 37 | 37 | EPRI |
| Formadehyde | lb/10^12 Btu | 20 | 20 | 20 | 20 | EPRI |
| Manganese | lb/10^12 Btu | 13 | 13 | 13 | 13 | EPRI |
| Methane | lb/10^3 gal | 0.28 | 0.28 | 0.28 | 0.052 | AP-42 |
| Nickel | lb/10^12 Btu | 720 | 370 | 370 | 170 | EPRI |
| Phosphorous | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Polycyclic Organic Matter | lb/10^12 Btu | 4.1 | 4.1 | 4.1 | 22.5 | Radian |
| Selenium | lb/10^12 Btu | 2 | 2 | 2 | 2 | EPRI |
| Toluene | lb/10^12 Btu | 9.9 | 9.9 | 9.9 | 9.9 | EPRI |
| Xylene | lb/10^12 Btu | NA | NA | NA | NA | NA |
| **Non-regulated Pollutants** | | | | | | |
| Carbon dioxide | lb/10^3 gal | 288 (C%) | 288 (C%) | 288 (C%) | 259 (C%) | AP-42 |
| PCB Used Oil Only (4) | lb/10^3 gal | NA | NA | NA | NA | FCG- 0.4 lb/10^3 g |
| Vanadium | lb/10^3 gal | 0.2656 | 0.2656 | 0.2656 | 0.2656 | FCEM |
| **Controlled Emission Factors (5)** | | | | | | |

(1) Based on 100 ppm fluorine content and oil density of 8.0 lb/gal.
(2) Based on 121.3 ppm chlorine content and oil density of 8.0 lb/gal.
(3) Based on SO3 emission factor and adjusting for molecular weight ratio (MW H2SO4/MW SO3= 98/80)
(4) Based on PCB concentration of 50 ppm.
(5) Controlled factors can be obtained by multiplying the following fractions for emission controls (representative of control efficiencies) by the uncontrolled emission factors:

| Pollutant | ESP | Baghouse | Scrubber |
|---|---|---|---|
| SO2/SO3 | 1.0 | 1.0 | 0.1 |
| PM | 0.008 | -- | 0.06 |
| PM10 | 0.007119 | -- | 0.006475 |

| | LNB | LNB+OFA | LNB(LNC3) | SCR |
|---|---|---|---|---|
| NOx- Normal firing | 0.625 | 0.45 | -- | 0.25 |
| - Tangential firing | 0.775 | 0.65 | -- | 0.25 |

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Table SUM-4. Oil Combustion for Industrial Boilers- Summary of Recommended Emission Factors, Uncontrolled and Controlled

| Pollutant | Units | No. 6 | No. 5 | No. 4 | No. 2 | Basis |
|---|---|---|---|---|---|---|
| | | FCG- Recommendation | | | | |
| **Criteria And Precursor Pollutants** | | | | | | |
| Sulfur Dioxide | lb/10^3 gal | 157(S%) | 157(S%) | 150(S%) | 142(S%) | AP-42 |
| Particulate Matter | lb/10^3 gal | 9.19(S%)+3.22 | 10 | 7 | 2 | AP-42 |
| Particulate Matter (PM10) | lb/10^3 gal | [9.19(S%)+3.22] 0.7 | 7.1 | 4.97 | 1 | AP-42 |
| Nitrogen Oxides | lb/10^3 gal | 67 | 67 | 67 | 20 | AP-42 |
| Nitrogen Oxides (tangential-firing) | lb/10^3 gal | 55 | 55 | 20 | 20 | AP-42 |
| Carbon Monoxide | lb/10^3 gal | 5 | 5 | 5 | 5 | AP-42 |
| Volatile Organic Compounds | lb/10^3 gal | 0.28 | 0.28 | 0.28 | 0.2 | AP-42 |
| Lead | lb/10^12 Btu | 7 | 7 | 7 | 8.9 | EPRI/Radian (No. 2 |
| **NSPS/NESHAP Pollutants** | | | | | | |
| Arsenic | lb/10^12 Btu | 5.5 | 5.5 | 5.5 | 4.2 | EPRI/Radian (No. 2 |
| Beryllium | lb/10^12 Btu | 0.2 | 0.2 | 0.2 | 0.2 | EPRI |
| Fluorides (as HF) (1) | lb/10^3 gal | 0.842 | 0.842 | 0.842 | 0.842 | FCG |
| Hydrogen Chloride (2) | lb/10^3 gal | 0.998 | 0.998 | 0.998 | 0.998 | FCG |
| Mercury | lb/10^12 Btu | 1 | 1 | 1 | 1 | FCG |
| Radionuclides | pCi/gram | 1.9 | 1.9 | 1.9 | 1.9 | EPRI |
| Sulfuric Acid Mist (3) | lb/10^3 gal | 6.983(S%) | 6.983(S%) | 6.983(S%) | 2.45(S%) | AP-42 |
| 2,3,7,8-TCDD equiv. (dioxins/furans) | lb/10^12 Btu | 8.300E-06 | 8.3E-06 | 8.3E-06 | 8.3E-06 | EPRI |
| **Other Regulated Air Pollutants** | | | | | | |
| Acetaldehyde | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Acrolein | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Antimony | lb/10^12 Btu | 35 | 35 | 35 | 35 | AP-42 |
| Benzene | lb/10^12 Btu | 1.1 | 1.1 | 1.1 | 1.1 | EPRI |
| Cadmium | lb/10^12 Btu | 1.3 | 1.3 | 1.3 | 1.3 | EPRI |
| Chromium | lb/10^12 Btu | 5.2 | 4 | 4 | 4 | EPRI |
| Cobalt | lb/10^12 Btu | 37 | 37 | 37 | 37 | EPRI |
| Formadehyde | lb/10^12 Btu | 20 | 20 | 20 | 20 | EPRI |
| Manganese | lb/10^12 Btu | 13 | 13 | 13 | 13 | EPRI |
| Methane | lb/10^3 gal | 1 | 1 | 0.052 | 0.052 | AP-42 |
| Nickel | lb/10^12 Btu | 720 | 370 | 370 | 170 | EPRI |
| Phosphorous | lb/10^12 Btu | NA | NA | NA | NA | NA |
| Polycyclic Organic Matter | lb/10^12 Btu | 4.1 | 4.1 | 4.1 | 22.5 | Radian |
| Selenium | lb/10^12 Btu | 2 | 2 | 2 | 2 | EPRI |
| Toluene | lb/10^12 Btu | 9.9 | 9.9 | 9.9 | 9.9 | EPRI |
| Xylene | lb/10^12 Btu | NA | NA | NA | NA | NA |
| **Non-regulated Pollutants** | | | | | | |
| Carbon dioxide | lb/10^3 gal | 288 (C%) | 288 (C%) | 288 (C%) | 259 (C%) | AP-42 |
| PCB Used Oil Only (4) | lb/10^3 gal | NA | NA | NA | NA | FCG- 0.4 lb/10^3 g |
| Vanadium | lb/10^3 gal | 0.2656 | 0.2658 | 0.2656 | 0.2656 | FCEM |
| **Controlled Emission Factors (5)** | | | | | | |

(1) Based on 100 ppm fluorine content and oil density of 8.0 lb/gal.
(2) Based on 121.3 ppm chlorine content and oil density of 8.0 lb/gal.
(3) Based on SO3 emission factor and adjusting for molecular weight ratio (MW H2SO4/MW SO3= 98/80)
(4) Based on PCB concentration of 50 ppm.
(5) Controlled factors can be obtained by multiplying the following fractions for emission controls (representative of control efficiencies) by the uncontrolled emission factors:

| Pollutant | ESP | Baghouse | Scrubber |
|---|---|---|---|
| SO2/SO3 | 1 | 1 | 0.1 |
| PM | 0.008 | -- | 0.06 |
| PM10 | 0.007119 | -- | 0.008475 |

| | LNB | LNB+OFA | LNB(LNC3) | SCR |
|---|---|---|---|---|
| NOx- Normal firing | 0.625 | 0.45 | -- | 0.25 |
| - Tangential firing | 0.775 | 0.65 | -- | 0.25 |

**Table SUM-5. General Summary of Recommended Emission Factors**

| Fuel/ Pollutant | Emission Type | Size | References | Comments |
|---|---|---|---|---|
| **1. Boilers** | | | | |
| Coal- Bituminous, Sub-bituminous | Utility: Dry bottom wall-fired; Dry bottom tangentially fired; Wet bottom | | AP-42, EPRI, FCG | See Table SUM-1 |
| Coal/Petroleum coke (50-50 blend) | | | Same as Coal | Default to Coal |
| Coal/ Tire derived fuel (90-10 blend) | | | Same as Coal | Default to Coal, except additional margin for NOx, CO, Mn, Co |
| Coal/ Wood (90-10 blend) | | | Same as Coal | Default to Coal |
| Natural Gas | Utility | > 100 MMBtu/hr | AP-42, EPRI, FCG | See Table SUM-2 |
| | | 10 - 100 MMBtu/hr | AP-42, EPRI, FCG | See Table SUM-2 |
| | Industrial | > 100 MMBtu/hr | Same as Utility Gas | See Table SUM-2 |
| | | 10 - 100 MMBtu/hr | Same as Utility Gas | See Table SUM-2 |
| Propane | Industrial | | AP-42 | |
| Butane | Industrial | | AP-42 | |
| Fuel Oil- Residual (No. 6,5, Distillate (No. 2) | Utility: Normal- fired; Tangentially- fired | | AP-42, EPRI, Radian, FCG, FCEM | See Table SUM-3 |
| | Industrial | | AP-42, EPRI, Radian, FCG, FCEM | See Table SUM-4 |
| Used oil | All Boilers | | FCG- default to residual or distillate with exceptions | See Tables SUM-3 and4 (in part); Exceptions for: On-spec- PCB; Off-spec- As, Cd, Cr, Pb, HCl, P |
| **2. Combustion Turbines** | | | | |
| Natural Gas | Utility, Industrial | | AP-42, FCG | FCG- mercury |
| Fuel Oil | Utility, Industrial | | AP-42, see Utility Boilers | For factors not in AP-42, use factors for utility fuel oil; Controls for NOx, CO for SCR, water and steam injection |

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Table SUM-5. General Summary of Recommended Emission Factors

| Fuel/ Pollutant | Emission Type | Size | References | Comments |
|---|---|---|---|---|
| **3. Fugitive Emission Sources** | | | | |
| Particulate Matter | Continuous Drop<br>Batch Drop<br>Wind Erosion- Active Storage Pile<br>Unpaved and Paved Roads<br>Abrasive Blasting | | AP-42 | Based on permit reference; use of site characterisic data |
| Particulate Matter | Wet Cooling Tower | | AP-42 | |
| Volatile Organic Compounds | Painting Operations | | Manufacturer | Normal- 6 lb/gal;<br>Low VOC- 3.5 lb/gal |
| | Petroleum Industry<br>Cooling towers;<br>Pipeline valves, flanges, etc. | | Fire/ AP-42 | |
| | Storage tanks | | AP-42 | Calculate breathing, working losses, etc. with EPA's TANKS Program |
| As, Be, Cd, Cr, Pb, Hg, Se, Ag | Boiler Cleaning Waste Evaporation | | TCLP limits | |

References:

AP-42- EPA document, "Air Pollutant Emission Factors for Stationary Point Sources"
EPRI- Synthesis Report, November, 1994.
Radian- "Estimating Air Toxics Emissions from Coal and Oil Combustion Sources, April, 1989.
FCG- Based on specific information from available fuel data.
FCEM- EPRI's Field Chemical Emission Monitoring Program.
Fire- EPA's Factor Information Retrieval System

# APPENDIX D

# EPA BACT/LAER CLEARINGHOUSE
# COMBUSTION TURBINE
# QUERY RESULTS

CITY OF TALLAHASSEE
PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
*BACT EVALUATION*
U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AL-0089 | INTERNATIONAL PAPER CO. RIVERDALE MILL | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER | 40.00 | MW | CO | 2.21E+01 | LB/HR | DESIGN | 0.000 | BACT-PSD |
| AL-0089 | INTERNATIONAL PAPER CO. RIVERDALE MILL | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER | 40.00 | MW | NOX | 8.00E-02 | LB/MMBTU (GAS) | STEAM INJECTION INTO THE TURBINE | 0.000 | BACT-PSD |
| AL-0089 | INTERNATIONAL PAPER CO. RIVERDALE MILL | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER | 40.00 | MW | PM10 | 1.00E-02 | LB/MMBTU (GAS) | FUEL SPECIFICATION | 0.000 | BACT-PSD |
| AL-0089 | INTERNATIONAL PAPER CO. RIVERDALE MILL | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, STATIONARY (GAS-FIRED) WITH DUCT BURNER | 40.00 | MW | VOC | 8.30E+00 | LB/HR (GAS) | DESIGN | 0.000 | BACT-PSD |
| AL-0074 | FLORIDA GAS TRANSMISSION COMPANY | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, NATURAL GAS | 12800.00 | BHP | CO | 4.20E-01 | GM/HP HR | AIR-TO-FUEL RATIO CONTROL, DRY COMBUSTION CONTROLS | 0.000 | BACT-PSD |
| AL-0074 | FLORIDA GAS TRANSMISSION COMPANY | ALABAMA DEPT OF ENVIRONMENTAL MGMT | (205) 271-7861 | TURBINE, NATURAL GAS | 12800.00 | BHP | NOX | 5.80E-01 | GM/HP HR | AIR-TO-FUEL RATIO CONTROL, DRY LOW NOX COMBUSTION | 71.000 | BACT-PSD |
| AZ-0010 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | CO | 1.05E+01 | PPM @ 15% O2 | FUEL SPEC: LEAN FUEL MIX | 0.000 | BACT-PSD |
| AZ-0010 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | NOX | 8.49E+01 | PPM @ 15% O2 | LEAN BURN | 0.000 | NSPS |
| AZ-0010 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | NOX | 4.20E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 51.000 | BACT-PSD |
| AZ-0011 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | CO | 1.05E+01 | PPM @ 15% O2 | FUEL SPEC: LEAN FUEL MIX | 0.000 | BACT-PSD |
| AZ-0011 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | NOX | 8.51E+01 | PPM @ 15% O2 | FUEL SPEC: LEAN FUEL MIX | 0.000 | NSPS |
| AZ-0011 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, GAS, SOLAR CENTAUR H | 5500.00 | HP | NOX | 4.20E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 51.000 | BACT-PSD |
| AZ-0012 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, NAT. GAS TRANSM., GE FRAME 3 | 12000.00 | HP | CO | 6.00E+01 | PPM @ 15% O2 | LEAN BURN | 0.000 | BACT-PSD |
| AZ-0012 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, NAT. GAS TRANSM., GE FRAME 3 | 12000.00 | HP | NOX | 2.25E+02 | PPM @ 15% O2 | LEAN BURN | 0.000 | BACT-PSD |
| AZ-0012 | EL PASO NATURAL GAS | EPA REGION IX | (415)-744-1263 | TURBINE, NAT. GAS TRANSM., GE FRAME 3 | 12000.00 | HP | NOX | 4.20E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 80.000 | BACT-PSD |
| CA-0418 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS-FIRED | 47.84 | MMBTU/H | CO | 7.74E+00 | PPM @ 15% O2 | HIGH TEMPERATURE OXIDATION CATALYST | 80.000 | BACT-PSD |
| CA-0418 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS-FIRED | 47.84 | MMBTU/H | HC | 1.84E+00 | PPM @ 15% O2 | HIGH TEMPERATURE OXIDATION CATALYST | 50.000 | BACT-PSD |
| CA-0418 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS-FIRED | 47.84 | MMBTU/H | NOX | 8.00E+00 | PPMVD @ 15% O2 | HIGH TEMPERATURE SELECTIVE CATALYTIC REDUCTION | 83.000 | BACT-PSD |
| CA-0437 | KINGSBURG ENERGY SYSTEMS | FRESNO APCD, CA | (209)-445-3239 | TURBINE, NATURAL GAS FIRED, DUCT BURNER | 34.50 | MW | NOX | 6.00E+00 | PPM @ 15% O2 | SCR, STEAM INJECTION | 90.000 | BACT-PSD |
| CA-0441 | GRANITE ROAD LIMITED | SAN JOAQUIN COUNTY APCD, CA | (805)-861-3682 | TURBINE, GAS, ELECTRIC GENERATION | 480.90 | MMBTU/H" | NOX | 3.50E+00 | PPMVD @ 15% O2 | SCR, STEAM INJECTION | 97.000 | BACT-PSD |
| CA-0463 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS FIRED, SOLAR MODEL H | 5500.00 | HP | CO | 7.74E+00 | PPM @ 15% O2 | HIGH TEMP OXIDATION CATALYST | 80.000 | BACT-PSD |
| CA-0463 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS FIRED, SOLAR MODEL H | 5500.00 | HP | HC | 1.84E+00 | PPM @ 15% O2 | HIGH TEMP OXIDATION CATALYST | 50.000 | BACT-PSD |
| CA-0463 | SOUTHERN CALIFORNIA GAS | KERN COUNTY APCD (DESERT PORTION), CA | (805)-861-3682 | TURBINE, GAS FIRED, SOLAR MODEL H | 5500.00 | HP | NOX | 8.00E+00 | PPM @ 15% O2 | HIGH TEMP SELECT. CAT. REDUCTION | 83.000 | BACT-PSD |
| CA-0544 | GOAL LINE, LP ICEFLOE | SAN DIEGO COUNTY APCD, CA | (619) 694-3316 | TURBINE, COMBUSTION (NATURAL GAS) (42.4 MW) | 386.00 | MMBTU/HR | NOX | 5.00E+00 | PPMVD @ 15% OXYGE | WATER INJECTION & SCR W/ AUTOMATIC AMMONIA INJECT | 88.000 | BACT-OTHER |
| CA-0611 | BANK OF AMERICA LOS ANGELES DATA CENTER | SOUTH COAST AQMD, CA | (909) 396-2638 | TURBINE, DIESEL & GENERATOR (SEE NOTES) | 0.00 | | NOX | 1.63E+02 | PPM @ 15% O2 | FUEL SPEC: LOW NOX DIESEL FUEL (SEE NOTES) | 0.000 | BACT-OTHER |
| CA-0613 | UNOCAL | SOUTH COAST AQMD, CA | (909) 396-2606 | TURBINE, GAS (SEE NOTES) | 0.00 | | CO | 1.00E+01 | PPM @ 15% O2 | OXIDATION CATALYST | 75.000 | BACT-OTHER |
| CA-0613 | UNOCAL | SOUTH COAST AQMD, CA | (909) 396-2606 | TURBINE, GAS (SEE NOTES) | 0.00 | | NOX | 9.00E+00 | PPM @ 15% O2 | SELECTIVE CATALYTIC REDUCTION (SCR), WATER INJECTN | 80.000 | BACT-OTHER |
| CO-001 | THERMO INDUSTRIES, LTD. | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE, GAS FIRED, 5 EACH | 246.00 | MMBTU/H | CO | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| CO-001 | THERMO INDUSTRIES, LTD. | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE, GAS FIRED, 5 EACH | 246.00 | MMBTU/H | NOX | 2.50E+01 | PPM @ 15% O2 | DRY LOW NOX TECH. | 0.000 | BACT-PSD |
| CO-001 | THERMO INDUSTRIES, LTD. | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE, GAS FIRED, 5 EACH | 246.00 | MMBTU/H | PM | 2.58E+01 | LB/H | FUEL SPEC: NATURAL GAS FIRED | 0.000 | OTHER |
| CO-001 | THERMO INDUSTRIES, LTD. | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE, GAS FIRED, 5 EACH | 246.00 | MMBTU/H | SOX | 1.50E+00 | LB/H | | 0.000 | OTHER |
| CO-001 | THERMO INDUSTRIES, LTD. | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE, GAS FIRED, 5 EACH | 246.00 | MMBTU/H | VOC | 1.67E+01 | LB/H | | 0.000 | OTHER |
| CO-001 | BRUSH COGENERATION PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE | 350.00 | MMBTU/H | NOX | 2.50E+01 | PPM @ 15% O2 | DRY LOW NOX BURNER | 74.000 | BACT-PSD |
| CO-001 | BRUSH COGENERATION PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE | 350.00 | MMBTU/H | PM | 9.80E+00 | T/YR | | 0.000 | OTHER |
| CO-001 | BRUSH COGENERATION PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE | 360.00 | MMBTU/H | PM10 | 9.80E+00 | T/YR | | 0.000 | OTHER |
| CO-001 | BRUSH COGENERATION PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE | 350.00 | MMBTU/H | SO2 | 3.20E+00 | T/YR | | 0.000 | OTHER |
| CO-001 | BRUSH COGENERATION PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINE | 350.00 | MMBTU/H | VOC | 2.67E+01 | T/YR | | 0.000 | OTHER |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | CO | 2.24E+01 | PPM @ 15% O2 | | 0.000 | BACT-PSD |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | NOX | 4.20E+01 | PPM @ 15% O2 | WATER INJECTION | 88.000 | BACT-PSD |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | PM | 1.24E+01 | T/YR | | 0.000 | OTHER |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | PM10 | 1.24E+01 | T/YR | | 0.000 | OTHER |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | SO2 | 3.20E+00 | T/YR | | 0.000 | OTHER |
| CO-001 | COLORADO POWER PARTNERSHIP | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-692-3176 | TURBINES, 2 NAT GAS & 2 DUCT BURNERS | 385.00 | MMBTU/H | VOC | 3.52E+01 | T/YR | | 0.000 | OTHER |
| CO-002 | CIMARRON CHEMICAL | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-331-4593 | TURBINE #2, GE FRAME 6 | 33.00 | MW | CO | 2.50E+02 | T/YR, LESS THAN | CO CATALYST | 0.000 | OTHER |
| CO-002 | CIMARRON CHEMICAL | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-331-4593 | TURBINE #1, GE FRAME 6 | 33.00 | MW | NOX | 2.50E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | OTHER |
| CO-002 | CIMARRON CHEMICAL | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303)-331-4593 | TURBINE #2, GE FRAME 6 | 33.00 | MW | NOX | 9.00E+00 | PPM @ 15% O2 | SCR | 0.000 | OTHER |
| CO-002 | NORTHWEST PIPELINE CORPORATION | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303) 692-3176 | TURBINE, SOLAR TAURUS | 45.00 | MMBTU/HR | NO2 | 9.50E+01 | PPMVD (UNTIL 11/98) | DRY LOW NOX COMBUSTOR (BY 11/01/98) | 0.000 | BACT-PSD |
| CO-002 | PHOENIX POWER PARTNERS | COLORADO DEPT OF HEALTH - AIR POLL CTRL | (303) 692-3176 | TURBINE (NATURAL GAS) | 311.00 | MMBTU/HR | NOX | 2.70E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTION | 0.000 | BACT-OTHER |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 1 EACH | 80.00 | MW | CO | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 1 EACH | 80.00 | MW | CO | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 1 EACH | 80.00 | MW | H2SO4 | 0.00E+00 | | FUEL SPEC: LIMIT FUEL SULFUR CONTENT | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 1 EACH | 80.00 | MW | H2SO4 | 0.00E+00 | | FUEL SPEC: LIMIT FUEL SULFUR CONTENT | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 1 EACH | 80.00 | MW | NOX | 2.50E+01 | PPM @ 15% O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 1 EACH | 80.00 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 1 EACH | 80.00 | MW | PM | 6.00E-03 | LB/MMBTU | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 1 EACH | 80.00 | MW | PM | 2.50E-02 | LB/MMBTU | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 1 EACH | 80.00 | MW | SO2 | 0.00E+00 | | FUEL SPEC: LIMIT FUEL SULFUR CONTENT | 0.000 | BACT-PSD |
| FL-0045 | CHARLES LARSEN POWER PLANT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 1 EACH | 80.00 | MW | SO2 | 0.00E+00 | | FUEL SPEC: LIMIT FUEL SULFUR CONTENT | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 400.00 | MW | CO | 3.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |

# CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 400.00 | MW | CO | 3.30E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, CG, 4 EACH | 400.00 | MW | CO | 3.30E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 400.00 | MW | NOX | 2.50E+01 | PPM @ 15% O2 | LOW NOX COMBUSTORS | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 400.00 | MW | NOX | 6.50E+01 | PPM @ 15% O2 | LOW NOX COMBUSTORS | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, CG, 4 EACH | 400.00 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | LOW NOX COMBUSTORS | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 400.00 | MW | PM | 1.80E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 400.00 | MW | PM | 6.08E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, CG, 4 EACH | 400.00 | MW | PM | 1.90E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 400.00 | MW | SO2 | 9.15E+01 | LB/H | FUEL SPEC: NATURAL GAS AS FUEL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 400.00 | MW | SO2 | 9.20E+02 | LB/H | FUEL SPEC: NO. 2 FUEL OIL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, CG, 4 EACH | 400.00 | MW | SO2 | 8.34E-02 | LB/H | FUEL SPEC: COAL DERIVED GAS | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 400.00 | MW | VOC | 1.60E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 400.00 | MW | VOC | 6.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0052 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, CG, 4 EACH | 400.00 | MW | VOC | 9.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | CO | 3.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | CO | 3.30E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | H2SO4 | 0.00E+00 | | FUEL SPEC: NATURAL GAS AS FUEL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | H2SO4 | 0.00E+00 | | FUEL SPEC: FIRING #2 FUEL OIL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | NOX | 6.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | PM | 1.54E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | PM | 5.80E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | SO2 | 0.00E+00 | | FUEL SPEC: NATURAL GAS AS FUEL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | SO2 | 0.00E+00 | | FUEL SPEC: NO. 2 FUEL OIL AS FUEL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 240.00 | MW | VOC | 1.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0053 | FLORIDA POWER AND LIGHT | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 0.00 | | VOC | 6.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 2 EACH | 42.00 | MW | CO | 4.20E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 42.00 | MW | CO | 7.80E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 2 EACH | 42.00 | MW | NOX | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 42.00 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 2 EACH | 42.00 | MW | PM | 6.50E-03 | LB/MMBTU | COMBUSTION CONTROL, FUEL SPEC: CLEAN FUEL | 0.000 | BACT-PSD |
| FL-0054 | LAKE COGEN LIMITED | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 2 EACH | 42.00 | MW | PM | 2.60E-02 | LB/MMBTU | COMBUSTION CONTROL, FUEL SPEC: CLEAN FUEL | 0.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 35.00 | MW | CO | 1.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 35.00 | MW | CO | 1.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 35.00 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | WET INJECTION | 70.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 35.00 | MW | NOX | 6.50E+01 | PPM @ 15% O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS, 4 EACH | 35.00 | MW | VOC | 7.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0056 | ORLANDO UTILITIES COMMISSION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 4 EACH | 35.00 | MW | VOC | 7.00E+00 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | CO | 5.40E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | H2SO4 | 7.60E+01 | LB/H | FUEL SPEC: #2 FUEL OIL | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | NOX | 4.20E+01 | PPM @ 15% O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | PM | 1.50E+01 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | SO2 | 5.55E+02 | LB/H | FUEL SPEC: #2 FUEL OIL | 0.000 | BACT-PSD |
| FL-0057 | FLORIDA POWER GENERATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, OIL, 6 EACH | 92.90 | MW | VOC | 5.00E+00 | LB/H | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| FL-0059 | SEMINOLE FERTILIZER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904)-488-1344 | TURBINE, GAS | 26.00 | MW | NOX | 9.00E+00 | PPM @ 15% O2 | SCR | 0.000 | BACT-PSD |
| FL-0068 | ORANGE COGENERATION LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS, 2 | 368.30 | MMBTU/H | CO | 3.00E+01 | PPMVD | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0068 | ORANGE COGENERATION LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS, 2 | 368.30 | MMBTU/H | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0068 | ORANGE COGENERATION LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS, 2 | 368.30 | MMBTU/H | PM | 5.00E+00 | LB/H | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0068 | ORANGE COGENERATION LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS, 2 | 368.30 | MMBTU/H | VOC | 1.00E+01 | PPMVD | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, GAS | 1614.80 | MMBTU/H | CO | 4.80E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1849.90 | MMBTU/H | CO | 9.84E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, GAS | 1614.80 | MMBTU/H | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1849.90 | MMBTU/H | NOX | 4.20E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, GAS | 1614.80 | MMBTU/H | PM | 9.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0072 | TIGER BAY LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1849.90 | MMBTU/H | PM | 1.70E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0074 | FLORIDA GAS TRANSMISSION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, GAS | 131.58 | MMBTU/H | NOX | 2.50E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 869.00 | MMBTU/H | CO | 5.40E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 928.00 | MMBTU/H | CO | 6.50E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 367.00 | MMBTU/H | CO | 4.00E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |

**CITY OF TALLAHASSEE**
**PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE**
**BACT EVALUATION**
**U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE**

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 371.00 | MMBTU/H | CO | 7.80E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 928.00 | MMBTU/H | H2SO4 | 5.70E+00 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 371.00 | MMBTU/H | H2SO4 | 2.20E+00 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 880.00 | MMBTU/H | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 928.00 | MMBTU/H | NOX | 4.20E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 367.00 | MMBTU/H | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 371.00 | MMBTU/H | NOX | 4.20E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 880.00 | MMBTU/H | PM | 7.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 928.00 | MMBTU/H | PM | 1.50E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS | 367.00 | MMBTU/H | PM | 9.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 371.00 | MMBTU/H | PM | 1.00E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 928.00 | MMBTU/H | SO2 | 5.20E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0078 | KISSIMMEE UTILITY AUTHORITY | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 371.00 | MMBTU/H | SO2 | 2.00E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | CO | 1.50E+01 | PPMVD | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | CO | 2.50E+01 | PPMVD | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | H2SO4 | 7.50E+00 | LB/H | FUEL SPEC: LOW SULFUR IN NATURAL GAS | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | H2SO4 | 1.40E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | NOX | 1.50E+01 | PPMVD @ 15 % O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | NOX | 4.20E+01 | PPMVD @ 15 % O2 | STEAM INJECTION | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | PM | 1.38E-02 | LB/MMBTU | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | PM | 4.72E-02 | LB/MMBTU | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | SO2 | 4.00E+01 | LB/H | FUEL SPEC: LOW SULFUR IN NATURAL GAS | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | SO2 | 7.00E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE,GAS | 1214.00 | MMBTU/H | VOC | 6.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0080 | AUBURNDALE POWER PARTNERS, LP | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1170.00 | MMBTU/H | VOC | 1.00E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0081 | TECO POLK POWER STATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 1765.00 | MMBTU/H | CO | 4.00E+01 | PPMVD | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0081 | TECO POLK POWER STATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 1765.00 | MMBTU/H | NOX | 4.20E+01 | PPMVD @ 15 % O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0081 | TECO POLK POWER STATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 1765.00 | MMBTU/H | PM | 9.00E-03 | LB/MMBTU | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0081 | TECO POLK POWER STATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 1765.00 | MMBTU/H | SO2 | 4.80E-02 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0081 | TECO POLK POWER STATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL | 1765.00 | MMBTU/H | VOC | 2.80E-02 | LB/MMBTU | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS (2) | 1510.00 | MMBTU/H | CO | 2.50E+01 | PPMVD | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL (2) | 1730.00 | MMBTU/H | CO | 3.00E+01 | PPMVD | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS (2) | 1510.00 | MMBTU/H | NOX | 1.20E+01 | PPMVD @15 % O2 | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL (2) | 1730.00 | MMBTU/H | NOX | 4.20E+01 | PPMVD @ 15 %O2 | WATER INJECTION | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS (2) | 1510.00 | MMBTU/H | PM | 9.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL (2) | 1730.00 | MMBTU/H | PM | 1.70E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS (2) | 1510.00 | MMBTU/H | SO2 | 9.90E-01 | LB/H | FUEL SPEC: LOW SULFUR IN NATURAL GAS | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL (2) | 1730.00 | MMBTU/H | SO2 | 9.40E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL (MAX 0.05 % SULFUR) | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, NATURAL GAS (2) | 1510.00 | MMBTU/H | VOC | 7.00E+00 | PPMVW | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0082 | FLORIDA POWER CORPORATION POLK COUNTY SITE | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, FUEL OIL (2) | 1730.00 | MMBTU/H | VOC | 7.00E+00 | PPMVW | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | CO | 5.40E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | CO | 7.80E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | H2SO4 | 1.80E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | H2SO4 | 2.80E+01 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | NOX | 4.20E+01 | PPMVD @ 15 % O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | NOX | 4.20E+01 | PPMVD @ 15 % O2 | WET INJECTION | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | PM | 1.50E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | PM | 1.70E+01 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | SO2 | 2.22E+02 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | SO2 | 4.07E+02 | LB/H | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1029.00 | MMBTU/H | VOC | 5.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0083 | FLORIDA POWER CORPORATION | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, OIL | 1866.00 | MMBTU/H | VOC | 9.00E+00 | LB/H | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | SIMPLE CYCLE COMBUSTION TURBINE, GAS/NO 2 OIL B-U | 74.00 | MW | H2SO4 | 3.00E+00 | LB/HR AT 20 F (GAS) | FUEL SPEC: LOW SULFUR OIL BACKUP FUEL AND NAT GAS PRIMARY 0.05% S OIL | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | SIMPLE CYCLE COMBUSTION TURBINE, GAS/NO 2 OIL B-U | 74.00 | MW | NOX | 1.50E+01 | PPM AT 15% OXYGEN | DRY LOW NOX BURNERS | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | OIL FIRED COMBUSTION TURBINE | 74.00 | MW | NOX | 4.20E+01 | PPM AT 15% OXYGEN | WATER INJECTION | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | SIMPLE CYCLE COMBUSTION TURBINE, GAS/NO 2 OIL B-U | 74.00 | MW | PM | 7.00E+00 | LB/HR AT 20 F | FUEL SPEC: LOW SULFUR FUELS | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | SIMPLE CYCLE COMBUSTION TURBINE, GAS/NO 2 OIL B-U | 74.00 | MW | SO2 | 2.90E+01 | LB/HR AT 20 F (GAS) | FUEL SPEC: LOW SULFUR OIL BACKUP FUEL AND NAT GAS PRIMARY 0.05% S | 0.000 | BACT-PSD |
| FL-0092 | GAINESVILLE REGIONAL UTILITIES | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | OIL FIRED COMBUSTION TURBINE | 74.00 | MW | SO2 | 5.30E+01 | LB/HR AT 20 F | FUEL SPEC: LOW S OIL 0.05% S | 0.000 | BACT-PSD |
| FL-0102 | PANDA-KATHLEEN, L.P. | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE (TOTAL 115MW) | 75.00 | MW | CO | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROLS | 0.000 | BACT-PSD |

# CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FL-0102 | PANDA-KATHLEEN, L.P. | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE (TOTAL 115MW) | 75.00 | MW | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LOW NOX BURNER | 0.000 | BACT-PSD |
| FL-0104 | SEMINOLE HARDEE UNIT 3 | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE | 140.00 | MW | CO | 2.00E+01 | PPM (NAT. GAS) | DRY LNB - GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| FL-0104 | SEMINOLE HARDEE UNIT 3 | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE | 140.00 | MW | NOX | 1.50E+01 | PPM @ 15% O2 | DRY LNB - STAGED COMBUSTION | 0.000 | BACT-PSD |
| FL-0104 | SEMINOLE HARDEE UNIT 3 | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE | 140.00 | MW | PM/PM10 | 7.00E+00 | LB/HR (NAT. GAS) | DRY LNB - FUEL SPEC: LOW S OIL, LIMITED OPERATION ON OIL. GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0104 | SEMINOLE HARDEE UNIT 3 | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | COMBINED CYCLE COMBUSTION TURBINE | 140.00 | MW | SO2 | 1.00E+00 | GRAIN S/100 SCF GAS | FUEL SPEC: LOW S FUEL OIL OR NATURAL GAS FUEL; COMBUSTION OF CLEAN FUELS | 0.000 | BACT-PSD |
| FL-0109 | KEY WEST CITY ELECTRIC SYSTEM | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, EXISTING CT RELOCATION TO A NEW PLANT | 23.00 | MW | CO | 2.00E+01 | PPM @ 15% O2 FULL L | GOOD COMBUSTION | 0.000 | BACT-PSD |
| FL-0109 | KEY WEST CITY ELECTRIC SYSTEM | FLORIDA DEPT OF ENV REGULATION | (904) 488-1344 | TURBINE, EXISTING CT RELOCATION TO A NEW PLANT | 23.00 | MW | NOX | 7.50E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 1032.00 | MMBTU/H, NAT GAS | CO | 9.00E+00 | PPM @ 15% O2 | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 972.00 | MMBTU/H, #2 OIL | CO | 9.00E+00 | PPM @ 15% O2 | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 1032.00 | MMBTU/H, NAT GAS | HG | 9.00E-01 | LB/E11 BTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 972.00 | MMBTU/H, #2 OIL | HG | 2.80E+00 | LB/E12 BTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 1032.00 | MMBTU/H, NAT GAS | NOX | 2.50E+01 | PPM @ 15% O2 | MAX WATER INJECTION | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 972.00 | MMBTU/H, #2 OIL | NOX | 0.00E+00 | SEE NOTES | MAX WATER INJECTION | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 1032.00 | MMBTU/H, NAT GAS | PM | 6.00E-03 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 972.00 | MMBTU/H, #2 OIL | PM | 1.20E-02 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 972.00 | MMBTU/H, #2 OIL | SO2 | 5.00E-01 | % S MAX | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 1032.00 | MMBTU/H, NAT GAS | VOC | 3.00E-03 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0052 | SAVANNAH ELECTRIC AND POWER CO. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404)-363-7000 | TURBINES, 8 | 977.00 | MMBTU/H, #2 OIL | VOC | 4.20E-03 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL OIL | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, GAS FIRED (2 EACH) | 1817.00 | M BTU/HR | CO | 2.50E+01 | PPMVD @ FULL LOAD | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, OIL FIRED (2 EACH) | 1840.00 | M BTU/HR | CO | 2.50E+01 | PPMVD @ FULL LOAD | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, GAS FIRED (2 EACH) | 1817.00 | M BTU/HR | NOX | 2.50E+01 | PPM @ 15% O2 | MAXIMUM WATER INJECTION | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363 7000 | TURBINE, OIL FIRED (2 EACH) | 1840.00 | M BTU/HR | NOX | 2.50E+01 | PPMVD, FUEL N AFLOW | MAXIMUM WATER INJECTION | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, GAS FIRED (2 EACH) | 1817.00 | M BTU/HR | PM | 8.40E-03 | LB/M BTU | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, OIL FIRED (2 EACH) | 1840.00 | M BTU/HR | PM | 1.58E-02 | LB/M BTU | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| GA-0053 | HARTWELL ENERGY LIMITED PARTNERSHIP | GEORGIA, OTHER | (404) 363-7000 | TURBINE, OIL FIRED (2 EACH) | 1840.00 | M BTU/HR | SO2 | 5.00E-02 | % S IN FUEL | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| GA-0056 | GEORGIA POWER COMPANY, ROBINS TURBINE PROJECT | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | TURBINE, COMBUSTION, NATURAL GAS | 80.00 | MW | NOX | 2.50E+01 | PPM | WATER INJECTION, FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| GA-0056 | GEORGIA POWER COMPANY, ROBINS TURBINE PROJECT | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | TURBINE, COMBUSTION, NATURAL GAS | 80.00 | MW | SO2 | 5.80E+01 | PPM | FUEL SPEC: LOW SULFUR FUEL (.3% AVG) FUEL 0.1 | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), NATURAL GAS | 116.00 | MW | CO | 1.00E+01 | PPMVD | COMPLETE COMBUSTION | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), FUEL OIL | 116.00 | MW | CO | 3.00E+01 | PPMVD | COMPLETE COMBUSTION | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), NATURAL GAS | 116.00 | MW | NOX | 9.00E+00 | PPMVD | DRY LOW NOX BURNER WITH SCR | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), FUEL OIL | 116.00 | MW | NOX | 2.00E+01 | PPMVD | WATER INJECTION WITH SCR | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), NATURAL GAS | 116.00 | MW | PM | 1.80E+01 | LB/HR | CLEAN FUEL | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), FUEL OIL | 116.00 | MW | PM | 5.50E+01 | LB/HR | CLEAN FUEL | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), FUEL OIL | 116.00 | MW | SO2 | 5.00E-02 | % SULFUR IN FUEL | FUEL SPEC: VERY LOW SULFUR IN FUEL | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), NATURAL GAS | 116.00 | MW | VOC | 6.00E+00 | PPMVD | COMPLETE COMBUSTION | 0.000 | BACT-PSD |
| GA-0063 | MID-GEORGIA COGEN. | GEORGIA DEPARTMENT OF NATURAL RESOU | (404) 363-7110 | COMBUSTION TURBINE (2), FUEL OIL | 116.00 | MW | VOC | 3.00E+01 | PPMVD | COMPLETE COMBUSTION | 0.000 | BACT-PSD |
| HI-0013 | MAUI ELECTRIC COMPANY, LTD. | HAWAII CLEAN AIR BRANCH | (808)-586-4200 | TURBINE, FUEL OIL #2 | 28.00 | MW | CO | 0.00E+00 | SEE NOTES | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| HI-0013 | MAUI ELECTRIC COMPANY, LTD. | HAWAII CLEAN AIR BRANCH | (808)-586-4200 | TURBINE, FUEL OIL #2 | 28.00 | MW | NOX | 4.20E+01 | PPM | WATER INJECTION | 71.000 | BACT-PSD |
| HI-0013 | MAUI ELECTRIC COMPANY, LTD. | HAWAII CLEAN AIR BRANCH | (808)-586-4200 | TURBINE, FUEL OIL #2 | 28.00 | MW | PM | 4.50E-02 | GR/DSCF | FUEL SPEC: 0.4 % SULFUR | 0.000 | BACT-PSD |
| HI-0013 | MAUI ELECTRIC COMPANY, LTD. | HAWAII CLEAN AIR BRANCH | (808)-586-4200 | TURBINE, FUEL OIL #2 | 28.00 | MW | SO2 | 7.80E+01 | PPM | FUEL SPEC: 0.4 % SULFUR | 0.000 | BACT-PSD |
| HI-0013 | MAUI ELECTRIC COMPANY, LTD. | HAWAII CLEAN AIR BRANCH | (808)-586-4200 | TURBINE, FUEL OIL #2 | 28.00 | MW | VOC | 0.00E+00 | SEE NOTES | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | CO | 2.68E+01 | LB/HR @ 100% PEAKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | CO | 5.64E+01 | LB/H @ 75-<100% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | CO | 1.81E+02 | LB/H @ 50-<75% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | CO | 4.78E+02 | LB/H @ 25-<50% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | NOX | 4.23E+01 | LB/HR | COMBUSTOR WATER INJECTOR, WATER INJECTION | 70.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | PM | 1.87E+01 | LB/HR | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | SO2 | 1.10E+02 | LB/HR | COMBUSTOR WATER INJECTOR, FUEL SPEC: 0.4% SULFUR FUEL | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | VOC | 8.00E-01 | LB/HR @ 100% PEAKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | VOC | 2.80E+00 | LB/H @ 75-<100% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | VOC | 2.81E+01 | LB/H @ 50-<75% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0014 | HAWAII ELECTRIC LIGHT CO., INC. | HAWAII, OTHER | (808) 586-4200 | TURBINE, FUEL OIL #2 | 20.00 | MW | VOC | 2.98E+02 | LB/H @ 25-<50% PKLD | COMBUSTION DESIGN | 0.000 | BACT-PSD |
| HI-0015 | MAUI ELECTRIC COMPANY, LTD./MAALAEA GENERATING S | HAWAII CLEAN AIR BRANCH | (808) 586-4200 | TURBINE, COMBINED-CYCLE COMBUSTION | 28.00 | MW | CO | 2.68E+01 | LB/HR | COMBUSTION TECHNOLOGY/DESIGN | 0.000 | BACT-OTHER |
| HI-0015 | MAUI ELECTRIC COMPANY, LTD./MAALAEA GENERATING S | HAWAII CLEAN AIR BRANCH | (808) 586-4200 | TURBINE, COMBINED-CYCLE COMBUSTION | 28.00 | MW | NOX | 4.23E+01 | LB/HR | WATER INJECTION | 60.000 | BACT-OTHER |
| HI-0015 | MAUI ELECTRIC COMPANY, LTD./MAALAEA GENERATING S | HAWAII CLEAN AIR BRANCH | (808) 586-4200 | TURBINE, COMBINED-CYCLE COMBUSTION | 28.00 | MW | PM | 1.87E+01 | LB/HR | COMBUSTION TECHNOLOGY/DESIGN | 0.000 | BACT-OTHER |
| HI-0015 | MAUI ELECTRIC COMPANY, LTD./MAALAEA GENERATING S | HAWAII CLEAN AIR BRANCH | (808) 586-4200 | TURBINE, COMBINED-CYCLE COMBUSTION | 28.00 | MW | SO2 | 1.10E+02 | LB/HR | FUEL SPEC: 0.4 PERCENT SULFUR CONTENT | 0.000 | BACT-OTHER |
| HI-0015 | MAUI ELECTRIC COMPANY, LTD./MAALAEA GENERATING S | HAWAII CLEAN AIR BRANCH | (808) 586-4200 | TURBINE, COMBINED-CYCLE COMBUSTION | 28.00 | MW | VOC | 8.00E-01 | LB/HR | COMBUSTION TECHNOLOGY/DESIGN | 0.000 | BACT-OTHER |
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | CO | 7.50E+01 | LB/HR (EACH) | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | N2O | 6.50E+01 | PPM @ 15% O2, OIL | WATER INJECTION | 0.000 | BACT-PSD |

## CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | NOX | 4.20E+01 | PPM @ 15% O2, N. GAS | WATER INJECTION | 0.000 | BACT-PSD |
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | PM/PM10 | 8.70E+01 | LB/HR (EACH) | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | SO2 | 4.44E+02 | LB/HR (EACH) | FUEL SPEC: LOW SULFUR FUEL (0.3% SULFUR FUEL) | 0.000 | BACT-PSD |
| KY-0053 | KENTUCKY UTILITIES COMPANY | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINE, #2 FUEL OIL/NATURAL GAS (8) | 1500.00 | MM BTU/HR | VOC | 2.04E+01 | LB/HR (EACH) | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | CO | 7.50E+01 | LBS/H (EACH) | PROPER COMBUSTION TECHNIQUES | 0.000 | BACT-OTHER |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | H2SO4 | 1.50E+01 | LBS/H (EACH) | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-OTHER |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | NOX | 4.20E+01 | PPM @ 15% O2 (OIL) | WATER INJECTION | 46.000 | SEE NOTES |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | PM/PM10 | 5.40E+01 | LBS/H (EACH) | PROPER COMBUSTION TECHNIQUES | 0.000 | BACT-OTHER |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | SO2 | 5.00E+02 | LBS/H (EACH) | FUEL SPEC: LOW SULFUR FUEL (0.3% SULFUR FUEL) | 0.000 | SEE NOTES |
| KY-0057 | EAST KENTUCKY POWER COOPERATIVE | KENTUCKY DEP, DIV FOR AIR QUALITY | (502) 564-3382 | TURBINES (5), #2 FUEL OIL AND NAT. GAS FIRED | 1492.00 | MM BTU/HR | VOC | 2.80E+01 | LBS/H (EACH) | PROPER COMBUSTION TECHNIQUES | 0.000 | BACT-OTHER |
| LA-0079 | ENRON LOUISIANA ENERGY COMPANY | LOUISIANA DEPARTMENT OF ENV QUALITY | (504)-765-0195 | TURBINE, GAS, 2 | 39.10 | MM BTU/HR | CO | 6.00E+01 | PPM @ 15% O2 | BASE CASE, NO ADDITIONAL CONTROLS | 0.000 | BACT-PSD |
| LA-0079 | ENRON LOUISIANA ENERGY COMPANY | LOUISIANA DEPARTMENT OF ENV QUALITY | (504)-765-0195 | TURBINE, GAS, 2 | 39.10 | MM BTU/HR | NOX | 4.00E+01 | PPM @ 15% O2 | H2O INJECT 0.67 LB/LB | 71.000 | BACT-PSD |
| LA-0088 | INTERNATIONAL PAPER | LOUISIANA DEPARTMENT OF ENV QUALITY | (504) 765-0199 | TURBINE/HRSG, GAS COGEN | 338.00 | MM BTU/HR | CO | 1.80E+02 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT |
| LA-0088 | INTERNATIONAL PAPER | LOUISIANA DEPARTMENT OF ENV QUALITY | (504) 765-0199 | TURBINE/HRSG, GAS COGEN | 338.00 | MM BTU/HR | NOX | 2.90E+01 | PPMV 15% O2 TURBINE | DRY LOW NOX COMBUSTOR/COMBUSTION CONTROL | 0.000 | BACT |
| LA-0088 | INTERNATIONAL PAPER | LOUISIANA DEPARTMENT OF ENV QUALITY | (504) 765-0199 | TURBINE/HRSG, GAS COGEN | 338.00 | MM BTU/HR | VOC | 3.80E+00 | LB/HR COMBINED | COMBUSTION CONTROLS, FUEL SELECTION | 0.000 | BACT |
| LA-0089 | FORMOSA PLASTICS CORPORATION, LOUISIANA | LOUISIANA DEPARTMENT OF ENV QUALITY | (504) 765-0199 | TURBINE/HRSG, GAS COGENERATION | 450.00 | MM BTU/HR | CO | 2.58E+01 | LB/HR | PROPER OPERATION | 0.000 | BACT-PSD |
| LA-0089 | FORMOSA PLASTICS CORPORATION, LOUISIANA | LOUISIANA DEPARTMENT OF ENV QUALITY | (504) 765-0199 | TURBINE/HRSG, GAS COGENERATION | 450.00 | MM BTU/HR | NOX | 9.00E+00 | PPMV | DRY LOW NOX BURNER/COMBUSTION DESIGN AND CONTROL | 0.000 | LAER |
| MA-0015 | PEABODY MUNICIPAL LIGHT PLANT | MASSACHUSETTS DIV OF AIR QUAL CONTROL | (617) 292-5630 | TURBINE, 38 MW NATURAL FAS FIRED* | 412.00 | MM BTU/HR | CO | 4.00E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-OTHER |
| MA-0015 | PEABODY MUNICIPAL LIGHT PLANT | MASSACHUSETTS DIV OF AIR QUAL CONTROL | (617) 292-5630 | TURBINE, 38 MW NATURAL FAS FIRED | 412.00 | MM BTU/HR | NOX | 2.50E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-OTHER |
| MA-0015 | PEABODY MUNICIPAL LIGHT PLANT | MASSACHUSETTS DIV OF AIR QUAL CONTROL | (617) 292-5630 | TURBINE, 38 MW OIL FIRED | 412.00 | MM BTU/HR | NOX | 4.00E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-OTHER |
| MA-0015 | PEABODY MUNICIPAL LIGHT PLANT | MASSACHUSETTS DIV OF AIR QUAL CONTROL | (617) 292-5630 | TURBINE, 38 MW OIL FIRED | 412.00 | MM BTU/HR | PM | 6.00E-02 | LB/MMBTU | FUEL SPECIFICATION: NO 2 LIGHT OIL | 0.000 | BACT-OTHER |
| MD-001 | SOUTHERN MARYLAND ELECTRIC COOPERATIVE (SMECO | MARYLAND, OTHER | (410) 631-3215 | TURBINE, NATURAL GAS FIRED ELECTRIC | 80.00 | MW | NO2 | 1.88E+02 | LB/HR | WATER INJECTION | 0.000 | BACT-PSD |
| MD-001 | SOUTHERN MARYLAND ELECTRIC COOPERATIVE (SMECO | MARYLAND, OTHER | (410) 631-3215 | TURBINE, OIL FIRED ELECTRIC | 80.00 | MW | NO2 | 4.00E+02 | LB/HR | WATER INJECTION | 0.000 | BACT-PSD |
| MD-001 | SOUTHERN MARYLAND ELECTRIC COOPERATIVE (SMECO | MARYLAND, OTHER | (410) 631-3215 | TURBINE, OIL FIRED ELECTRIC | 80.00 | MW | SO2 | 0.00E+00 | | FUEL SPEC: FUEL LIMITED AND 0.3 % S | 0.000 | BACT-PSD |
| MD-001 | PEPCO - CHALK POINT PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 105 MW NATURAL GAS FIRED ELECTRIC | 105.00 | MW | NO2 | 7.70E+01 | PPM @ 15% O2 | DRY PREMIX AND WATER INJECTION | 0.000 | BACT-PSD |
| MD-001 | PEPCO - CHALK POINT PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 105 MW OIL FIRED ELECTRIC | 105.00 | MW | NO2 | 2.50E+01 | PPM @ 15% O2 | DRY PREMIX BURNER | 0.000 | BACT-PSD |
| MD-001 | PEPCO - CHALK POINT PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 84 MW NATURAL GAS FIRED ELECTRIC | 84.00 | MW | NO2 | 2.50E+01 | PPM @ 15% O2 | QUIET COMBUSTION AND WATER INJECTION | 0.000 | BACT-PSD |
| MD-001 | PEPCO - CHALK POINT PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 84 MW OIL FIRED ELECTRIC | 84.00 | MW | NO2 | 5.80E+01 | PPM @ 15% O2 | QUIET COMBUSTION AND WATER INJECTION | 0.000 | BACT-PSD |
| MD-001 | BALTIMORE GAS & ELECTRIC - PERRYMAN PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 140 MW NATURAL GAS FIRED ELECTRIC | 140.00 | MW | CO | 2.00E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| MD-001 | BALTIMORE GAS & ELECTRIC - PERRYMAN PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 140 MW NATURAL GAS FIRED ELECTRIC | 140.00 | MW | NO2 | 1.50E+01 | PPM @ 15% O2 | DRY BURN LOW NOX BURNERS | 91.000 | BACT-PSD |
| MD-001 | BALTIMORE GAS & ELECTRIC - PERRYMAN PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 140 MW OIL FIRED ELECTRIC | 140.00 | MW | NO2 | 6.90E+01 | PPM @ 15% O2 | WATER INJECTION | 72.000 | BACT-PSD |
| MD-001 | BALTIMORE GAS & ELECTRIC - PERRYMAN PLANT | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 140 MW OIL FIRED ELECTRIC | 140.00 | MW | SO2 | 8.70E+01 | LB/HR | FUEL SPEC: LOW SULFUR OIL (0.05%) | 75.000 | BACT-PSD |
| MD-002 | PEPCO - STATION A | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 124 MW NATURAL GAS FIRED | 125.00 | MW | NO2 | 4.20E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| MD-002 | PEPCO - STATION A | MARYLAND, OTHER | (410) 631-3215 | TURBINE, 124 MW OIL FIRED | 125.00 | MW | NO2 | 7.70E+01 | PPM @ 15% O2 | WATER INJECTION | 0.000 | BACT-PSD |
| MI-0206 | KALAMAZOO POWER LIMITED | MICHIGAN DEPARTMENT OF NATURAL RESOU | (517)-373-7023 | TURBINE, GAS-FIRED, 2, W/ WASTE HEAT BOILERS | 1805.90 | MMBTU/H | CO | 2.00E+01 | PPMV | DRY LOW NOX TURBINES | 0.000 | BACT-PSD |
| MI-0206 | KALAMAZOO POWER LIMITED | MICHIGAN DEPARTMENT OF NATURAL RESOU | (517)-373-7023 | TURBINE, GAS-FIRED, 2, W/ WASTE HEAT BOILERS | 1805.90 | MMBTU/H | NOX | 1.50E+01 | PPMV | DRY LOW NOX TURBINES | 0.000 | BACT-PSD |
| MN-002 | LSP-COTTAGE GROVE, L.P. | MINNESOTA POLL CTRL AGCY, AIR QUAL DIV | (612) 296-7625 | COMBUSTION TURBINE/GENERATOR | 1970.00 | MMBTU/HR | H2SO4 | 3.70E-01 | LB/HR GAS | FUEL SELECTION | 0.000 | BACT-PSD |
| MN-002 | LSP-COTTAGE GROVE, L.P. | MINNESOTA POLL CTRL AGCY, AIR QUAL DIV | (612) 296-7625 | COMBUSTION TURBINE/GENERATOR | 1970.00 | MMBTU/HR | NOX | 4.50E+00 | PPM @ 15% O2 GAS | SELECTIVE CATALYTIC REDUCTION (SCR) | 70.000 | BACT-PSD |
| MN-002 | LSP-COTTAGE GROVE, L.P. | MINNESOTA POLL CTRL AGCY, AIR QUAL DIV | (612) 296-7625 | COMBUSTION TURBINE/GENERATOR | 1970.00 | MMBTU/HR | PM10 | 1.07E+01 | LB/HR GAS | FUEL SELECTION; GOOD COMBUSTION | 0.000 | BACT-PSD |
| MN-002 | LSP-COTTAGE GROVE, L.P. | MINNESOTA POLL CTRL AGCY, AIR QUAL DIV | (612) 296-7625 | COMBUSTION TURBINE/GENERATOR | 1970.00 | MMBTU/HR | VOC | 1.80E+01 | LB/HR GAS | FUEL SELECTION, GOOD COMBUSTION | 0.000 | BACT-PSD |
| MS-0028 | SOUTH MISSISSIPPI ELECTRIC POWER ASSOC. | MISSISSIPPI DEPT OF ENV QUALITY | (601) 961-5242 | COMBUSTION TURBINE, COMBINED CYCLE | 1299.00 | MMBTU/HR | CO | 2.83E+01 | PPM @ 15% O2, GAS | GOOD COMBUSTION CONTROLS | 0.000 | BACT-PSD |
| MS-0028 | SOUTH MISSISSIPPI ELECTRIC POWER ASSOC. | MISSISSIPPI DEPT OF ENV QUALITY | (601) 961-5242 | COMBUSTION TURBINE, COMBINED CYCLE | 1299.00 | MMBTU/HR | PM | 8.10E+00 | LB/HR, GAS | GOOD COMBUSTION CONTROLS | 0.000 | BACT-PSD |
| MS-0028 | SOUTH MISSISSIPPI ELECTRIC POWER ASSOC. | MISSISSIPPI DEPT OF ENV QUALITY | (601) 961-5242 | COMBUSTION TURBINE, COMBINED CYCLE | 1299.00 | MMBTU/HR | VOC | 5.20E+00 | PPM @ 15% O2, GAS | GOOD COMBUSTION CONTROLS | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1247.00 | MM BTU/HR | CO | 8.00E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1313.00 | MM BTU/HR | CO | 5.80E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1247.00 | MM BTU/HR | H2SO4 | 2.51E+01 | LB/HR | FUEL SPEC: 0.2% SULFUR FUEL OIL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1247.00 | MM BTU/HR | NOX | 2.87E+02 | LB/HR | MULTINOZZLE COMBUSTOR, MAXIMUM WATER INJECTION | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1313.00 | MM BTU/HR | NOX | 1.18E+02 | LB/HR | MULTINOZZLE COMBUSTOR, MAXIMUM WATER INJECTION | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1313.00 | MM BTU/HR | PM10 | 5.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1247.00 | MM BTU/HR | SO2 | 2.41E+02 | LB/HR | FUEL SPEC: 0.2% SULFUR FUEL OIL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1313.00 | MM BTU/HR | SO2 | 7.00E-01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1247.00 | MM BTU/HR | VOC | 6.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0055 | DUKE POWER CO. LINCOLN COMBUSTION TURBINE STATI | NORTH CAROLINA DIV OF ENV MGMT | (919) 733-3340 | TURBINE, COMBUSTION | 1313.00 | MM BTU/HR | VOC | 2.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | CO, GAS | 8.00E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | CO, OIL | 8.10E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | H2SO4 | 1.80E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | NOX, GAS | 1.58E+02 | LB/HR | WATER INJECTION | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | NOX, OIL | 5.12E+02 | LB/HR | WATER INJECTION; FUEL SPEC: 0.04% N FUEL OIL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | PM/PM10, GAS | 9.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |

## CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | PM/PM10, OIL | 1.70E+01 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | SO2, GAS | 1.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | SO2, OIL | 3.00E+02 | LB/HR | FUEL SPEC: 0.15% S FUEL OIL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | VOC, GAS | 2.80E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NC-0059 | CAROLINA POWER & LIGHT | NORTH CAROLINA DIV OF ENV MGMT | (919) 715-6283 | COMBUSTION TURBINE, 4 EACH | 1907.80 | MMBTU/HR | VOC, OIL | 7.00E+00 | LB/HR | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NJ-0009 | NEWARK BAY COGENERATION PARTNERSHIP | NEW JERSEY DEPT OF ENV PROTECTION | (609) 904-0491 | TURBINE, NATURAL GAS FIRED | 585.00 | MMBTU/HR | CO | 5.50E-03 | LB/MMBTU | CATALYTIC OXIDATION | 80.000 | BACT-PSD |
| NJ-0009 | NEWARK BAY COGENERATION PARTNERSHIP | NEW JERSEY DEPT OF ENV PROTECTION | (609) 904-0491 | TURBINE, KEROSENE FIRED | 585.00 | MMBTU/HR | CO | 6.30E-02 | LB/MMBTU | CATALYTIC OXIDATION | 83.000 | BACT-PSD |
| NJ-0009 | NEWARK BAY COGENERATION PARTNERSHIP | NEW JERSEY DEPT OF ENV PROTECTION | (609) 904-0491 | TURBINE, NATURAL GAS FIRED | 585.00 | MMBTU/HR | NOX | 3.30E-02 | LB/MMBTU | STEAM INJECTION AND SCR | 94.000 | BACT-PSD |
| NJ-0009 | NEWARK BAY COGENERATION PARTNERSHIP | NEW JERSEY DEPT OF ENV PROTECTION | (609) 904-0491 | TURBINE, KEROSENE FIRED | 585.00 | MMBTU/HR | NOX | 6.30E-02 | LB/MMBTU | STEAM INJECTION AND SCR | 94.000 | BACT-PSD |
| NJ-0010 | PEDRICKTOWN COGENERATION LIMITED PARTNERSHIP | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-0491 | TURBINE, NATURAL GAS FIRED | 1000.00 | MMBTU/HR | NOX | 4.40E-02 | LB/MMBTU | STEAM INJECTION AND SCR | 93.000 | BACT-PSD |
| NJ-0011 | LINDEN COGENERATION TECHNOLOGY | NEW JERSEY DEPT OF ENV PROTECTION | (609) 633-8210 | TURBINE, NATURAL GAS FIRED | 50.00 | X E12 BTU/YR | NO2 | 3.34E+01 | LB/HR | STEAM INJECTION AND SCR | 94.500 | BACT-PSD |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (NATURAL GAS) (2) | 1190.00 | MMBTU/HR | CO | 2.80E-02 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (#2 FUEL OIL) (2) | 1190.00 | MMBTU/HR | CO | 8.00E-02 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (NATURAL GAS) (2) | 1190.00 | MMBTU/HR | NOX | 3.30E-02 | LB/MMBTU | SCR, DRY LOW NOX BURNER | 64.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (#2 FUEL OIL) (2) | 1190.00 | MMBTU/HR | NOX | 8.20E-02 | LB/MMBTU | SCR AND WATER INJECTION | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (NATURAL GAS) (2) | 1190.00 | MMBTU/HR | PM | 2.30E-03 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (#2 FUEL OIL) (2) | 1190.00 | MMBTU/HR | PM | 2.80E-02 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (NATURAL GAS) (2) | 1190.00 | MMBTU/HR | SO2 | 8.90E-03 | LB/MMBTU | FUEL SPEC: NAT GAS/LOW SULFUR NO.2 OIL | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (#2 FUEL OIL) (2) | 1190.00 | MMBTU/HR | SO2 | 2.10E-01 | LB/MMBTU | FUEL SPEC: USE OF LOW SULFUR NO.2 OIL | 0.000 | BACT-OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (NATURAL GAS) (2) | 1190.00 | MMBTU/HR | VOC | 4.80E-03 | LB/MMBTU | TURBINE DESIGN | 0.000 | OTHER |
| NJ-0013 | LAKEWOOD COGENERATION, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES (#2 FUEL OIL) (2) | 1190.00 | MMBTU/HR | VOC | 7.30E-03 | LB/MMBTU | TURBINE DESIGN | 0.000 | OTHER |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | CO | 1.80E+00 | PPMDV | OXIDATION CATALYST | 0.000 | OTHER |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | CO | 2.80E+00 | PPMDV | OXIDATION CATALYST | 0.000 | OTHER |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | NOX | 8.30E+00 | PPMDV | SCR | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | NOX | 1.80E+01 | PPMDV | SCR | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | PM10 | 8.00E-03 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | PM10 | 2.30E-02 | LB/MMBTU | TURBINE DESIGN | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | SO2 | 2.80E-03 | LB/MMBTU | FUEL SPEC: USE OF NATURAL GAS | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | SO2 | 4.00E-02 | LB/MMBTU | FUEL SPEC: USE OF LOW SULFUR OIL | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | TSP | 8.00E-03 | LB/MMBTU | TURBINE DESIGN | 0.000 | OTHER |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | TSP | 3.10E-02 | LB/MMBTU | TURBINE DESIGN | 0.000 | OTHER |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, NATURAL GAS-FIRED (2) | 617.00 | MMBTU/HR | VOC | 4.00E+00 | PPMDV | TURBINE DESIGN | 0.000 | BACT-PSD |
| NJ-0017 | NEWARK BAY COGENERATION PARTNERSHIP, L.P. | NEW JERSEY DEPT OF ENV PROTECTION | (609) 984-3022 | TURBINES, COMBUSTION, KEROSENE-FIRED (2) | 840.00 | MMBTU/HR | VOC | 6.10E+00 | PPMDV | TURBINE DESIGN | 0.000 | OTHER |
| NM-002 | WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSO | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2412 | TURBINE, GAS-FIRED | 11257.00 | HP | CO | 5.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NM-002 | WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSO | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2412 | TURBINE, GAS-FIRED | 11257.00 | HP | NOX | 4.20E+01 | PPM @ 15% O2 | SOLONOX COMBUSTOR, DRY LOW NOX TECHNOLOGY | 68.000 | BACT-PSD |
| NM-002 | WILLIAMS FIELD SERVICES CO. - EL CEDRO COMPRESSO | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2412 | TURBINE, GAS-FIRED | 11257.00 | HP | VOC | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| NM-002 | MARATHON OIL CO. - INDIAN BASIN N.G. PLAN | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-0068 | TURBINES, NATURAL GAS (2) | 5500.00 | HP | CO | 1.32E+01 | LBS/HR | LEAN-PREMIXED COMBUSTION TECHNOLOGY | 66.000 | BACT-PSD |
| NM-002 | MARATHON OIL CO. - INDIAN BASIN N.G. PLAN | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-0068 | TURBINES, NATURAL GAS (2) | 5500.00 | HP | NOX | 7.40E+00 | LBS/HR | LEAN-PREMIXED COMBUSTION TECHNOLOGY DRY/LOW NOX | 66.000 | BACT-PSD |
| NM-002 | MILAGRO, WILLIAMS FIELD SERVICE | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2411 | TURBINE/COGEN, NATURAL GAS (2) | 900.00 | MMCF/DAY | CO | 2.78E+01 | PPM @ 15% O2 | | 0.000 | BACT-PSD |
| NM-002 | MILAGRO, WILLIAMS FIELD SERVICE | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2411 | TURBINE/COGEN, NATURAL GAS (2) | 900.00 | MMCF/DAY | NO2 | 9.00E+00 | PPM @ 15% O2 | DRY LOW NOX (GENERAL ELECTRIC MODEL PG6541B) | 94.000 | BACT-PSD |
| NM-002 | MILAGRO, WILLIAMS FIELD SERVICE | NEW MEXICO ENVIRONMENT DEPT/APC BURE | (505) 827-2411 | TURBINE/COGEN, NATURAL GAS (2) | 900.00 | MMCF/DAY | PM10 | 0.00E+00 | SEE P2 DESC. | COMBUSTION AIR FILTERS; GOOD COMBUSTION PRACTICE AND MAINTENANCE | 0.000 | BACT-PSD |
| NV-0015 | SAGUARO POWER COMPANY | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE GENERATOR | 34.50 | MW | CO | 9.00E+00 | PPH | CONVERTER (CATALYTIC) | 90.000 | BACT-PSD |
| NV-0015 | SAGUARO POWER COMPANY | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE GENERATOR | 34.50 | MW | NOX | 1.88E+01 | PPH (WINTER) | SELECTIVE CATALYTIC REDUCTION (SCR) | 80.000 | BACT-PSD |
| NV-0015 | SAGUARO POWER COMPANY | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE GENERATOR | 34.50 | MW | PM | 2.50E+00 | PPH | COMBUSTION SYSTEM | 0.000 | LAER |
| NV-0015 | SAGUARO POWER COMPANY | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE GENERATOR | 34.50 | MW | VOC | 8.00E-01 | PPH | COMBUSTION SYSTEM | 0.000 | LAER |
| NV-0017 | NEVADA POWER COMPANY, HARRY ALLEN PEAKING PLAN | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE ELECTRIC POWER GENERATION | 75.00 | MW | CO | 1.53E+02 | TPY (EACH TURBINE) | PRECISION CONTROL FOR THE LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| NV-0017 | NEVADA POWER COMPANY, HARRY ALLEN PEAKING PLAN | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE ELECTRIC POWER GENERATION | 75.00 | MW | NO2 | 8.88E+01 | TPY (EACH TURBINE) | LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| NV-0017 | NEVADA POWER COMPANY, HARRY ALLEN PEAKING PLAN | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE ELECTRIC POWER GENERATION | 75.00 | MW | PM10 | 3.08E+01 | TPY (EACH TURBINE) | PRECISION CONTROL FOR THE COMBUSTOR | 0.000 | BACT-PSD |
| NV-0017 | NEVADA POWER COMPANY, HARRY ALLEN PEAKING PLAN | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE ELECTRIC POWER GENERATION | 75.00 | MW | SO2 | 2.71E+01 | TPY (EACH TURBINE) | FUEL SPEC: S IN #2 DISTILLATE LIMITED TO 0.05% | 0.000 | BACT-PSD |
| NV-0018 | NEVADA COGENERATION ASSOCIATES #2 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | CO | 4.00E+01 | LBS/HR | CATALYTIC CONVERTER | 0.000 | BACT-PSD |
| NV-0018 | NEVADA COGENERATION ASSOCIATES #2 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | NMHC | 8.00E+00 | LBS/HR | FUEL SPEC: BURN NATURAL GAS | 0.000 | BACT-PSD |
| NV-0018 | NEVADA COGENERATION ASSOCIATES #2 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | NO2 | 8.13E+01 | LBS/HR | SELECTIVE CATALYTIC SYSTEM ON ONE UNIT | 0.000 | BACT-PSD |
| NV-0018 | NEVADA COGENERATION ASSOCIATES #2 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | PM10 | 3.00E+00 | LBS/HR | FUEL SPEC: BURN NATURAL GAS | 0.000 | BACT-PSD |
| NV-0018 | NEVADA COGENERATION ASSOCIATES #2 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | SO2 | 2.10E+00 | LB/HR | FUEL SPEC: USE OF LOW-SULFUR OIL AS STANDBY FUEL | 0.000 | BACT-PSD |
| NV-0020 | NEVADA COGENERATION ASSOCIATES #1 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | CO | 4.00E+01 | LBS/HR | CATALYTIC CONVERTER | 0.000 | BACT-PSD |
| NV-0020 | NEVADA COGENERATION ASSOCIATES #1 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | NMHC | 6.00E+00 | LBS/HR | FUEL SPEC: BURN NATURAL GAS | 0.000 | BACT-PSD |
| NV-0020 | NEVADA COGENERATION ASSOCIATES #1 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | NO2 | 8.13E+01 | LBS/HR | SELECTIVE CATALYTIC SYSTEM ON ONE UNIT | 0.000 | BACT-PSD |
| NV-0020 | NEVADA COGENERATION ASSOCIATES #1 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | PM10 | 3.00E+00 | LBS/HR | FUEL SPEC: BURN NATURAL GAS | 0.000 | BACT-PSD |
| NV-0020 | NEVADA COGENERATION ASSOCIATES #1 | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBINED-CYCLE POWER GENERATION | 85.00 | MW | SO2 | 2.10E+00 | LBS/HR | FUEL SPEC: USE OF LOW SULFUR OIL AS THE STAND-BY FUEL | 0.000 | BACT-PSD |

518 457-7688
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# CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV-0030 | MUDDY RIVER L.P. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | CO | 7.70E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NV-0030 | MUDDY RIVER L.P. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | NOX | 3.03E+02 | LB/HR | LOW NOX BURNER | 0.000 | BACT-PSD |
| NV-0030 | MUDDY RIVER L.P. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | PM10 | 1.70E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NV-0030 | MUDDY RIVER L.P. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | SO2 | 8.80E+01 | LB/HR | FUEL SPEC: LOW SULFUR FUEL (LESS THAN .05%S) | 0.000 | BACT-PSD |
| NV-0030 | MUDDY RIVER L.P. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | VOC | 1.40E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NV-0031 | CSW NEVADA, INC. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | CO | 8.30E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NV-0031 | CSW NEVADA, INC. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | NOX | 2.73E+02 | LB/HR | DRY LOW NOX COMBUSTOR | 0.000 | BACT-PSD |
| NV-0031 | CSW NEVADA, INC. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | PM10 | 1.70E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NV-0031 | CSW NEVADA, INC. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | SO2 | 3.05E+01 | LB/HR | FUEL SPEC: LOW SULFUR FUEL (LESS THAN 0.05%S) | 0.000 | BACT-PSD |
| NV-0031 | CSW NEVADA, INC. | CLARK CO HEALTH DIST, DIV APC, NV | (702) 383-1276 | COMBUSTION TURBINE, DIESEL & NATURAL GAS | 140.00 | MW | VOC | 1.30E+01 | LB/HR | FUEL SPEC: NATURAL GAS | 0.000 | BACT-PSD |
| NY-0044 | BROOKLYN NAVY YARD COGENERATION PARTNERS L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, NATURAL GAS FIRED | 240.00 | MW | CO | 4.00E+00 | PPM @ 15% O2 | | 0.000 | LAER |
| NY-0044 | BROOKLYN NAVY YARD COGENERATION PARTNERS L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, OIL FIRED | 240.00 | MW | CO | 5.00E+00 | PPM @ 15% O2 | | 0.000 | LAER |
| NY-0044 | BROOKLYN NAVY YARD COGENERATION PARTNERS L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, NATURAL GAS FIRED | 240.00 | MW | NOX | 3.50E+00 | PPM @ 15% O2 | SCR | 0.000 | LAER |
| NY-0044 | BROOKLYN NAVY YARD COGENERATION PARTNERS L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, OIL FIRED | 240.00 | MW | NOX | 1.00E+01 | PPM @ 15% O2 | SCR | 0.000 | LAER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINES (2) (252 MW) | 1173.00 | MMBTU/HR | CO | 1.00E+01 | PPM | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINE (79 MW) | 1173.00 | MMBTU/HR | CO | 2.50E+01 | PPM | COMBUSTION CONTROL | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINES (2) (252 MW) | 1173.00 | MMBTU/HR | H2SO4 MIST | 2.10E-02 | LB/MMBTU OIL | FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINES (2) (252 MW) | 1173.00 | MMBTU/HR | NOX | 9.00E+00 | PPM GAS | STEAM INJECTION AND SCR | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINE (79 MW) | 1173.00 | MMBTU/HR | NOX | 2.50E+01 | PPM GAS | STEAM INJECTION | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINES (2) (252 MW) | 1173.00 | MMBTU/HR | PM/PM10 | 4.00E-03 | LB/MMBTU GAS (BASE) | COMBUSTION CONTROLS AND FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINE (79 MW) | 1173.00 | MMBTU/HR | PM/PM10 | 4.00E-03 | LB/MMBTU, GAS | COMBUSTION CONTROLS AND FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINES (2) (252 MW) | 1173.00 | MMBTU/HR | SO2 | 2.00E-01 | % SULFUR OIL | FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0045 | SELKIRK COGENERATION PARTNERS, L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | COMBUSTION TURBINE (79 MW) | 1173.00 | MMBTU/HR | SO2 | 2.00E-01 | % SULFUR OIL | FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0046 | SARANAC ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (2) (NATURAL GAS) | 1123.00 | MMBTU/HR | CO | 3.00E+00 | PPM | OXIDATION CATALYST | 0.000 | BACT-OTHER |
| NY-0046 | SARANAC ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (2) (NATURAL GAS) | 1123.00 | MMBTU/HR | NOX | 8.00E+00 | PPM | SCR | 0.000 | BACT-OTHER |
| NY-0046 | SARANAC ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (2) (NATURAL GAS) | 1123.00 | MMBTU/HR | PM/PM10 | 6.20E-03 | LB/MMBTU | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0046 | SARANAC ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (2) (NATURAL GAS) | 1123.00 | MMBTU/HR | VOC | 4.50E-03 | LB/MMBTU | OXIDATION CATALYST | 0.000 | BACT-OTHER |
| NY-0047 | PASNY/HOLTSVILLE COMBINED CYCLE PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION GAS (150 MW) | 1146.00 | MMBTU/HR | CO | 8.50E+00 | PPM | COMBUSTION CONTROL | 0.000 | BACT-OTHER |
| NY-0047 | PASNY/HOLTSVILLE COMBINED CYCLE PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION GAS (150 MW) | 1146.00 | MMBTU/HR | NOX (FROM GAS) | 9.00E+00 | PPM | DRY LOW NOX | 0.000 | BACT-OTHER |
| NY-0047 | PASNY/HOLTSVILLE COMBINED CYCLE PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION GAS (150 MW) | 1146.00 | MMBTU/HR | NOX (FROM OIL) | 4.20E+01 | PPM | WATER INJECTION | 0.000 | BACT-OTHER |
| NY-0047 | PASNY/HOLTSVILLE COMBINED CYCLE PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION GAS (150 MW) | 1146.00 | MMBTU/HR | SO2 | 2.00E-01 | % SULFUR OIL | FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0048 | KAMINE/BESICORP CORNING L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (79 MW) | 853.00 | MMBTU/HR | NOX | 9.00E+00 | PPM | DRY LOW NOX OR SCR | 0.000 | BACT-OTHER |
| NY-0048 | KAMINE/BESICORP CORNING L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (79 MW) | 853.00 | MMBTU/HR | PM/PM10 | 9.00E-03 | LB/MMBTU | COMBUSTION CONTROL | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | CO | 9.50E+00 | PPM | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | NOX (FROM GAS) | 9.00E+00 | PPM | DRY LOW NOX OR SCR | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | NOX (FROM OIL) | 5.50E+01 | PPM | DRY LOW NOX OR SCR | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | PM/PM10 (FROM GAS) | 8.00E-03 | LB/MMBTU | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | PM/PM10 (FROM OIL) | 3.00E-02 | LB/MMBTU | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | SO2 | 8.00E-02 | % SULFUR OIL | FUEL SPEC: LOW SULFUR OIL | 0.000 | BACT-OTHER |
| NY-0049 | KAMINE/BESICORP BEAVER FALLS COGENERATION FACILI | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINE, COMBUSTION (NAT. GAS & OIL FUEL) (79MW) | 850.00 | MMBTU/HR | VOC | 7.00E-03 | LB/MMBTU | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0050 | SITHE/INDEPENDENCE POWER PARTNERS | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (4) (NATURAL GAS) (1012 MW) | 2133.00 | MMBTU/HR | CO | 1.30E+01 | PPM | COMBUSTION CONTROLS | 0.000 | BACT-OTHER |
| NY-0050 | SITHE/INDEPENDENCE POWER PARTNERS | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (4) (NATURAL GAS) (1012 MW) | 2133.00 | MMBTU/HR | NOX | 4.50E+00 | PPM | SCR AND DRY LOW NOX | 0.000 | BACT-OTHER |
| NY-0050 | SITHE/INDEPENDENCE POWER PARTNERS | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | TURBINES, COMBUSTION (4) (NATURAL GAS) (1012 MW) | 2133.00 | MMBTU/HR | SO2 | 0.00E+00 | | FUEL SPEC; USE OF NATURAL GAS | 0.000 | BACT-OTHER |
| NY-0057 | MEGAN-RACINE ASSOCIATES, INC | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000-N COMBINED CYCLE GAS TURBINE | 401.00 | MMBTU/HR | CO | 2.80E-02 | LB/MMBTU, 11 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0057 | MEGAN-RACINE ASSOCIATES, INC | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000-N COMBINED CYCLE GAS TURBINE | 401.00 | MMBTU/HR | NOX | 4.20E+01 | PPMDV @ 15% O2 | WATER INJECTION | 80.000 | BACT |
| NY-0057 | MEGAN-RACINE ASSOCIATES, INC | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000-N COMBINED CYCLE GAS TURBINE | 401.00 | MMBTU/HR | PM,PM10 | 2.80E-02 | LB/MMBTU, 12 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0057 | MEGAN-RACINE ASSOCIATES, INC | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000-N COMBINED CYCLE GAS TURBINE | 401.00 | MMBTU/HR | VOC | 2.00E-02 | LB/MMBTU, 8.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0061 | ANITEC COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001 | 451.00 | MMBTU/HR | CO | 3.60E+01 | PPM, 33 LB/HR | BAFFLE CHAMBER | 80.000 | SEE NOTE #4 |
| NY-0061 | ANITEC COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001 | 451.00 | MMBTU/HR | NOX | 2.80E+01 | PPM, 41 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0061 | ANITEC COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001 | 451.00 | MMBTU/HR | PM,PM10 | 5.00E-03 | LB/MMBTU, 2.0 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.1% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0061 | ANITEC COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 COMBINED CYCLE GAS TURBINE EP #00001 | 451.00 | MMBTU/HR | VOC | 8.00E-03 | LB/MMBTU, 3.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0062 | FULTON COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 GAS TURBINE | 500.00 | MMBTU/HR | CO | 1.07E+02 | PPM, 120 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0062 | FULTON COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 GAS TURBINE | 500.00 | MMBTU/HR | NOX | 3.60E+01 | PPM, 85 LB/HR | WATER INJECTION | 58.500 | BACT |
| NY-0062 | FULTON COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 GAS TURBINE | 500.00 | MMBTU/HR | PM,PM10 | 2.40E-02 | LB/MMBTU, 12.0 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.3% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0062 | FULTON COGEN PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM5000 GAS TURBINE | 500.00 | MMBTU/HR | VOC | 4.00E-03 | LB/MMBTU, 2.0 LB/HR | NO CONTROLS | 0.000 | SEE NOTE #6 |
| NY-0063 | TBG COGEN COGENERATION PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM2500 GAS TURBINE | 214.90 | MMBTU/HR | CO | 1.81E-01 | LB/MMBTU | CATALYTIC OXIDIZER | 80.000 | BACT |
| NY-0063 | TBG COGEN COGENERATION PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM2500 GAS TURBINE | 214.90 | MMBTU/HR | NOX | 7.50E+01 | PPM + FBN CORRECTI | WATER INJECTION | 80.000 | BACT |
| NY-0063 | TBG COGEN COGENERATION PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM2500 GAS TURBINE | 214.90 | MMBTU/HR | PM,PM10 | 2.40E-02 | LB/MMBTU, 5.0 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.037% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0063 | TBG COGEN COGENERATION PLANT | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM2500 GAS TURBINE | 214.90 | MMBTU/HR | VOC | 8.00E-03 | LB/MMBTU, 2.9 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |

7/92

## CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF. | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NY-0064 | INDECK-OSWEGO ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 533.00 | MMBTU/HR | CO | 1.00E+01 | PPM, 10.00 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0064 | INDECK-OSWEGO ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 533.00 | MMBTU/HR | NOX | 4.20E+01 | PPM, 75.00 LB/HR | STEAM INJECTION | 53.000 | BACT |
| NY-0064 | INDECK-OSWEGO ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 533.00 | MMBTU/HR | PM,PM10 | 8.00E-03 | LB/MMBTU, 5.00 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.27% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0064 | INDECK-OSWEGO ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 533.00 | MMBTU/HR | VOC | 1.00E-02 | LB/MMBTU, 5.00 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0065 | KAMINE/BESICORP CARTHAGE L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 491.00 | MMBTU/HR | CO | 1.00E+01 | PPM, 11.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0065 | KAMINE/BESICORP CARTHAGE L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 491.00 | MMBTU/HR | NOX | 4.20E+01 | PPM, 78.6 LB/HR | STEAM INJECTION | 83.000 | BACT |
| NY-0065 | KAMINE/BESICORP CARTHAGE L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 491.00 | MMBTU/HR | PM,PM10 | 5.00E-03 | LB/MMBTU, 3.0 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.20% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0065 | KAMINE/BESICORP CARTHAGE L.P. | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 491.00 | MMBTU/HR | VOC | 9.00E-03 | LB/MMBTU, 5.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0066 | INDECK ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE EP #00001 | 491.00 | MMBTU/HR | CO | 4.00E+01 | PPM | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0066 | INDECK ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE EP #00001 | 491.00 | MMBTU/HR | NOX | 3.20E+01 | PPM | STEAM INJECTION | 58.200 | BACT |
| NY-0066 | INDECK ENERGY COMPANY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE EP #00001 | 491.00 | MMBTU/HR | PM,PM10 | 6.00E-03 | LB/MMBTU, 2.5 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0068 | KAMINE/BESICORP NATURAL DAM LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 500.00 | MMBTU/HR | CO | 2.00E-02 | LB/MMBTU, 10 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0068 | KAMINE/BESICORP NATURAL DAM LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 500.00 | MMBTU/HR | NOX | 4.20E+01 | PPM, 80.1 LB/HR | STEAM INJECTION | 35.000 | BACT |
| NY-0068 | KAMINE/BESICORP NATURAL DAM LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 500.00 | MMBTU/HR | PM,PM10 | 0.00E+00 | SEE NOTE #1 | FUEL SPECIFICATION | 0.000 | BACT-OTHER |
| NY-0068 | KAMINE/BESICORP NATURAL DAM LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 500.00 | MMBTU/HR | VOC | 8.00E-03 | LB/MMBTU, 4 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0071 | KAMINE SOUTH GLENS FALLS COGEN CO | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 498.00 | MMBTU/HR | CO | 9.00E+00 | PPM, 11.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0071 | KAMINE SOUTH GLENS FALLS COGEN CO | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 498.00 | MMBTU/HR | NOX | 4.20E+01 | PPM, 78.6 LB/HR | WATER INJECTION | 50.000 | BACT |
| NY-0071 | KAMINE SOUTH GLENS FALLS COGEN CO | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 498.00 | MMBTU/HR | PM,PM10 | 5.00E-03 | LB/MMBTU, 3.0 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.20% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0071 | KAMINE SOUTH GLENS FALLS COGEN CO | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 498.00 | MMBTU/HR | VOC | 9.00E-03 | LB/MMBTU, 5.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0072 | KAMINE/BESICORP SYRACUSE LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | SIEMENS V84.3 GAS TURBINE (EP #00001) | 650.00 | MMBTU/HR | CO | 9.50E+00 | PPM | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0072 | KAMINE/BESICORP SYRACUSE LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | SIEMENS V84.3 GAS TURBINE (EP #00001) | 650.00 | MMBTU/HR | NOX | 2.50E+01 | PPM | WATER INJECTION | 70.000 | BACT |
| NY-0072 | KAMINE/BESICORP SYRACUSE LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | SIEMENS V84.3 GAS TURBINE (EP #00001) | 650.00 | MMBTU/HR | PM,PM10 | 8.00E-03 | LB/MMBTU, 5.8 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.15% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0072 | KAMINE/BESICORP SYRACUSE LP | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | SIEMENS V84.3 GAS TURBINE (EP #00001) | 650.00 | MMBTU/HR | VOC | 7.00E-03 | LB/MMBTU, 4.6 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0073 | LOCKPORT COGEN FACILITY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (6) GE FRAME 6 TURBINES (EP #S 00001-00006) | 423.90 | MMBTU/HR | CO | 1.00E+01 | PPM | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0073 | LOCKPORT COGEN FACILITY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (6) GE FRAME 6 TURBINES (EP #S 00001-00006) | 423.90 | MMBTU/HR | NOX | 4.20E+01 | PPM | STEAM INJECTION | 78.000 | BACT |
| NY-0073 | LOCKPORT COGEN FACILITY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (6) GE FRAME 6 TURBINES (EP #S 00001-00006) | 423.90 | MMBTU/HR | PM,PM10 | 6.00E-03 | LB/MMBTU, 2.5 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.20% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0073 | LOCKPORT COGEN FACILITY | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (6) GE FRAME 6 TURBINES (EP #S 00001-00006) | 423.90 | MMBTU/HR | VOC | 1.20E-02 | LB/MMBTU, 5.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0075 | PILGRIM ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) WESTINGHOUSE W501D5 TURBINES (EP #S 00001&2) | 1400.00 | MMBTU/HR | CO | 1.00E+01 | PPM, 29.0 LB/HR | | 0.000 | BACT-OTHER |
| NY-0075 | PILGRIM ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) WESTINGHOUSE W501D5 TURBINES (EP #S 00001&2) | 1400.00 | MMBTU/HR | NOX | 4.50E+00 | PPM, 23.6 LB/HR | STEAM INJECTION FOLLOWED BY SCR | 0.000 | BACT |
| NY-0075 | PILGRIM ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) WESTINGHOUSE W501D5 TURBINES (EP #S 00001&2) | 1400.00 | MMBTU/HR | PM,PM10 | 7.00E-03 | LB/MMBTU, 7.20 LB/HR | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.05% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0075 | PILGRIM ENERGY CENTER | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) WESTINGHOUSE W501D5 TURBINES (EP #S 00001&2) | 1400.00 | MMBTU/HR | VOC | 2.00E-03 | LB/MMBTU, 2.53 LB/HR | | 0.000 | BACT-OTHER |
| NY-0076 | TRIGEN MITCHEL FIELD | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 424.70 | MMBTU/HR | CO | 1.00E+01 | PPM, 10.0 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0076 | TRIGEN MITCHEL FIELD | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 424.70 | MMBTU/HR | NOX | 8.00E+01 | PPM, 90 LB/HR | STEAM INJECTION | 20.000 | BACT |
| NY-0076 | TRIGEN MITCHEL FIELD | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 424.70 | MMBTU/HR | PM,PM10 | 6.00E-03 | LB/MMBTU, 2.9 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0076 | TRIGEN MITCHEL FIELD | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE | 424.70 | MMBTU/HR | VOC | 1.10E-02 | LB/MMBTU, 4.5 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0077 | INDECK-YERKES ENERGY SERVICES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE (EP #00001) | 432.20 | MMBTU/HR | CO | 1.00E+01 | PPM, 10 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0077 | INDECK-YERKES ENERGY SERVICES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE (EP #00001) | 432.20 | MMBTU/HR | NOX | 4.20E+01 | PPM, 74 LB/HR | STEAM INJECTION | 35.000 | BACT |
| NY-0077 | INDECK-YERKES ENERGY SERVICES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE FRAME 6 GAS TURBINE (EP #00001) | 432.20 | MMBTU/HR | TSP/PM10 | 7.00E-03 | LB/MMBTU, 2.5 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) GAS TURBINES (EP #S 00101&102) | 110.00 | MMBTU/HR | CO | 4.80E+01 | PPM, 12.8 LB/HR | | 0.000 | BACT-OTHER |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) DUCT BURNERS (EP #S 00101&102) | 99.00 | MMBTU/HR | CO | 6.00E-02 | LB/MMBTU, 5.9 LB/HR | | 0.000 | BACT-OTHER |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) GAS TURBINES (EP #S 00101&102) | 110.00 | MMBTU/HR | NOX | 4.20E+01 | PPM, 18 LB/HR | STEAM INJECTION | 0.000 | BACT-PSD |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) DUCT BURNERS (EP #S 00101&102) | 99.00 | MMBTU/HR | NOX | 4.00E-01 | LB/MMBTU, 38.3 LB/HR | | 0.000 | BACT-OTHER |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) GAS TURBINES (EP #S 00101&102) | 110.00 | MMBTU/HR | PM,PM10 | 0.00E+00 | SEE NOTE #2 | FUEL SPEC: SULFUR CONTENT NOT TO EXCEED 0.30% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0079 | LEDERLE LABORATORIES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (2) DUCT BURNERS (EP #S 00101&102) | 99.00 | MMBTU/HR | PM,PM10 | 0.00E+00 | SEE NOTE #2 | FUEL SPEC: SULFUR CONTENT NO TO EXCEED 0.30% BY WEIGHT | 0.000 | BACT-OTHER |
| NY-0080 | PROJECT ORANGE ASSOCIATES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM-5000 GAS TURBINE | 550.00 | MMBTU/HR | CO | 9.20E+01 | LB/HR TEMP > 20F | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0080 | PROJECT ORANGE ASSOCIATES | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | GE LM-5000 GAS TURBINE | 550.00 | MMBTU/HR | NOX | 2.50E+01 | PPM, 47 LB/HR | STEAM INJECTION, FUEL SPEC; NATURAL GAS ONLY | 80.000 | BACT |
| NY-0081 | LILCO SHOREHAM | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (3) GE FRAME 7 TURBINES (EP #S 00007-9) | 850.00 | MMBTU/HR | CO | 1.00E+01 | PPM, 19.7 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| NY-0081 | LILCO SHOREHAM | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (3) GE FRAME 7 TURBINES (EP #S 00007-9) | 850.00 | MMBTU/HR | NOX | 5.50E+01 | PPM +FBN & HEAT RAT | WATER INJECTION | 30.000 | BACT |
| NY-0081 | LILCO SHOREHAM | NEW YORK DEC, DIV OF AIR RESOURCES | (518) 457-7688 | (3) GE FRAME 7 TURBINES (EP #S 00007-9) | 850.00 | MMBTU/HR | PM10 | 1.20E-02 | LB/MMBTU, 10.2 LB/HR | NO CONTROLS | 0.000 | BACT-OTHER |
| OH-021 | CNG TRANSMISSION | OHIO ENVIRONMENTAL PROTECTION AGENCY | (614) 644-2270 | TURBINE (NATURAL GAS) (3) | 5500.00 | HP (EACH) | CO | 1.50E-02 | G/HP-HR | FUEL SPEC: USE OF NATURAL GAS | 0.000 | OTHER |
| OH-021 | CNG TRANSMISSION | OHIO ENVIRONMENTAL PROTECTION AGENCY | (614) 644-2270 | TURBINE (NATURAL GAS) (3) | 5500.00 | HP (EACH) | NOX | 1.60E+00 | G/HP-HR* | LOW NOX COMBUSTION | 0.000 | BACT-OTHER |
| OH-021 | CNG TRANSMISSION | OHIO ENVIRONMENTAL PROTECTION AGENCY | (614) 644-2270 | TURBINE (NATURAL GAS) (3) | 5500.00 | HP (EACH) | PM | 3.50E-02 | LB/MMBTU | FUEL SPEC: USE OF NATURAL GAS | 0.000 | OTHER |
| OH-021 | CNG TRANSMISSION | OHIO ENVIRONMENTAL PROTECTION AGENCY | (614) 644-2270 | TURBINE (NATURAL GAS) (3) | 5500.00 | HP (EACH) | VOC | 1.00E-01 | G/HP-HR | FUEL SPEC: USE OF NATURAL GAS | 0.000 | OTHER |
| OK-0027 | OKLAHOMA MUNICIPAL POWER AUTHORITY | OKLAHOMA AIR QUALITY SERVICE | (405) 271-5220 | TURBINE, COMBUSTION | 58.00 | MW | H2SO4 | 1.30E-02 | LB/MM BTU | FUEL SPEC: USE OF DISTILLATE FUEL | 90.000 | BACT-OTHER |
| OK-0027 | OKLAHOMA MUNICIPAL POWER AUTHORITY | OKLAHOMA AIR QUALITY SERVICE | (405) 271-5220 | TURBINE, COMBUSTION | 58.00 | MW | NOX (FROM GAS FUEL) | 2.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROLS | 83.000 | BACT-OTHER |
| OK-0027 | OKLAHOMA MUNICIPAL POWER AUTHORITY | OKLAHOMA AIR QUALITY SERVICE | (405) 271-5220 | TURBINE, COMBUSTION | 58.00 | MW | NOX (FROM OIL FUEL) | 6.50E+01 | PPM @ 15% O2 | COMBUSTION CONTROLS | 83.000 | BACT-OTHER |
| OK-0027 | OKLAHOMA MUNICIPAL POWER AUTHORITY | OKLAHOMA AIR QUALITY SERVICE | (405) 271-5220 | TURBINE, COMBUSTION | 58.00 | MW | PM | 1.25E-02 | LB/MMBTU | FUEL SPEC: USE OF DISTILLATE FUEL | 90.000 | BACT-OTHER |
| OK-0027 | OKLAHOMA MUNICIPAL POWER AUTHORITY | OKLAHOMA AIR QUALITY SERVICE | (405) 271-5220 | TURBINE, COMBUSTION | 58.00 | MW | SO2 | 4.30E-01 | LB/MMBTU | FUEL SPEC: USE OF DISTILLATE FUEL | 50.000 | BACT-OTHER |
| OR-000 | PACIFIC GAS TRANSMITION | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503)-229-5988 | TURBINE, NAT. GAS | 14800.00 | HP | NOX | 4.20E+01 | PPM @ 15% O2 | LOW NOX BURNERS | 75.000 | BACT-PSD |

## CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OR-000 | PACIFIC GAS TRANSMISSION COMPANY | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5988 | TURBINE GAS, COMPRESSOR STATION | 110.00 | MMBTU/HR | NO2 | 1.99E+02 | PPM @ 15% O2 | LOW NOX BURNER DESIGN | 30.000 | NSPS |
| OR-001 | PORTLAND GENERAL ELECTRIC CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | TURBINES, NATURAL GAS (2) | 1720.00 | MMBTU/HR | CO | 1.50E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| OR-001 | PORTLAND GENERAL ELECTRIC CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | BOILERS, AUXILIARY, NATURAL GAS (2) | 361.00 | MMBTU/HR | CO | 5.80E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| OR-001 | PORTLAND GENERAL ELECTRIC CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | TURBINES, NATURAL GAS (2) | 1720.00 | MMBTU/HR | NOX | 4.50E+00 | PPM @ 15% O2 | SCR | 82.000 | BACT-PSD |
| OR-001 | PORTLAND GENERAL ELECTRIC CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | BOILERS, AUXILIARY, NATURAL GAS (2) | 361.00 | MMBTU/HR | NOX | 1.00E-01 | LB/MMBTU | LOW NOX BURNER AND FLUE GAS RECIRCULATION | 0.000 | BACT-PSD |
| OR-001 | HERMISTON GENERATING CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | TURBINES, NATURAL GAS (2) | 1696.00 | MMBTU/HR | CO | 1.50E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| OR-001 | HERMISTON GENERATING CO. | OREGON DEPT OF ENVIRONMENTAL QUALITY | (503) 229-5584 | TURBINES, NATURAL GAS (2) | 1696.00 | MMBTU/HR | NOX | 4.50E+00 | PPM @ 15% O2 | SCR | 82.000 | BACT-PSD |
| PA-0083 | NORTHERN CONSOLIDATED POWER | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (814)-332-6940 | TURBINES, GAS, 2 | 34.80 | MMBTU/HR | CO | 1.10E+02 | T/YR | OXIDATION CATALYST | 90.000 | OTHER |
| PA-0083 | NORTHERN CONSOLIDATED POWER | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (814)-332-6940 | TURBINES, GAS, 2 | 34.80 | MMBTU/HR | NOX | 2.50E+01 | PPM @ 15% O2 | STEAM INJECTION+SCR IN 1997 | 85.000 | OTHER |
| PA-0083 | NORTHERN CONSOLIDATED POWER | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (814)-332-6940 | TURBINES, GAS, 2 | 34.80 | MMBTU/HR | VOC | 1.05E+02 | PPM @ 15% O2 | OXIDATION CATALYST | 50.000 | OTHER |
| PA-0098 | GRAYS FERRY CO. GENERATION PARTNERSHIP | PHILADELPHIA DOPH, AIR MGMT SERV, PA | (215) 823-7572 | TURBINE (NATURAL GAS & OIL) | 1150.00 | MMBTU/HR | CO | 5.50E-03 | LB/MMBTU (GAS)* | COMBUSTION | 0.000 | BACT-OTHER |
| PA-0098 | GRAYS FERRY CO. GENERATION PARTNERSHIP | PHILADELPHIA DOPH, AIR MGMT SERV, PA | (215) 823-7572 | TURBINE (NATURAL GAS & OIL) | 1150.00 | MMBTU/HR | NOX | 9.00E+00 | PPMVD (NAT. GAS)* | DRY LOW NOX BURNER, COMBUSTION CONTROL | 0.000 | BACT-OTHER |
| PA-0098 | GRAYS FERRY CO. GENERATION PARTNERSHIP | PHILADELPHIA DOPH, AIR MGMT SERV, PA | (215) 823-7572 | TURBINE (NATURAL GAS & OIL) | 1150.00 | MMBTU/HR | PM | 1.00E-01 | LB/MMBTU* | DRY LOW NOX BURNER, COMBUSTION CONTROL | 0.000 | BACT-OTHER |
| PA-0098 | GRAYS FERRY CO. GENERATION PARTNERSHIP | PHILADELPHIA DOPH, AIR MGMT SERV, PA | (215) 823-7572 | TURBINE (NATURAL GAS & OIL) | 1150.00 | MMBTU/HR | VOC | 3.30E-03 | LB/MMBTU* | COMBUSTION | 0.000 | BACT-OTHER |
| PA-0099 | FLEETWOOD COGENERATION ASSOCIATES | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (215) 468-4175 | NG TURBINE (GE LM6000) WITH WASTE HEAT BOILER | 360.00 | MMBTU/HR | NOX | 2.10E+01 | LB/HR | SCR WITH LOW NOX COMBUSTORS | 47.000 | BACT-OTHER |
| PA-0099 | FLEETWOOD COGENERATION ASSOCIATES | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (215) 468-4175 | NG TURBINE (GE LM6000) WITH WASTE HEAT BOILER | 360.00 | MMBTU/HR | PM | 8.00E+00 | LB/HR | | 0.000 | BACT-OTHER |
| PA-0099 | FLEETWOOD COGENERATION ASSOCIATES | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (215) 468-4175 | NG TURBINE (GE LM6000) WITH WASTE HEAT BOILER | 360.00 | MMBTU/HR | SO2 | 1.13E+01 | LB/HR | FUEL SPEC: 0.1 % SULFUR IN FUEL | 0.000 | BACT-OTHER |
| PA-0099 | FLEETWOOD COGENERATION ASSOCIATES | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (215) 468-4175 | NG TURBINE (GE LM6000) WITH WASTE HEAT BOILER | 360.00 | MMBTU/HR | VOC | 4.40E+00 | LB/HR | GOOD COMBUSTION PRACTICES | 0.000 | BACT-OTHER |
| PA-0130 | PROCTOR AND GAMBLE PAPER PRODUCTS CO (CHARMIN | PENNSYLVANIA DER, BUR OF AIR QUAL CTRL | (717) 826-2531 | TURBINE, NATURAL GAS | 580.00 | MMBTU/HR | NOX | 5.50E+01 | PPM @ 15% O2 | STEAM INJECTION | 75.000 | RACT |
| RI-0010 | NARRAGANSETT ELECTRIC/NEW ENGLAND POWER CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS AND DUCT BURNER | 1380.00 | MMBTU/HR | CO | 1.10E+01 | PPM @ 15% O2, GAS | | 0.000 | BACT-PSD |
| RI-0010 | NARRAGANSETT ELECTRIC/NEW ENGLAND POWER CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS AND DUCT BURNER | 1380.00 | MMBTU/HR | NOX | 9.00E+00 | PPM @ 15% O2, GAS | SCR | 0.000 | BACT-PSD |
| RI-0010 | NARRAGANSETT ELECTRIC/NEW ENGLAND POWER CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS AND DUCT BURNER | 1380.00 | MMBTU/HR | PM | 5.00E-03 | LB/MMBTU, GAS | | 0.000 | BACT-PSD |
| RI-0010 | NARRAGANSETT ELECTRIC/NEW ENGLAND POWER CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS AND DUCT BURNER | 1380.00 | MMBTU/HR | VOC | 5.00E+00 | PPM @ 15% O2 | | 0.000 | BACT-PSD |
| RI-0012 | ALGONQUIN GAS TRANSMISSION CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS, 2 | 49.00 | MMBTU/HR | CO | 1.14E-01 | LB/MMBTU | GOOD COMBUSTION PRACTICES | 0.000 | BACT-OTHER |
| RI-0012 | ALGONQUIN GAS TRANSMISSION CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS, 2 | 49.00 | MMBTU/HR | NOX | 1.00E+02 | PPM @ 15% O2 | LOW NOX COMBUSTION | 0.000 | BACT-OTHER |
| RI-0012 | ALGONQUIN GAS TRANSMISSION CO. | RHODE ISLAND DIV OF AIR & HAZ MAT | (401)-277-2808 | TURBINE, GAS, 2 | 49.00 | MMBTU/HR | VOC | 1.60E-02 | LB/MMBTU | GOOD COMBUSTION PRACTICES | 0.000 | BACT-OTHER |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C. | 80.00 | MW | CO | 6.00E+01 | LB/H | | 0.000 | BACT-PSD |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C. | 80.00 | MW | H2SO4 | 3.00E+00 | LB/H | | 0.000 | BACT-PSD |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C. | 80.00 | MW | NOX | 2.92E+02 | LB/H | WATER INJECTION | 50.000 | BACT-PSD |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C. | 80.00 | MW | PM | 1.50E+01 | LB/H | | 0.000 | BACT-PSD |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C. | 80.00 | MW | SO2 | 2.28E+02 | LB/H | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| SC-0021 | CAROLINA POWER AND LIGHT CO. | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4857 | TURBINE, I.C | 80.00 | MW | VOC | 1.00E+01 | LB/H | | 0.000 | BACT-PSD |
| SC-0029 | SC ELECTRIC AND GAS COMPANY - HAGOOD STATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | INTERNAL COMBUSTION TURBINE | 110.00 | MW | CO | 2.30E+01 | LBS/HR | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| SC-0029 | SC ELECTRIC AND GAS COMPANY - HAGOOD STATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | INTERNAL COMBUSTION TURBINE | 110.00 | MW | NOX | 3.08E+02 | LBS/HR | WATER INJECTION | 0.000 | BACT-PSD |
| SC-0029 | SC ELECTRIC AND GAS COMPANY - HAGOOD STATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | INTERNAL COMBUSTION TURBINE | 110.00 | MW | PM | 4.50E+01 | LBS/HR | FUEL SPEC: LOW ASH CONTENT FUELS | 0.000 | BACT-PSD |
| SC-0029 | SC ELECTRIC AND GAS COMPANY - HAGOOD STATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | INTERNAL COMBUSTION TURBINE | 110.00 | MW | SO2 | 8.30E+02 | LBS/HR | FUEL SPEC: LOW SULFUR CONTENT FUELS | 0.000 | BACT-PSD |
| SC-0029 | SC ELECTRIC AND GAS COMPANY - HAGOOD STATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | INTERNAL COMBUSTION TURBINE | 110.00 | MW | VOC | 1.00E+01 | LBS/HR | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| SC-0031 | BMW MANUFACTURING CORPORATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | TURBINE, NAT GAS FIRED (3 - 1 SPARE) AND 2 BOILERS | 54.50 | MMBTU/HR | PM10 | 3.79E+00 | TPY | EACH OF THE 2 BOILER-TURBINE USE A COMMON STACK | 0.000 | BACT-PSD |
| SC-0031 | BMW MANUFACTURING CORPORATION | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | TURBINE, NAT GAS FIRED (3 - 1 SPARE) AND 2 BOILERS | 54.50 | MMBTU/HR | VOC | 7.79E+01 | LBS/DAY | EACH OF THE 2 BOILER-TURBINE USE A COMMON STACK | 0.000 | LAER |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | CO (NG) | 7.02E+02 | LB/H | PROPER OPERATION TO ACHIEVE GOOD COMBUSTION | 0.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | CO (OIL) | 4.14E+02 | LB/H | PROPER OPERATION TO ACHIEVE GOOD COMBUSTION | 0.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | NOX (NG) | 2.50E+01 | PPMDV @ 15% O2 | WATER INJECTION | 30.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | NOX (OIL) | 8.20E+01 | PPMDV @ 15% O2 | WATER INJECTION | 30.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | PM (NG) | 5.90E+00 | LB/H | PROPER OPERATION TO ACHIEVE GOOD COMBUSTION | 0.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | PM (OIL) | 2.20E+01 | LB/H | PROPER OPERATION TO ACHIEVE GOOD COMBUSTION | 0.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | SO2 (NG) | 1.50E+01 | PPMDV @ 15% O2 | | 0.000 | BACT-PSD |
| SC-0036 | CAROLINA POWER AND LIGHT | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | STATIONARY GAS TURBINE | 1520.00 | MMBTU/HR | SO2 (OIL) | 1.50E+01 | PPMDV @ 15% O2 | FUEL SPEC: LOW SULFUR OIL, 0.2% MAX SULFUR CONTENT | 0.000 | BACT-PSD |
| SC-0038 | GENERAL ELECTRIC GAS TURBINES | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | I.C. TURBINE | 2700.00 | MMBTU/HR | CO | 2.72E+04 | LB/HR | GOOD COMBUSTION PRACTICES TO MINIMIZE EMISSIONS | 0.000 | BACT-PSD |
| SC-0038 | GENERAL ELECTRIC GAS TURBINES | SOUTH CAROLINA DEPT OF HEALTH & ENV CT | (803) 734-4750 | I.C. TURBINE | 2700.00 | MMBTU/HR | NOX | 8.85E+02 | LB/HR | GOOD COMBUSTION PRACTICES TO MINIMIZE EMISSIONS | 0.000 | BACT-PSD |
| SD-0001 | NORTHERN STATES POWER COMPANY | EPA REGION VIII | (303) 293-1755 | TURBINE, SIMPLE CYCLE, 4 EACH | 129.00 | MW | CO | 5.00E+01 | PPM FOR GAS | GOOD COMBUSTION TECHNIQUES | 0.000 | BACT-PSD |
| SD-0001 | NORTHERN STATES POWER COMPANY | EPA REGION VIII | (303) 293-1755 | TURBINE, SIMPLE CYCLE, 4 EACH | 129.00 | MW | NO2 | 2.40E+01 | PPM @ 15% O2 GAS | WATER INJECTION FOR GAS & DISTILLATION | 0.000 | BACT-PSD |
| SD-0001 | NORTHERN STATES POWER COMPANY | EPA REGION VIII | (303) 293-1755 | TURBINE, SIMPLE CYCLE, 4 EACH | 129.00 | MW | PM | 1.20E+01 | LB/H FOR GAS | FUEL SPEC: NATURAL GAS AS PRIMARY FUEL | 0.000 | BACT-PSD |
| SD-0001 | NORTHERN STATES POWER COMPANY | EPA REGION VIII | (303) 293-1755 | TURBINE, SIMPLE CYCLE, 4 EACH | 129.00 | MW | SO2 | 1.40E+01 | PPM @ 15% O2 GAS | FUEL SPEC: NATURAL GAS AND 0.37% SULFUR IN OIL | 0.000 | BACT-PSD |
| SD-0001 | NORTHERN STATES POWER COMPANY | EPA REGION VIII | (303) 293-1755 | TURBINE, SIMPLE CYCLE, 4 EACH | 129.00 | MW | VOC | 6.00E+00 | PPM FOR GAS | GOOD COMBUSTION TECHNIQUES | 0.000 | BACT-PSD |
| TX-0231 | WEST CAMPUS COGENERATION COMPANY | TEXAS AIR CONTROL BOARD | (512) 239-1000 | GAS TURBINES | 75.30 | MW | CO | 3.00E+02 | TPY | INTERNAL COMBUSTION CONTROLS | 0.000 | BACT |
| TX-0231 | WEST CAMPUS COGENERATION COMPANY | TEXAS AIR CONTROL BOARD | (512) 239-1000 | GAS TURBINES | 75.30 | MW | NOX | 2.00E+02 | TPY | INTERNAL COMBUSTION CONTROLS | 0.000 | BACT-PSD |
| TX-0231 | WEST CAMPUS COGENERATION COMPANY | TEXAS AIR CONTROL BOARD | (512) 239-1000 | GAS TURBINES | 75.30 | MW | PM10 | 5.20E+01 | TPY | INTERNAL COMBUSTION CONTROLS | 0.000 | BACT |
| TX-0231 | WEST CAMPUS COGENERATION COMPANY | TEXAS AIR CONTROL BOARD | (512) 239-1000 | GAS TURBINES | 75.30 | MW | SO2 | 2.80E+00 | TPY | INTERNAL COMBUSTION CONTROLS | 0.000 | BACT |
| TX-0231 | WEST CAMPUS COGENERATION COMPANY | TEXAS AIR CONTROL BOARD | (512) 239-1000 | GAS TURBINES | 75.30 | MW | VOC | 3.80E+01 | TPY | INTERNAL COMBUSTION CONTROLS | 0.000 | BACT |

# CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION/BURNER, DUCT | 0.00 | NO. 2 FUEL OIL | CO | 1.00E-02 | LB/H | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | CO | 8.20E+01 | LB/H/UNIT | FURNACE DESIGN | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | CO | 6.20E+01 | LB/H/UNIT | FURNACE DESIGN | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | CO | 2.29E+02 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION/BURNER, DUCT | 0.00 | NATURAL GAS | HG | 2.00E-02 | LB/H | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION/BURNER, DUCT | 0.00 | NO. 2 FUEL OIL | HG | 3.00E-03 | LB/H | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION/BURNER, DUCT | 0.00 | NO. 2 FUEL OIL | MN | 2.00E-02 | LB/H | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | NOX | 9.00E+00 | PPM @ 15% O2 | SCR, STEAM INJECTION | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | NOX | 1.50E+01 | PPM @ 15% O2 | SCR, STEAM INJ. | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | NOX | 1.91E+02 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | PM | 5.00E+00 | E-3 LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | PM | 3.50E+00 | E-2 LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | PM | 8.22E+01 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | PM10 | 5.00E+00 | E-3 LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | PM10 | 3.50E+00 | E-2 LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | PM10 | 8.22E+01 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | SO2 | 9.00E+00 | E-4 LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | SO2 | 6.80E+00 | E-2 LB/MMBTU | FUEL SPEC: LOW SULFUR OIL | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | SO2 | 1.39E+02 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1175.00 | MMBTU/HR | VOC | 2.30E+00 | LB/H/UNIT | FURNACE DESIGN | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION | 1117.00 | MMBTU/HR | VOC | 5.80E+00 | LB/H/UNIT | FURNACE DESIGN | 91.000 | BACT-PSD |
| VA-0184 | BERMUDA HUNDRED ENERGY LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804)-323-2409 | TURBINE, COMBUSTION, 2 | 0.00 | | VOC | 1.49E+01 | T/YR/UNIT | | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 1331.13 | X10(7) SCF/Y NAT GAS | CO | 2.50E+02 | TOTAL TPY | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 7.44 | X10(7) GPY FUEL OIL | CO | 2.50E+02 | TOTAL TPY | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.51 | X10(9) BTU/HR N GAS | CO | 5.70E+01 | LBS/HR/UNIT | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.36 | X10(9) BTU/H #2 OIL | CO | 6.80E+01 | LBS/HR/UNIT | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 1331.13 | X10(7) SCF/Y NAT GAS | NOX | 2.45E+02 | TOTAL TPY | SELECTIVE CATALYTIC REDUCTION (SCR) W/ WATER INJEC | 80.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 7.44 | X10(7) GPY FUEL OIL | NOX | 2.45E+02 | TOTAL TPY | SELECTIVE CATALYTIC REDUCTION (SCR) | 80.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.51 | X10(9) BTU/HR N GAS | NOX | 9.00E+00 | PPMDV/UNIT @ 15% 02 | SCR WITH WATER INJECTION | 80.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.36 | X10(9) BTU/H #2 OIL | NOX | 6.60E+01 | LBS/HR/UNIT | WATER INJECTION AND SCR | 80.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 1331.13 | X10(7) SCF/Y NAT GAS | SO2 | 2.50E+02 | TOTAL TPY | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 7.44 | X10(7) GPY FUEL OIL | SO2 | 2.50E+02 | TOTAL TPY | FUEL SPEC: 0.2 WT LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.51 | X10(9) BTU/HR N GAS | SO2 | 5.00E-01 | LB/HR/UNIT | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.36 | X10(9) BTU/H #2 OIL | SO2 | 6.80E+01 | LBS/HR/UNIT | FUEL SPEC: 0.2 WT LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 1331.13 | X10(7) SCF/Y NAT GAS | TSP/PM10 | 5.06E+01 | TOTAL TPY | FUEL SPEC: CLEAN BURNING FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 7.44 | X10(7) GPY FUEL OIL | TSP/PM10 | 5.06E+01 | TOTAL TPY | FUEL SPEC: CLEAN BURNING FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.51 | X10(9) BTU/HR N GAS | TSP/PM10 | 8.00E+00 | LBS/HR/UNIT | FUEL SPEC: CLEAN BURNING FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.36 | X10(9) BTU/H #2 OIL | TSP/PM10 | 1.30E+01 | LBS/HR/UNIT | FUEL SPEC: CLEAN BURNING FUEL | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 1331.13 | X10(7) SCF/Y NAT GAS | VOC | 9.71E+01 | TOTAL TPY | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINE FACILITY, GAS | 7.44 | X10(7) GPY FUEL OIL | VOC | 9.71E+01 | TOTAL TPY | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.51 | X10(9) BTU/HR N GAS | VOC | 2.20E+01 | LBS/HR/UNIT | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0189 | GORDONSVILLE ENERGY L.P. | FAIRFAX COUNTY AIR POLLUTION CONTROL, | (703) 899-4600 | TURBINES (2) [EACH WITH A SF] | 1.36 | X10(9) BTU/H #2 OIL | VOC | 2.10E+01 | LBS/HR/UNIT | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | CO | 1.10E+01 | LBS/HR | GOOD COMBUSTION | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | CO | 1.10E+01 | LBS/HR | GOOD COMBUSTION | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | CO | 4.82E+01 | TPY | GOOD COMBUSTION | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | NOX | 9.00E+00 | PPM | SELECTIVE CATALYTIC REDUCTION (SCR) | 74.500 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | NOX | 1.50E+01 | PPM | SCR | 80.800 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | NOX | 6.97E+01 | TPY | SCR | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | PM10 | 5.30E-03 | LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | PM10 | 3.60E-02 | LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | PM10 | 7.46E+01 | TPY | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | SO2 | 3.20E-03 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | SO2 | 2.10E-01 | LB/MMBTU | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | SO2 | 4.39E+02 | TPY | FUEL SPEC: LOW SULFUR FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | TSP | 5.30E-03 | LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | TSP | 3.60E-02 | LB/MMBTU | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | TSP | 7.46E+01 | TPY | FUEL SPEC: CLEAN BURN FUEL | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 474.00 | X10(6) BTU/HR N. GAS | VOC | 5.00E+00 | LBS/HR | GOOD COMBUSTION | 0.000 | BACT-PSD |
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS | 468.00 | X10(6) BTU/HR #2 OIL | VOC | 5.00E+00 | LBS/HR | GOOD COMBUSTION | 0.000 | BACT-PSD |

## CITY OF TALLAHASSEE
## PURDOM UNIT 8 - COMBINED CYCLE GAS TURBINE
## BACT EVALUATION
## U. S. ENVIRONMENTAL PROTECTION AGENCY'S RACT/BACT/LAER CLEARINGHOUSE

| RBLCID | FACILITY | AGCYNAME | PHONE | PROCESS | THRUPUT | THRUPUTUNIT | POLLUTANT | EMISSION | UNITS | CTRLDESC | % EFF | BASIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VA-0190 | BEAR ISLAND PAPER COMPANY, L.P. | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION GAS (TOTAL) | 0.00 | | VOC | 2.19E+01 | TPY | GOOD COMBUSTION | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84 2, 3 | 10.20 | X109 SCF/YR NAT GAS | CO | 1.40E-02 | LB/HR | FUEL SPEC: CLEAN FUELS | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3 | 10.20 | X109 SCF/YR NAT GAS | CO | 2.60E+01 | LB/HR | GOOD COMBUSTION OPERATING PRACTICES | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84 2, 3 | 10.20 | X109 SCF/YR NAT GAS | HG | 5.00E-03 | LB/HR | FUEL SPEC: CLEAN FUELS | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3 | 10.20 | X109 SCF/YR NAT GAS | NOX | 1.31E+02 | LB/HR(GAS); 339 OIL | DRY LOW NOX COMBUSTOR; DESIGN, WATER INJECTION | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84 2, 3 | 10.20 | X109 SCF/YR NAT GAS | SO2 | 2.60E+01 | LB/HR(GAS); 71 (OIL) | FUEL SPEC: LOW SULFUR FUELS (NAT.GAS/OIL .05% S) | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3 | 10.20 | X109 SCF/YR NAT GAS | TSP/PM10 | 1.00E+00 | LB/HR | FUEL SPEC: CLEAN BURNING FUELS | 0.000 | BACT-PSD |
| VA-0206 | PATOWMACK POWER PARTNERS, LIMITED PARTNERSHIP | VIRGINIA DEPT OF AIR POLLUTION CONTROL | (804) 786-6849 | TURBINE, COMBUSTION, SIEMENS MODEL V84.2, 3 | 10.20 | X109 SCF/YR NAT GAS | VOC | 6.00E+00 | LB/HR | GOOD COMBUSTION OPERATING PRACTICES | 0.000 | BACT-PSD |
| WA-002 | SUMAS ENERGY INC. | NORTHWEST AIR POLLUTION AUTHORITY, WA | (206)-428-1617 | TURBINE, NATURAL GAS | 88.00 | MW | CO | 6.00E+00 | PPM @ 15% O2 | CO CATALYST | 80.000 | BACT-PSD |
| WA-002 | SUMAS ENERGY INC. | NORTHWEST AIR POLLUTION AUTHORITY, WA | (206)-428-1617 | TURBINE, NATURAL GAS | 88.00 | MW | NOX | 6.00E+00 | PPM @ 15% O2 | SCR | 90.000 | BACT-PSD |
| WA-027 | NORTHWEST PIPELINE COMPANY | WASHINGTON STATE DEPARTMENT OF ECOL | (206) 649-7109 | TURBINE, GAS-FIRED | 12100.00 | HP | NO2 | 1.98E+02 | PPM @ 15% O2 | ADVANCED DRY LOW NOX COMBUSTOR (BY 07/01/95) | 78.000 | BACT-PSD |
| WA-027 | TENASKA WASHINGTON PARTNERS, L.P. | WASHINGTON STATE DEPARTMENT OF ECOL | (206) 649-7106 | COGENERATION PLANT, COMBINED CYCLE | 1.83 | MMBTU/HR | CO | 2.00E+01 | PPM @ 15% O2 | COMBUSTION CONTROL | 0.000 | BACT-PSD |
| WA-027 | TENASKA WASHINGTON PARTNERS, L.P. | WASHINGTON STATE DEPARTMENT OF ECOL | (206) 649-7106 | COGENERATION PLANT, COMBINED CYCLE | 1.83 | MMBTU/HR | NOX | 7.00E+00 | PPM @ 15% O2 (GAS) | STAGED LNB, STEAM INJECTION, SCR | 95.000 | BACT-PSD |
| WA-027 | TENASKA WASHINGTON PARTNERS, L.P. | WASHINGTON STATE DEPARTMENT OF ECOL | (206) 649-7106 | COGENERATION PLANT, COMBINED CYCLE | 1.83 | MMBTU/HR | PM10 | 2.20E-03 | GR/DSCF @ 15% O2 | FUEL SPEC: LIMITS ON FUEL USE, CONTENT. | 0.000 | BACT-PSD |
| WA-027 | TENASKA WASHINGTON PARTNERS, L.P. | WASHINGTON STATE DEPARTMENT OF ECOL | (206) 649-7106 | COGENERATION PLANT, COMBINED CYCLE | 1.83 | MMBTU/HR | SO2 | 4.00E+00 | PPM @ 15% O2 (GAS) | FUEL SPEC: LIMITS ON FUEL USE, CONTENT. | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | CO | 2.50E+01 | LBS/HR (SEE NOTES) | | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | NOX (FROM NAT. GAS) | 2.50E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | NOX (FROM OIL) | 6.50E+01 | PPM @ 15% O2 | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | PM | 1.20E+01 | LBS/HR | GOOD COMBUSTION | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | SO2 | 5.25E-02 | LB/MM BTU | | 0.000 | BACT-PSD |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | VE | 1.00E+01 | % OPACITY | | 0.000 | |
| WI-0067 | WEPCU, PARIS SITE | WISCONSIN DEPT OF NATURAL RESOURCES | (608) 267-2015 | TURBINES, COMBUSTION (4) | 0.00 | | VOC | 9.00E+00 | LBS/HR (SEE NOTES) | GOOD COMBUSTION PRACTICES | 0.000 | BACT-PSD |

# APPENDIX E

# BACT EMISSION ESTIMATES

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

**By:** D. Graziani, P.E.
**Date:** 12/23/96

**Ck'd By:** A. Chapman
**Date:** 1/31/97

**Rev'd By:** D. Graziani, P.E
**Date:** 2/28/97

**Client:** City of Tallahassee
**OFS No:** 1584.0005.0008

**Sheet No.:** 1 of 5
**Calc. No.:** 961223DJG01

**Description:**

This calculation documents the emission estimates associated with the BACT determination. Emission estimates for CO and NOx are provided based on the specific operating scenario identified for the pollutant.

**References:**
No. 1 - GE Performance Data Sheets
No. 2 - Vendor Quotes

**Operating Scenarios**

For the BACT evaluation of carbon monoxide and the additional evaluation of volatile organic compounds, Unit 8 was assumed to operate continuously (8,760 hr/yr), firing natural gas for 8,260 hr/yr and Number 2 diesel fuel oil for 500 hr/yr. The load was split between full load and 50 percent load to account for the increased emissions at the lower levels. The reduced load estimate of 19 percent of the year was provided by the City. The reduced load operation was assumed to be evenly split between natural gas and low sulfur distillate oil firing. The average annual temperature of 59 degrees was selected as the representative point.

For the additional evaluation of nitrogen oxides, Unit 8 was assumed to operate continuously (8,760 hr/yr), firing natural gas for 8,260 hr/yr and low sulfur distillate oil for 500 hr/yr at full load. The average annual temperature of 59 degrees was selected as the representative point.

The selected scenarios are within the requested facility-wide emission caps for SO2 and NOx.

**Calculations**

Carbon Monoxide Emissions :

Natural Gas Firing $\quad NGHOP := 8260 \cdot \frac{hr}{yr}$

Full Load Firing $\quad NG100HOP := NGHOP \cdot (1 - .19)$

$NG100HOP = 6690.6 \cdot \frac{hr}{yr}$

50% Load Firing $\quad NG50HOP := NGHOP \cdot (.19)$

$NG50HOP = 1569.4 \cdot \frac{hr}{yr}$

Sam O. Purdom

Generating Station - Unit 8

St. Marks Lighthouse - Artwork by Ouida Vick

St. Marks, Florida

*Entrance to the Sam O. Purdom Generating Station*

CITY OF TALLAHASSEE

Mr. Rob McGarrah ▪ 2602 Jackson Bluff Road ▪ Tallahassee, FL 32304
by voice mail: 904-891-5585 ▪ or by E-mail: purdom8@sc.ci.tlh.fl.us

## *What is Happening?*

**Need for Power**

The City of Tallahassee is considering the installation of new, advanced power generating equipment (referred to as Unit 8) at its existing Purdom Generating Station in St. Marks, Florida. The need for additional power is due to increases in the demand for electricity and the anticipated expiration within the next six years of two contracts for purchased power. The City needs to plan for the addition of about 88 megawatts of electricity to its system by 2000 and about 160 megawatts by 2004. (One megawatt of electricity serves about 200 homes.)

In addition, some of the generating equipment within the City's electric system needs to be retired and replaced because of its age. And with increasing competition in the electric utility industry, the City needs to take advantage of the availability of new, highly efficient, clean technology to maintain competitive electric rates while protecting the environment.

**Continuing the Commitment to Conservation and Load Management**

Although the City continues to be committed to conservation and load management as a way to slow the growth in electricity demand and conserve energy resources, these programs are not sufficient to eliminate the need for additional generating capacity.

**The Electric Department's Mission**

The key components of the City of Tallahassee Electric Department's mission are to:

- Provide high quality, reliable, competitively priced electric services within our retail and wholesale market areas, and
- Improve the quality of life in Tallahassee by valuing our customers, workforce and community.

To achieve this mission, the City needs to plan for the future. Purdom Unit 8 will help ensure that a reliable supply of competitively priced electricity is available to Tallahassee customers well into the next century.

## *How Could This Affect You?*

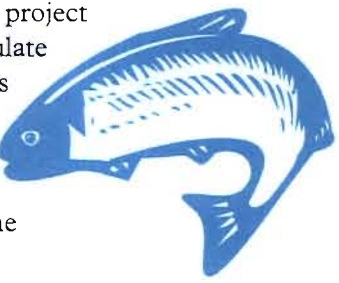
**Electric Department Revenues Support City Services**

The City's electric utility currently provides about $35 million each year to the General Fund to be used for a wide variety of City services, from parks and recreation to law enforcement. This revenue source is especially important to Tallahassee, as the state capital, because so much of the commercial (office) property in the City is government-owned and therefore tax exempt. So, by contributing revenues to help run the City, the electric utility helps to maintain the quality of life for Tallahassee citizens while keeping property taxes low.

**Protecting the Environment**

In the past, Tallahassee residents have made it clear that environmental protection is a primary value in planning for future electric generation needs. As a result, specifications for Purdom Unit 8 have included clean fuels (specifically, natural gas) and an environmentally sensitive design.

Protection of the environment is also an important value in Wakulla County, where the Purdom Station is located. Situated on the west bank of the St. Marks River and directly across the river from the St. Marks National Wildlife Refuge, the Purdom Station has the potential to affect water quality, habitat quality and the aesthetics of the area. The design of Purdom Unit 8 has incorporated specific features for the protection and enhancement of those natural resources. These design features include technology to limit air pollutant emissions and eliminate the need for a discharge of heated water from Unit 8 into the St. Marks River. The project includes a zero discharge plant that will recirculate and reuse cooling water and plant process waters, eliminating wastewater discharges. In addition, the design calls for reuse of existing sanitary wastewater from the local area, thus reducing discharges of this wastewater into the St. Marks River.



**The Purdom Generating Station's Importance to the Local Economy**

The Purdom Station contributes to employment in St. Marks, generates income for local businesses, and provides in-kind services such as fire fighting equipment and support to the oil spill response capability of the St. Marks Oil Spill Response Cooperative. The City of Tallahassee is committed to being a good neighbor to the City of St. Marks and Wakulla County and will be working closely with local government officials to make sure that their concerns and ideas are taken into account as the project moves forward in the permitting process.

*Aerial view of the St. Marks River from Purdom Generating Station*

## *What Would Happen If the New Power Plant Were Not Built?*

**Meeting Customer Needs Efficiently and Cost-Effectively**

Recent extreme winter temperatures caused the City of Tallahassee to reach its projected 2002 peak demand level six years earlier than expected. Because there is a variety of options available for meeting electricity demand, it is likely that some way would be found to meet the City's needs even if the new unit were not built at Purdom. However, in that case the City's needs would not be met with the most cost-effective option, and the benefits associated with the installation of the new unit at Purdom would not be realized.

*Old Spanish fort at confluence of St. Marks and Wakulla Rivers*

**Maintaining Adequate Reserves**

In addition, if there were some delay in implementing an alternative option, the utility could be forced to operate for a time without adequate reserve margins. That means that supplies could fall short if especially high peak demands or unexpected outages occur.

In the short term, if there were a shortage, the City would first try to meet customers' needs with power purchases from the statewide electric grid. If sufficient supplies were not available, rotating blackouts could occur. Rotating blackouts involve deliberately curtailing power to parts of the City for brief periods of time so that the system does not have to supply the full customer load all at once. In addition to the inconvenience of rotating blackouts, it is possible in these situations for overloaded equipment to fail, ultimately resulting in a full blackout.


*Posey's - Home of the Topless Oyster*

## *What Has Been Done So Far?*

**Integrated Resource Planning**

In 1994, the Tallahassee Electric Department began a review of customer electricity requirements, fuel price forecasts and resulting resource needs. The City's system planning process utilized Integrated Resource Planning (IRP) modeling and procedures to ensure that the best choices in resources, considering both new generation and energy conservation, were blended to provide the least cost plan.

During the initial stages of the planning process, a citizens committee was utilized to identify the types of conservation programs and generation alternatives that should be considered and the criteria that should be used in framing the final recommendations for consideration by the City Commission. The results of the planning process showed that:

*Shields Marina*

- there was a need for additional power supplies beginning in 2000;
- recent advances in available electric generating technology provided an opportunity for the City of Tallahassee's customers to benefit by installing a new combined cycle unit and retiring older, less efficient units earlier than scheduled; and
- the appropriate size of the new unit for the City of Tallahassee's electric system would be up to 250 megawatts.

**Competitive Bidding Process**

Following the identification of the Year 2000 need, the City voluntarily embarked on a competitive solicitation process by issuing a Request for Proposals (RFP) to secure the additional power supply resources. This process allowed independent developers and other electric utilities to provide proposals for meeting the City of Tallahassee's need. In addition, the City of Tallahassee developed two "self-build" alternatives using a team of City Electric Department staff and outside consulting engineers with expertise in power plant design, permitting, construction and operation.

*St. Marks Community Center*

**Advantages of the Purdom Proposal**

The self-build team submitted their proposal on Purdom Unit 8 for comparison with the other outside proposals. Based on the following key advantages, the Purdom proposal was the clear winner in the competition:

- A 20-year net present value (NPV) cost that was approximately 16 percent lower than the next lowest cost proposal
- The ability to avoid payment of stockholder profit normally included in any proposal made by a taxable entity
- The project's eligibility for tax exempt financing
- The ability to optimize staffing and share common facilities because of the project's location at an existing power plant site
- The detail in the City of Tallahassee's alternative, which enabled a more definitive assessment of potential environmental impact and risk
- The availability of an existing site already owned by the City of Tallahassee and properly designated on the City of St. Marks' comprehensive plan and zoning maps
- The project's location at a site already connected to the City of Tallahassee's power grid so that no new transmission facilities would need to be constructed

## *Steps in the Power Plant Permitting Process*

Power plants of the size of Purdom Unit 8 are permitted under the Florida Electrical Power Plant Siting Act. That process, slated to take about two years, is just beginning as this document is being printed. The following shows the steps in the process and the approximate time frame for completion of those steps.

| | |
|---|---|
| **Preparation of the Application** | **July 1996 through Feb. 1997** |
| **Application Filing** | **Feb. 1997** |
| **Application Sufficiency Review** | **Feb. 1997 through June 1997** |
| **Agency Review** | **June 1997 through Oct. 1997** |
| **Filing of Agency Reports** | **Sept. 1997** |
| **Filing of DEP's Report** | **Oct. 1997** |
| **Certification Hearing** | **Jan. 1998** |
| **Filing of Hearing Officer's Recommended Order** | **March 1998** |
| **Decision by Governor and Cabinet** | **May 1998** |

## *We Need Your Input*

The Power Plant Siting Act provides for public notices of the application filing and the certification hearing in the form of large newspaper ads. Public comment will be taken during the certification hearing, and the public is allowed to speak briefly before the Governor and Cabinet take action on the final site certification.

In addition to the formal mechanisms for public notice and public participation provided for in the Power Plant Siting Act, the City of Tallahassee welcomes public input and has developed a program to meet with citizens, share information about the project and listen to citizens' views. This program includes public meetings, a Question and Answer column in "Insight" (the informational pamphlet included in customers' bills), a project newsletter, and other forums for the exchange of views. The City also welcomes the opportunity to make a brief presentation to interested civic, neighborhood, and business groups and will continue to meet with local government and agency representatives as requested or as needed to keep them informed.

A voice mailbox and E-mail address have been established for citizen inquiries about the project. For questions or comments, call or write to the following:

Mr. Rob McGarrah ▪ 2602 Jackson Bluff Road ▪ Tallahassee, FL 32304
by voice mail: 904-891-5585 ▪ or by E-mail: purdom8@sc.ci.tlh.fl.us

<u>Calculations (Cont.)</u>

Distillate Oil Firing $DOHOP := 500 \cdot \frac{hr}{yr}$

Full Load Firing $DO100HOP := DOHOP \cdot (1 - .19)$

$DO100HOP = 405 \cdot \frac{hr}{yr}$

50% Load Firing $DO50HOP := DOHOP \cdot (.19)$

$DO50HOP = 95 \cdot \frac{hr}{yr}$

***<u>Base Case</u>***

Natural Gas Firing (100 & 50 % loads) $NGHCO100 := 29 \cdot \frac{lb}{hr}$ $NGHCO50 := 53 \cdot \frac{lb}{hr}$

Distillatle Oil Firing (1000 & 50% loads) $DOHCO100 := 96 \cdot \frac{lb}{hr}$ $DOHCO50 := 189 \cdot \frac{lb}{hr}$

$$ABCCO := \frac{(NGHCO100 \cdot NG100HOP + NGHCO50 \cdot NG50HOP + DOHCO100 \cdot DO100HOP + DOHCO50 \cdot DO50HOP)}{2000 \cdot \frac{lb}{ton}}$$

$$ABCCO = 167 \cdot \frac{ton}{yr}$$

***<u>Option 1 (90% Control)</u>*** $AOP1CO := ABCCO \cdot (1 - 0.9)$

$AOP1CO = 16.7 \cdot \frac{ton}{yr}$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

**By:** D. Graziani, P.E.
**Date:** 12/23/96

**Ck'd By:** A. Chapman
**Date:** 1/31/97

**Rev'd By:** D. Graziani, P.E
**Date:** 2/28/97

**Client:** City of Tallahassee
**OFS No:** 1584.0005.0008

**Sheet No.:** 3 of 5
**Calc. No.:** 961223DJG01

**Calculations (Cont.)**

Volatile Organic Compound Emissions :

Natural Gas Firing $NGHOP := 8260 \cdot \frac{hr}{yr}$

Full Load Firing $NG100HOP := NGHOP \cdot (1 - .19)$

$NG100HOP = 6690.6 \cdot \frac{hr}{yr}$

50% Load Firing $NG50HOP := NGHOP \cdot (.19)$

$NG50HOP = 1569.4 \cdot \frac{hr}{yr}$

## *Base Case*

Natural Gas Firing (100 & 50 % loads) $NGHVOC100 := 2.8 \cdot \frac{lb}{hr}$ $NGHVOC50 := 2.6 \cdot \frac{lb}{hr}$

Distillatle Oil Firing (1000 & 50% loads) $DOHVOC100 := 17.5 \cdot \frac{lb}{hr}$ $DOHVOC50 := 16 \cdot \frac{lb}{hr}$

$$ABCVOC := \frac{(NGHVOC100 \cdot NG100HOP + NGHVOC50 \cdot NG50HOP + DOHVOC100 \cdot DO100HOP + DOHVOC50 \cdot DO50HOP)}{2000 \cdot \frac{lb}{ton}}$$

$$ABCVOC = 16 \cdot \frac{ton}{yr}$$

## *Option 1 (30% Control)*

$AOP1VOC := ABCVOC \cdot (1 - 0.3)$

$AOP1VOC = 11 \cdot \frac{ton}{yr}$

Nitrogen Oxide Emissions:

| | | | |
|---|---|---|---|
| Natural Gas Firing | $NGHNOX := 58\cdot\frac{lb}{hr}$ | $NGBCNOX := 9$ | Ref. No. 1 |
| Distillate Oil Firing | $DOHNOX := 322\cdot\frac{lb}{hr}$ | $DOBCNOX := 42$ | Ref. No. 1 |

Nitrogen Oxide Emissions (Cont.):

Natural Gas Firing $NGHOP := 8260\cdot\frac{hr}{yr}$

Distillate Oil Firing $DOHOP := 500\cdot\frac{hr}{yr}$

***Base Case***

$$ABCNOX := \frac{(NGHNOX\cdot NGHOP + DOHNOX\cdot DOHOP)}{2000\cdot\frac{lb}{ton}}$$

$$ABCNOX = 320\cdot\frac{ton}{yr}$$

***Option No. 1 (3.5 ppmvd Gas and 10 ppmvd Number 2 Diesel Fuel Oil)***

$NGOP1NOX := 3.5$ Ref. No. 2

$DOOP1NOX := 10$ Ref. No. 2

$$ABCNOX := \frac{\left(NGHNOX \cdot NGHOP \cdot \frac{NGOP1NOX}{NGBCNOX} + DOHNOX \cdot DOHOP \cdot \frac{DOOP1NOX}{DOBCNOX}\right)}{2000 \cdot \frac{lb}{ton}}$$

$$ABCNOX = 112 \cdot \frac{ton}{yr}$$

# APPENDIX F

## VENDOR QUOTE
## CO OXIDATION CATALYST

# CO OXIDATION CATALYST SYSTEM
## *QUOTATION SUMMARY*

| | |
|---|---|
| Customer: | Foster Wheeler |
| Project Name: | Unknown |
| Customer Contact: | Darrel Graziani |
| Customer Fax: | 561-781-3411 |
| Engelhard Reference: | EP-6000 |
| Date: | December 23, 1996 |
| Prepared By: | Stan Mack<br>Telephone: (908) 205-6174<br>Telefax: (908) 205-6146 |

1.0 **TECHNICAL**

1.1 ***Customer Design Parameters***

| | |
|---|---|
| Emission Source: | GE-MS7001FA |
| Fuel: | Natural Gas - Primary<br>#2 Fuel Oil - Secondary<br>(<500 hrs/yr) |
| Exhaust Flow, maximum (lbs/hr): | 3,950,000 |
| Exhaust Temperature, Range (°F): | None Specified (600-700 °F assumed) |
| HRSG Duct Dimension, W x H (ft): | None Specified |
| Pressure Loss, maximum (inch $H_2O$): | None Specified |
| CO Conversion, required (%): | 90% minimum on oil firing |

(a) For details reference customer fax dated 12/20/96

## 1.2 *CO Catalyst System Design*

| | |
|---|---|
| Catalyst Name: | CatCO™ 610 ST (This catalyst is sulfur tolerant for use with oil firing) |
| Catalyst Type: | Precious Metal |
| Substrate Type: | Ceramic Honeycomb |
| Substrate Cell Density (cpsi): | 400 |
| CO Catalyt Housing, W x H, Inside Liner (ft): | 65 x 34 |
| CO Catalyst Housing Length (ft): | 1.5 |
| Weights, approximate (lbs) CO Catalyst and Housing: | 55,000 |

## 1.3 *CO Catalyst System Performance*

| | |
|---|---|
| CO Conversion, warranted (%): Case 7/oil: | 90 |
| Pressure Loss, (inches $H_2O$): Case 7/oil: | 1:3 |

*Performance based upon:*

*(a) Flow at catalyst face not to exceed ± 15% average flow velocity.*

*(b) Temperature at catalyst face not to exceed ± 20° F temperature variation.*

## 1.4 *Scope of Supply*

### *CO Oxidation System:*

- ENGELHARD **CatCO™** oxidation catalyst in modules.
- Internal support structure for catalyst modules (frame). Includes all hardware and gaskets for catalyst module installation.
- CO catalyst housing with internal thermal expansion joint to prevent gas bypass around the catalyst. Internally insulated with SS liner.
- Five (5) day (max. 10 hrs/day) field supervision/operator training for catalyst/framework installation and start-up.

Drawings and Documents

- Foundation loads
- General arrangement drawings
- Equipment drawings
- Equipment and parts list
- Catalyst and frame installation/instruction manuals
- Operating manuals

Excluded from Scope of Supply:

- Installation of equipment supplied by Engelhard
- Any interconnecting field wiring or piping
- Electrical grounding equipment
- Utilities
- Foundations
- Monitors to measure pressure loss and inlet/outlet temperatures across the catalyst bed
- All other items not specifically listed in Scope of Supply

**NOTE:**

All structural steel equipment is inspected and certified by a local professional structural engineer in accordance with customer supplied applicable specifications.

## 2.0 COMMERCIAL

### 2.1 *Price*

| | |
|---|---|
| Type of Quotation: | Budget |
| FOB Point: | Union, NJ |
| Number of Systems: | One |
| Price for one system (U.S. Dollars): CO Oxidation Catalyst System* | $830,000 |

* This price is based on the current Engelhard Industrial value of Platinum (Pt). Should the price of Pt increase by the time of purchase, the price of our catalyst will reflect the following precious metal price adder per system:

(Pt - 400) x 229.71 for 1 system

where Pt is the "Engelhard Industrial price" as stated in the *Wall Street Journal* on the day the purchase order is provided.

### 2.2 ***Payment Terms*** (net 30 days):

- 10% with order
- 20% with release to fabricate
- 35% with frame delivery
- 35% with catalyst delivery

### 2.3 *Equipment Shipment*:

12 - 16 weeks after drawing approval

NOTE: Drawings submitted to approval 2-4 weeks after receipt of order.

2.4 ***Warranty***:

***CO Oxidation Catalyst Warranty***

- Period: Two years of operation* or 2.5 years after catalyst delivery, whichever occurs first.
- Conditions: Engelhard CO Oxidation catalyst warranty statement enclosed.

***Equipment Warranty***

- Period, Typical: One year of operation* or 1.5 years after catalyst delivery, whichever occurs first.
- Coverage: Equipment supplied to Engelhard and installed in quipment sold by Engelhard, the warranty is limited to the warranty of the original manufacturer.

**Operation is considered to start when exhaust gas is first passed through the catalyst.*

2.5 ***Quote Validity:***

This quote is valid for a period of sixty (60) days

2.6 ***Terms and Conditions***:

This proposal is made subject to the attached Engelhard standard Terms and Conditions (EC-6626, Rev. 7/92).

3.0 ***COMMENTS***

3.1 **Comments to Specification**

## 3.2 Other Comments

- A minimum access clearance of three (3) feet upstream of the CO catalyst housing is required to facilitate installation, inspection, and servicing of the catalyst modules. Alternative designs are available which provide less access space.

- All structural steel equipment is inspected and certified by a local professional structural engineer in accordance to customer supplied applicable specifications.

## TERMS AND CONDITIONS

**1. ACCEPTANCE**

The terms and conditions set forth herein contain the sole, entire and exclusive agreement between the Seller and the Buyer in this transaction superseding all prior discussions, proposals, negotiations, representations, and agreements. Any additional or conflicting terms, whether or not material, shall not, in any manner, by implication, by waiver, or otherwise, govern the relationship between Seller and Buyer. Any waiver, modification or amendment of these terms and conditions shall only be effective as against Seller if such waiver, modification or amendment is contained in a written instrument duly executed y or on behalf of Seller. Specification changes are subject to acceptance by Seller, to price revisions and to any adjustments necessary to cover material procured and processed and labor expended prior eceipt by Seller of revised specifications. Acceptance of this agreement by Seller is specifically conditioned upon the terms and conditions set forth herein.

**2. SHIPMENTS**

A) Shipment dates are based upon Seller's best judgment, are subject to production limitations and factory schedules, and hence are not guaranteed.

B) All sales, unless otherwise specified herein, are f.o.b. Seller's plant. Buyer is solely responsible for notifying the carrier as to any damage to or loss in transit of materials.

C) Claims for shortages shall not be accepted by Seller unless such claims are received by Seller in writing within forty-eight (48) hours after delivery of materials to Buyer and are accompanied by a reference to Seller's shipping slip number. Seller shall be given a reasonable opportunity to inspect any shipment claimed by Buyer to contain a shortage. Use of materials by Buyer prior to such inspection by Seller shall constitute acceptance of the materials and a waiver of all claims by Buyer.

D) All metal accounts established or maintained by Seller shall be subject to Seller's Metal Account Terms and Conditions, the current form of which appears on each metal account statement.

**3. PRICE**

A) Unless other pricing arrangements are set forth on the face hereof, all orders shall be priced in accordance with Seller's prices in effect on the date of shipment, including, in the case of precious metals prices, the metal market prices published by Seller on the day metal is shipped or credited to Buyer's metal account (or in the case of fabricated gold or silver products, such revision may be made in accordance with metal market prices published by Seller on the next day a price is published by Seller following the date of shipment.) Seller reserves the right to revise any price previously quoted without notice to Buyer at any time prior to acceptance by Buyer.

B) Except as set forth on the face hereof, Seller's price does not include any tax or other charge now or hereafter imposed by law or regulation, domestic or foreign, upon any material herein sold or on the production, manufacture, sale, transportation, disposal or delivery thereof. Accordingly, in addition to the price specified herein, the amount of any such tax or other charge applicable to this transaction herein shall be paid by Buyer, or, in lieu thereof, Buyer shall provide Seller with appropriate evidence of exemption thereof from the proper governmental authority. At its option, Seller may initially pay any such tax or other charges for Buyer's account and thereafter invoice Buyer for same.

**4. PAYMENT**

A) Payment for all shipments hereunder shall be made by Buyer against Seller's invoice within thirty (30) days from date of invoice, terms net cash, unless 1) otherwise indicated on the face hereof and 2) for precious metals, cash in advance unless otherwise specifically agreed in writing by Seller.

B) If at any time, in Seller's opinion, the financial responsibility of Buyer becomes impaired or unsatisfactory to Seller, or, inadequate to meet the obligations hereunder, the terms of payment may, at Seller's option, be revised or withdrawn, and Seller may require cash or other satisfactory security before making further shipments to Buyer.

C) In addition to any other legal remedy, if Buyer fails to fulfill the terms of payment, Seller may, at its option, defer further delivery of goods hereunder or cancel all further delivery of goods to Buyer.

D) Seller shall have the right at any time without notice to set off any liability (whether to pay money or to credit, deliver, or transfer metal or otherwise) of Seller to Buyer against any liability of Buyer to Seller and in furtherance thereof, to convert metal to money or money to metal at market value at the date of such set-off.

E) In the event Seller is required to commence collection action to recover unpaid invoices for goods sold and delivered, Seller shall be entitled to interest on the unpaid balance at the highest legal rate permitted from the due date of invoice, attorney's fees of 15% of the amount due, and costs of suit.

**5. FORCE MAJEURE**

A) Any delays in or any failure of performance or delivery by Seller shall not constitute default or give rise to any claims for damages if and to the extent caused, directly or indirectly, by acts of God, acts of the Buyer, acts, rules or regulations of governmental authority (civil or military, executive, legislative, judicial or otherwise), strikes or other concerted acts of workers, lockout, labor difficulties, fires, floods, storm, accident, earthquakes, tidal waves, or other natural disasters, epidemics, war, riots, rebellion, sabotage, insurrection, difficulties or delays in public transportation or in public or postal delivery services, car shortages, fuel shortages, inability to obtain from Seller's usual sources of supply, inability to obtain suitable or sufficient energy, labor, machinery, facilities, supplies or materials, as and when required, failure of any third party to honor its contractual commitments, or by any other circumstances beyond Seller's control whether of a similar or dissimilar nature.

B) When any such circumstance or circumstances exist as set forth in 5(A), Seller shall have the right, in its sole discretion, to allocate its available production, deliveries, services, raw materials or other resources among any or all purchasers, as well as among divisions, departments, subsidiaries and affiliates of Seller, upon any such basis as Seller may determine, without any liability whatsoever for any failure to perform which may result therefrom.

In any event, Seller may determine not to allocate any of its available production, deliveries, services, raw materials or other resources to Buyer, without any liability whatsoever for any failure to perform ich may result therefrom.

**6. PATENT INFRINGEMENT**

Seller agrees to defend Buyer in any suit alleging infringement by Buyer of any U.S. patent based on the manufacture and sale of the materials purchased by Buyer (except materials manufactured or sold by Seller in accordance with Buyer's specifications, requirements or designs) under this agreement and to indemnify Buyer against liability for any such infringement claim, provided that Buyer notify Seller within ten (10) days after receipt by it of any notice of commencement of any suit based upon such alleged infringement and provided further that Seller shall control and remain in control of any and all proceedings taken in defending such suit, including without limitation, utilization solely of counsel of Seller's own selection to defend such suit. The use of materials purchased hereunder in combination with other materials or in the operation of any process is beyond the control of Seller, and Seller shall have no obligation or liability whatsoever in connection with any suit claiming infringement by means of the use of such materials.

**7. WARRANTIES - REPRESENTATIONS**

A) Seller warrants that the materials delivered hereunder shall be free from defects in workmanship or material and shall conform to the specifications set forth herein.

B) Seller's liability for breach of warranty for materials delivered hereunder that are proven by Buyer to be defective or proven by Buyer to be at variance with applicable specifications shall be limited, at Seller's option, to:

1. replacing or repairing such materials, or
2. refunding the sales price received by Seller for such materials.

All claims for defects hereunder must be presented to Seller in writing within ten (10) days after delivery to Buyer. Failure of Buyer to give such notice shall constitute a waiver by Buyer of all claims in respect thereto. Seller shall have an opportunity of verifying any such defect before materials are used by Buyer. Where the defective or nonconforming materials are replaced by Seller or where Seller refunds the sales price received from Buyer for such materials, if requested by Seller, Buyer shall return the defective or nonconforming materials to Seller strictly in accordance with Seller's written instructions concerning shipping, handling, insurance and other matters as to which Seller issues instructions. Failure to comply with these provisions shall invalidate any claim by Buyer for defects in materials by Buyer.

C) In no event shall Seller be liable for: 1) Materials damaged in shipment or otherwise without fault of Seller. 2) Defects in materials due to negligence (other than that of Seller), accident, abuse, improper care or storage, abnormal condition of temperature or moisture. 3) Damage to materials which have been tampered with or altered in any way other than by Seller. 4) Expenses incurred by Buyer in attempting to correct any defects in materials.

D) Seller warrants that it complies with all applicable requirements of Sections 6, 7 and 12 of the Fair Labor Standards Act, as amended, and of the regulations and orders of the United States Department of Labor issued under Section 14 thereof.

E) Recommendations by Seller, if any, covering the use, utilization, properties or qualities of materials delivered hereunder are believed reliable, but Seller makes no warranty whatsoever with respect thereto. Use or application of materials sold by Seller to Buyer hereunder is at the discretion of the Buyer without any liability or obligation on the part of Seller except as expressly warranted by Seller in writing.

<u>THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE</u>.

**8. LIMITATION OF DAMAGES**

A) In no event shall Seller be liable for incidental, consequential or special damages arising out of or relating to the transactions herein.

B) In no event shall the aggregate liabilities of Seller to Buyer arising out of or relating to the transactions herein exceed the purchase price paid by Buyer to Seller hereunder of the materials in respect of which such claim is made.

**9. INDEMNIFICATION**

Buyer assumes all risk and liability for loss, damages or injury to persons or to the property of the Buyer or others arising out of the use or presence of the materials purchased hereunder. Buyer agrees to indemnify and hold harmless Seller against any liability, damages, losses, costs, and expenses in connection with any suit or claim, including but not limited to, any loss of use, loss of profits, damage or injuries to person or property arising out of or relating to any use of materials purchased by Buyer herein, whether such claim is made by Buyer, Buyer's customers, or other third parties.

**10. CANCELLATION**

Seller may cancel this Agreement as well as any or all other outstanding transactions between Seller and Buyer at any time in the event that Buyer shall fail to perform or observe any term or condition eof by giving Buyer ten (10) days written notice of cancellation. Cancellation hereunder shall not prevent Seller from pursuing any other remedy available to Seller by law or from seeking all such damages to which Seller may be entitled.

**11. GENERAL**

A) Buyer shall not assign or transfer this Agreement or the benefits thereof without the prior written consent of Seller.

B) This Agreement shall be governed by and construed according to the laws of the State of Seller's facility shown on the face of this form.

# APPENDIX G

# ECONOMICS CALCULATIONS

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

By: D. Graziani, P.E
Date: 12/30.96
Ckd. By: D. Ghayal, P.E.
Date: 1/10/97
Rev. By: D. Graziani, P.E. DJG 3/4/97
Date: 2/10/97

OFS No.: 1523.0005.0008
File: COTBACT.XLS
Sheet:: CO-BACT

**Description:** Incremental and total cost analysis for the CO Oxidation Catalyst. Cost factors and references listed. Capital costs estimate for the Oxidation Catalyst was supplied by a vendor.

### BACT ANALYSIS

### CAPITAL COSTS FOR OXIDATION CATALYST (90% CONTROL)

| COST ITEM | COST FACTOR | REFERENCE | COST ($1997) |
|---|---|---|---|
| *DIRECT COSTS (DC)* | | | |
| PURCHASED EQUIPMENT COSTS (PEC) | | | |
| OX CAT. & AUXILIARY EQUIPMENT | AS ESTIMATED, A | VENDOR QUOTE | $830,000.00 |
| INSTRUMENTATION | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| STATE SALES TAXES | 0.06 X A | State Sales Tax | $49,800.00 |
| FREIGHT | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| PEC SUBTOTAL | 1.16 X A = B | | $962,800.00 |
| DIRECT INSTALLATION COSTS (DIC) | | | |
| FOUNDATIONS & SUPPORTS | 0.08 X B | (ULRICH, 1984) | $77,024.00 |
| LABOR | 0.14 X B | (EPA, 1990d) | $134,792.00 |
| ELECTRICAL | 0.04 X B | (EPA, 1990d) | $38,512.00 |
| PIPING | N/A | | - |
| INSULATION | N/A | | - |
| PAINTING | 0.01 X B | (EPA, 1990d) | $9,628.00 |
| DIC SUBTOTAL | 0.27 X B | (EPA, 1990d) | $259,956.00 |
| SITE PREPARATION | N/A | - | - |
| BUILDINGS | N/A | - | - |
| TOTAL DC | 1.27 X B | - | $1,222,756.00 |
| *INDIRECT COSTS (IDC)* | | | |
| ENGINEERING | 0.10 X B | (EPA,1990d) | $96,280.00 |
| CONSTRUCTION OVERHEAD | 0.05 X B | (EPA,1990d) | $48,140.00 |
| CONTRACTOR FEES | 0.10 X B | (EPA,1990d) | $96,280.00 |
| CONTINGENCIES | 0.03 X B | (EPA,1990d) | $28,884.00 |
| START-UP | 0.02 X B | (EPA,1990d) | $19,256.00 |
| PERFORMANCE TESTING | 0.01 X B | (EPA,1990d) | $9,628.00 |
| TOTAL IDC | 0.53 X B | - | $298,468.00 |
| TOTAL CAPITAL INVESTMENT (TCI) | 1.84 X B | | $1,521,224.00 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

| | |
|---|---|
| By: D. Graziani, P.E | OFS No.: 1523.0005.0008 |
| Date: 12/30.96 | File: COTBACT.XLS |
| Ckd. By: D. Ghayal, P.E. | Sheet:: CO-BACT |
| Date: 1/10/97 | |
| Rev. By: D. Graziani, P.E. DJG 3/4/97 | |
| Date: 2/10/97 | |

**OPERATING COST FACTORS FOR OXIDATION CATALYST**

**COST DATA**

***CHEMICAL ENGINEERING PLANT COST INDEX***

| | |
|---|---|
| 1990 | 357.6 |
| 1993 | 359.2 |
| Sept. '96 | 383.9 |

***CAPITAL RECOVERY FACTOR (CRF) @i=7.25%,n=20:*** 0.0962

0.0725

20

| | FACTOR | REFERENCE | 1997 COSTS, $/YR |
|---|---|---|---|
| ***DIRECT ANNUAL COSTS, $/YR*** | | | |
| OPERATING LABOR | $27.82/HR @ .5HR/12HR-SHIFT | (COT & EPA 1990d) | $10,154.30 |
| SUPERVISORY LABOR | 15 % OF OPERATING LABOR | (EPA,1990d) | $1,523.15 |
| MAINTENANCE LABOR AND MATERIALS | 2 x $27.82/HR @ 0.5HR/12HR-SHIFT | (EPA,1990d) | $20,308.60 |
| CATALYST REPLACEMENT (CR) | 9 X 0.75 X A X CFR | Vendor Quote | $539,155.69 |
| CATALYST DISPOSAL | $15/CF | (EPA,1993b) | $172,308.62 |
| ELECTRICITY | N/A | (EPA,1990d) | - |
| PERFORMANCE LOSS | 0.50% | (EPA,1993b) | $272,461.58 |
| | | | $1,015,911.94 |
| ***INDIRECT ANNUAL COSTS, $/YR*** | | | |
| OVERHEAD | 60% OF ALL LABOR MAIN. COSTS | (EPA,1990d) | $19,192 |
| INSURANCE & ADMINISTRATION | 2.5%OF TCI | (EPA,1990d) | $38,031 |
| CAPITAL RECOVERY | CRF X (TCI - CR) | N/A | $86,489 |
| | | | $143,710.79 |
| ***TOTAL ANNUAL COSTS, $/YR*** | | | $1,159,622.73 |
| ***TOTAL NET REDUCTIONS (TPY)*** | | | |
| Carbon Monoxide | 90 % Reduction | | 150.32 |
| ***INCREMENTAL COST EFFECTIVENESS, $/TON*** | | | $7,714 |

**FOSTER WHEELER ENVIRONMENTAL CORPORATION**
**EXCEL 5.0 CALCULATION SHEET**

By: D. Graziani, P.E
Date: 12/30.96
Ckd. By: D. Ghayal, P.E.
Date: 1/10/97
Rev. By: D. Graziani, P.E. DJG 3/4/97
Date: 2/10/97

OFS No.: 1523.0005.0008
File: COTBACT.XLS
Sheet:: VOC-BACT

Description: Incremental and total cost analysis for the Oxidation Catalyst. Cost factors and references listed. Capital cost estimate for the Oxidation Catalyst was supplied by a vendor for the CO BACT Evaluation. The potential reductions of VOC emissions (30%) were added to the CO reductions as additional reductions.

## BACT ANALYSIS

## CAPITAL COSTS FOR OXIDATION CATALYST (30% CONTROL)

| COST ITEM | COST FACTOR | REFERENCE | COST ($1997) |
|---|---|---|---|
| *DIRECT COSTS (DC)* | | | |
| PURCHASED EQUIPMENT COSTS (PEC) | | | |
| OX CAT. & AUXILIARY EQUIPMENT | AS ESTIMATED, A | VENDOR QUOTE | $830,000.00 |
| INSTRUMENTATION | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| STATE SALES TAXES | 0.06 X A | State Sales Tax | $49,800.00 |
| FREIGHT | 0.05 X A | (EPA, 1990d) | $41,500.00 |
| PEC SUBTOTAL | 1.16 X A = B | | $962,800.00 |
| DIRECT INSTALLATION COSTS (DIC) | | | |
| FOUNDATIONS & SUPPORTS | 0.08 X B | (ULRICH, 1984) | $77,024.00 |
| LABOR | 0.14 X B | (EPA, 1990d) | $134,792.00 |
| ELECTRICAL | 0.04 X B | (EPA, 1990d) | $38,512.00 |
| PIPING | N/A | | - |
| INSULATION | N/A | | - |
| PAINTING | 0.01 X B | (EPA, 1990d) | $9,628.00 |
| DIC SUBTOTAL | 0.27 X B | (EPA, 1990d) | $259,956.00 |
| SITE PREPARATION | N/A | - | - |
| BUILDINGS | N/A | - | - |
| TOTAL DC | 1.27 X B | - | $1,222,756.00 |
| *INDIRECT COSTS (IDC)* | | | |
| ENGINEERING | 0.10 X B | (EPA,1990d) | $96,280.00 |
| CONSTRUCTION OVERHEAD | 0.05 X B | (EPA,1990d) | $48,140.00 |
| CONTRACTOR FEES | 0.10 X B | (EPA,1990d) | $96,280.00 |
| CONTINGENCIES | 0.03 X B | (EPA,1990d) | $28,884.00 |
| START-UP | 0.02 X B | (EPA,1990d) | $19,256.00 |
| PERFORMANCE TESTING | 0.01 X B | (EPA,1990d) | $9,628.00 |
| TOTAL IDC | 0.53 X B | - | $298,468.00 |
| TOTAL CAPITAL INVESTMENT (TCI) | 1.84 X B | | $1,521,224.00 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

| | |
|---|---|
| By: D. Graziani, P.E | OFS No.: 1523.0005.0008 |
| Date: 12/30.96 | File: COTBACT.XLS |
| Ckd. By: D. Ghayal, P.E. | Sheet:: VOC-BACT |
| Date: 1/10/97 | |
| Rev. By: D. Graziani, P.E. DJG 3/4/97 | |
| Date: 2/10/97 | |

***OPERATING COST FACTORS FOR OXIDATION CATALYST***

| | | | | |
|---|---|---|---|---|
| **COST DATA** | | | | |
| ***CHEMICAL ENGINEERING PLANT COST INDEX*** | | | | |
| 1990 | 357.6 | | | |
| 1993 | 359.2 | | | |
| Sept. '96 | 383.9 | | | |
| ***CAPITAL RECOVERY FACTOR (CRF) @i=7.25%,n=20:*** | | 0.0962 | | |
| | 0.0725 | | | |
| | 20 | | | 1997 |
| ***DIRECT ANNUAL COSTS, $/YR*** | | **FACTOR** | **REFERENCE** | **COSTS, $/YR** |
| OPERATING LABOR | | $27.82/HR @ .5HR/12HR-SHIFT | (COT & EPA 1990d) | $10,154.30 |
| SUPERVISORY LABOR | | 15 % OF OPERATING LABOR | (EPA,1990d) | $1,523.15 |
| MAINTENANCE LABOR AND MATERIALS | | 2 x $27.82/HR @ 0.5HR/12HR-SHIFT | (EPA,1990d) | $20,308.60 |
| CATALYST REPLACEMENT (CR) | | 9 X 0.75 X A X CFR | Vendor Quote | $539,155.69 |
| CATALYST DISPOSAL | | $15/CF | (EPA,1993b) | $172,308.62 |
| ELECTRICITY | | N/A | (EPA,1990d) | - |
| PERFORMANCE LOSS | | 0.50% | (EPA,1993b) | $272,461.58 |
| | | | | $1,015,911.94 |
| ***INDIRECT ANNUAL COSTS, $/YR*** | | | | |
| OVERHEAD | | 60% OF ALL LABOR MAIN. COSTS | (EPA,1990d) | $19,192 |
| INSURANCE & ADMINISTRATION | | 2.5%OF TCI | (EPA,1990d) | $38,031 |
| CAPITAL RECOVERY | | CRF X (TCI - CR) | N/A | $86,489 |
| | | | | $143,710.79 |
| ***TOTAL ANNUAL COSTS, $/YR*** | | | | <u>$1,159,622.73</u> |
| ***TOTAL NET REDUCTIONS (TPY)*** | | | | |
| Carbon Monoxide | | 90 % Reduction | | 150.32 |
| Volatile Organic Compounds | | 30% Reduction | | 4.11 |
| Total | | | | 154.42 |
| ***INCREMENTAL COST EFFECTIVENESS, $/TON*** | | | | $7,509 |

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# EXCEL 5.0 CALCULATION SHEET

By: D. Graziani, P.E
Date: 12/30.96
Ckd. By: D. Ghayal, P.E.
Date: 1/10/97
Rev. By: D. Graziani, P.E. DJG 3/4/97
Date: 2/10/97

OFS No.: 1523.0005.0008
File: COTBACT.XLS
Sheet:: SCR-BACT

Description: Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for theSCR was supplied by a vendor.

## BACT ANALYSIS

## CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION

OPTION 1 (3.5 ppmvd @ 15% O2 - Gas & 10 ppmvd @ 15% O2 - Oil Firing)

| COST ITEM | COST FACTOR | REFERENCE | COST ($1996) |
|---|---|---|---|
| *DIRECT COSTS (DC)* | | | |
| PURCHASED EQUIPMENT COSTS (PEC) | | | |
| SCR & AUXILIARY EQUIPMENT | AS ESTIMATED, A | VENDOR QUOTE | $1,676,000.00 |
| INSTRUMENTATION | 0.05 X A | (EPA, 1990d) | $83,800.00 |
| STATE SALES TAXES | 0.06 X A | State Sales Tax | $100,560.00 |
| FREIGHT | 0.05 X A | (EPA, 1990d) | $83,800.00 |
| PEC SUBTOTAL | 1.16 X A = B | | $1,944,160.00 |
| | | | |
| DIRECT INSTALLATION COSTS (DIC) | | | |
| FOUNDATIONS & SUPPORTS | 0.08 X B | (ULRICH, 1984) | $155,532.80 |
| LABOR | 0.14 X B | (EPA, 1990d) | $272,182.40 |
| ELECTRICAL | 0.04 X B | (EPA, 1990d) | $77,766.40 |
| PIPING | N/A | VENDOR QUOTE | - |
| INSULATION | N/A | VENDOR QUOTE | - |
| PAINTING | 0.01 X B | (EPA, 1990d) | $19,441.60 |
| DIC SUBTOTAL | 0.27 X B | (EPA, 1990d) | $524,923.20 |
| | | | |
| SITE PREPARATION | N/A | - | - |
| BUILDINGS | N/A | - | - |
| | | | |
| TOTAL DC | 1.27 X B | - | $2,469,083.20 |
| | | | |
| *INDIRECT COSTS (IDC)* | | | |
| ENGINEERING | 0.10 X B | (EPA,1990d) | $194,416.00 |
| CONSTRUCTION OVERHEAD | 0.05 X B | (EPA,1990d) | $97,208.00 |
| CONTRACTOR FEES | 0.10 X B | (EPA,1990d) | $194,416.00 |
| CONTINGENCIES | 0.03 X B | (EPA,1990d) | $58,324.80 |
| START-UP | 0.02 X B | (EPA,1990d) | $38,883.20 |
| PERFORMANCE TESTING | 0.01 X B | (EPA,1990d) | $19,441.60 |
| | | | |
| TOTAL IDC | 0.53 X B | - | $602,689.60 |
| | | | |
| TOTAL CAPITAL INVESTMENT (TCI) | 1.84 X B | | $3,071,772.80 |

## FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

By: D. Graziani, P.E
Date: 12/30.96
Ckd. By: D. Ghayal, P.E.
Date: 1/10/97
Rev. By: D. Graziani, P.E. DJG 3/4/97
Date: 2/10/97

OFS No.: 1523.0005.0008
File: COTBACT.XLS
Sheet:: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**
***CHEMICAL ENGINEERING PLANT COST INDEX***

| | |
|---|---|
| 1990 | 357.6 |
| 1993 | 359.2 |
| Sept. '96 | 383.9 |

***CAPITAL RECOVERY FACTOR (CRF) @i=7.25%,n=20:*** 0.0962
0.0725
20

| | FACTOR | REFERENCE | 1997 COSTS, $/YR |
|---|---|---|---|
| ***DIRECT ANNUAL COSTS, $/YR*** | | | |
| OPERATING LABOR | $27.82/HR @ 1HR/12HR-SHIFT | (COT & EPA 1993b) | $20,309 |
| SUPERVISORY LABOR | 15 % OF OPERATING LABOR | (EPA,1993b) | $3,046 |
| MAINTENANCE LABOR AND MATERIALS | 1,250 (MW) + 25,800 | (EPA,1993b) | $241,327 |
| CATALYST REPLACEMENT (CR) | N/A | Vendor Estimate | $350,000 |
| CATALYST DISPOSAL | $15/CF | (EPA,1993b) | $68,923 |
| AQUEOUS AMMONIA | $360/TON | (EPA,1993b) | $43,338 |
| DILUTION SYSTEM | N/A | (EPA,1993b) | - |
| ELECTRICITY | N/A | (EPA,1993b) | - |
| PERFORMANCE LOSS | 0.50% | (EPA,1993b) | $312,613 |
| BLOWER | N/A | (EPA,1993b) | - |
| PRODUCTION LOSS | N/A | (EPA,1993b) | - |
| | | | $1,039,556 |
| ***INDIRECT ANNUAL COSTS, $/YR*** | | | |
| OVERHEAD | 60% OF ALL LABOR MAIN. COSTS | (EPA,1990d) | $158,809 |
| INSURANCE & ADMINISTRATION | 2.5%OF TCI | (EPA,1990d) | $76,794 |
| CAPITAL RECOVERY | CRF X (TCI - CR) | N/A | $225,612 |
| | | | $461,215 |
| ***TOTAL ANNUAL COSTS, $/YR*** | | | $1,500,771 |
| ***TOTAL NET NOx REDUCTIONS (TPY)*** | | | |
| Oil Firing | | | 61 |
| Gas Firing | | | 146 |
| Total | | | 208 |
| ***INCREMENTAL COST EFFECTIVENESS, $/TON*** | | | $7,225 |

# APPENDIX H

# VENDOR QUOTE - SCR

**_Foster Wheeler Energy Corporation_**
_Perryville Corporate Park_
_Clinton, NJ 08809-4000_

_TELECOPY NO. 908-713-3210_
_TELEPHONE NO. 908-713-2432_

# TELECOPY FORM

December 23, 1996

TO: **Mr. Darrel Graziani: FWEnC** **561/781-3411**

FROM: Howard N. Franklin

SUBJECT: : SCR Estimate: FWEC Ref.: P738

This telefax contains **10 pages**, including this cover sheet.

---

Dear Mr. Darrel Graziani

Attached is the budgetary estimate you requested. I believe it is somewhat conservative.

Good luck

Howard

C

# FOSTER WHEELER ENERGY CORPORATION

PERRYVILLE CORPORATE PARK • CLINTON, NEW JERSEY 08809-4000 • PHONE 908-730-4000

December 23, 1996
P738-01/FWEC

Mr. Darrel Graziani
Foster Wheeler Environmental Corporation
759 south Federal Highway
Stuart, FL 34994

Subject: **Budgetary SCR for FWEnC**
**FWEC SCR # P-738**

Reference: Information data from D. Graziani received 12/20/96

Dear Mr Graziani:

Foster Wheeler Energy Corporation is pleased to have this opportunity to provide budgetary pricing for the subject SCR system based upon the reference.

**COMMERCIAL:**

The budgetary price (excluding all taxes) for the design and supply of one aqueous ammonia SCR system, F.O.B. U. S. job site, is:

**TWO MILLION TWO HUNDRED FORTY THOUSAND U.S. DOLLARS .. $ 2,240,000**

This cost can be reduced by getting an allowable higher outlet NOX for oil firing. It is our experience that oil is possibly fired during the winter when the natural gas supply may be curtailed for residential use. Winter is not the worst NOX season and we have often seen the NOX outlet raised from 3.5 to 9 ppmvd @ 15% $O_2$.

The budgetary price (excluding all taxes) for the design and supply of one aqueous ammonia SCR system, F.O.B. U. S. job site, is:

**ONE MILLION SIX HUNDRED SEVENTY-SIX THOUSAND U.S. DOLLARS ........................................................................ $ 1,676,000**

for this reduced case. The natural gas fired case remains unchanged.

These estimates are based upon scantly SCR duty requirements and vague project information. Taken as an aggregate they are deemed to be reasonable.

Scheduled fabrication completion of the SCR system is based upon full release no later than eight months prior to the scheduled fabrication completion date. Earlier deliveries may be possible if required by the schedule.

## DISCUSSION

The maximum ammonia flow rate, which is for the oil fired case, as given in Table 1, based upon a 27% aqueous solution. No reactor cross section was given so the flow cross-sectional area is also given in Table 1. Without HRSG and SCR Reactor sizes any required flue transitions could not be estimated and are not included - see General and Ammonia Scope of Supply.

In addition, FWEC has not broken out the catalyst price as requested. The bulk of the cost is the catalyst and without it the error band of this estimate wold be too high to make the estimated costs realistic. With regard to the supply of the catalyst FWEC would be willing to discuss this at a later date when the SCR duty requirements are solidified.

## COMMENTS AND EXCEPTIONS

Our quotation is based on the reference data. Comments and exceptions include:

1. The foregoing quotation is based on FWC acceptable Terms and Conditions.

2. Performance of the catalyst is dependent on reasonably uniform flue gas distribution at the Ammonia Injection Grid (AIG) and catalyst as well as sufficient mixing time between the AIG and catalyst. The flue gas distribution at the ammonia injection grid should satisfy an RMS deviation less than 10% of the mean and catalyst inlet should satisfy an RMS deviation less than 15% of the mean. A one-half second or greater residence time should be used between the AIG and SCR catalyst. The catalyst should not be blocked in such a way as to disrupt the flow distribution into the catalyst. The temperature distribution should be less than or equal to ±20 °F at the catalyst.

3. The maximum allowable exhaust gas temperature at the catalyst is 750 °F. For such a small $SO_3$ concentration the lower temperature catalyst limit is about 500 °F based upon performance rather than ammonium salt formation.

4. The allowed start-up and shut-down temperature gradient for the catalyst is 20 °F/min below and 110 °F/min above the flue gas dew point.

5. The SCR does not fit within the 12 M X 20 M dimensions, it is slightly larger to meet pressure drop.

6. The catalyst reactor outer casing and inner structure are included. They include 4" of internal insulation and catalyst loading doors at the top. Also included is the catalyst loading monorail with hoist. Access doors, etc. are supplied by others in the flue or, if required, in the flue transitions. The Ammonia Injection Grid is included and it fits into the HGSR flue upstream of the reactor. Please refer to the Scope of Supply.

7. An aqueous ammonia tank was included with an estimated 2 week 27% solution supply for the oil fired cases. The requirements for these cases are given in Table 1. For comparison the corresponding flow rate for the gas fired cases is 110 #.hr.

8. Also guestimated is the piping from the tank and ammonia skids through to the injection grid. Without the location of the individual piece locations this estimate is simply an educated guess based upon past experience.

9. The pressure drop indicated in Table 1 includes the ammonia injection grid, the reactor inlet/outlet and the catalyst, i.e., all components FWEC would supply.

**TECHNICAL:**

The SCR system design is based on the steady-state operating conditions given in the reference. Table 1 includes performance data for two oil cases: outlet NOx = 3.5 and 9 ppmvd @ 15% $O_2$, respectively. Both easily satisfy the natural gas fired cases.

Also attached are the following:

General SCR Scope of Supply
Aqueous Ammonia Scope of Supply
Electric Heater Aqueous Ammonia P&ID - Typical

If you have any questions or require additional information please contact me at (908)713-2432. The fax number is (908)713-3210.

Very truly yours,

Howard N. Franklin

Howard N. Franklin

cc: M. A. Broadhurst

# TABLE 1: SCR DESIGN CONDITIONS

| Case | 7 | 7 |
|---|---|---|
| Fuel - Gas Turbine | Oil | Oil |
| Exhaust, lb/hr | 3,950,000 | 3,950,000 |
| Exhaust Composition, % Vol. | | |
| O2 | 10.90 | 10.90 |
| N2 | 71.24 | 71.24 |
| CO2 | 5.35 | 5.35 |
| H2O | 11.44 | 11.44 |
| Ar | 0.85 | 0.85 |
| SO2 | 0.0013 | 0.0013 |
| Particulate, mg/Nm3 | 45 (est.) | 45 (est.) |
| SCR Inlet Temp, °F | 700 | 700 |
| Inlet NOX, ppmvd @ 15% O2 | 42 | 42 |
| Outlet NOX, ppmvd @ 15% O2* | **3.5** | **9** |
| Guarantee NH3 slip, ppmvd @ 15% O2* | 10 | 10 |
| Pressure drop, in wc* | ≤ 2.0 | ≤ 2.0 |
| NH3 Consumption, #/hr 27% Aqua Basis | 570 | 530 |
| Reactor Cross Section Required, Ft.2 | 2,975 | 2,257 |
| Catalyst Life* | 3 years | |

* Conditions to be Guaranteed based upon Given Inlet Conditions

FOSTER WHEELER ENERGY CORPORATION
SCR SYSTEM
SCOPE OF SUPPLY - GENERAL 

| ITEM | DESCRIPTION | FWEC SCOPE | OPTION | NOT Included |
|---|---|---|---|---|
| 1 | SCR CATALYST IN BASKETS | X | | |
| 2 | AQUEOUS AMMONIA INJECTION SYSTEM | X | | |
| 3 | ANHYDROUS AMMONIA INJECTION SYSTEM | | | X |
| | CATALYST REACTOR HOUSING: | | | |
| 4 | CATALYST HOUSING WITH INTERNAL INSULATION AND LINER | X | | |
| 5 | CATALYST MODULE SUPPORT STRUCTURE | X | | |
| 6 | SPACE IN REACTOR FOR ADDITION OF CATALYST AT A LATER DATE | | | X |
| 7 | ADDITIONAL CATALYST SUPPORT STRUCTURE FOR ADDITION OF CATALYST IN THE FUTURE | | | X |
| | CATALYST HANDLING/MAINTENANCE FACILITIES: | | | |
| 8 | CATALYST LOADING DOORS | X | | |
| 9 | ACCESS DOORS - IN TRANSITIONS | | | X |
| 10 | MONORAIL AND HOIST | X | | |
| 11 | PLATFORMS, LADDERS AND STAIRWAYS | | | X |
| | HRSG TRANSITIONS: | | | |
| 12 | INLET AND OUTLET TRANSITION DUCTS WITH INTERNAL INSULATION AND LINER | | | X |
| | ACCESSORIES: | | | |
| 13 | HOUSING SAMPLING PORTS - IN TRANSITIONS | | | X |
| 14 | CATALYST FOR SAMPLING CELLS | X | | |
| 15 | FOUNDATIONS | | | X |
| 16 | SELF-SUPPORTING OF ITEMS WITHIN THIS SCOPE OF SUPPLY | X | | |
| 17 | SURFACE PREPARATION PER THE SPECIFICATION | | | X |
| 18 | SHIPMENT OF ALL EQUIPMENT TO SITE | X | | |

**FOSTER WHEELER ENERGY CORPORATION**
**SCR SYSTEM**
**SCOPE OF SUPPLY - GENERAL** 

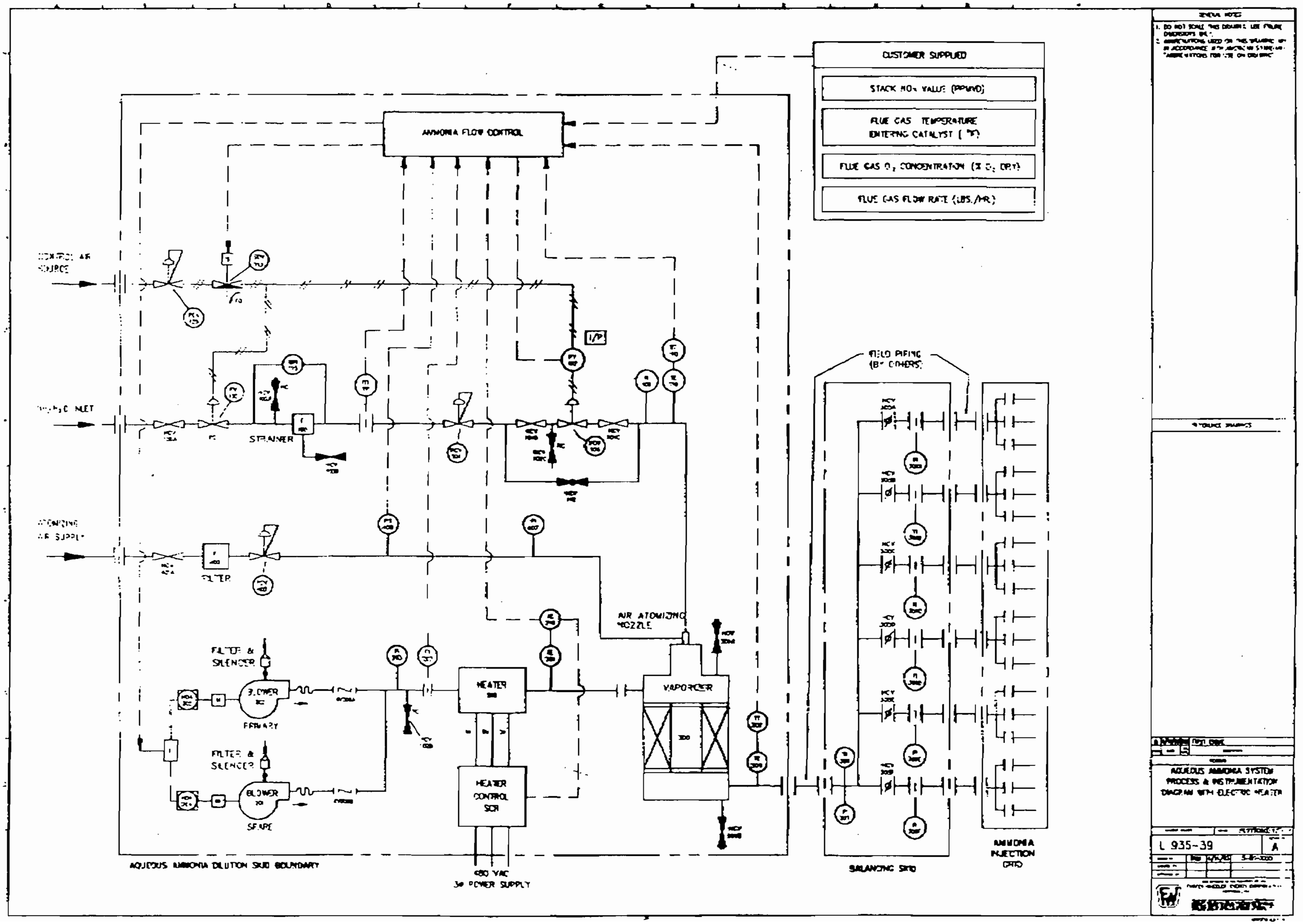
| | | | | |
|---|---|---|---|---|
| 19 | ERECTION OF CATALYST HOUSING | | | X |
| 20 | INSTALLATION OF AMMONIA INJECTION SKIDS | | | X |
| 21 | ALL CONSTRUCTION, STARTUP AND COMMISSION SPARES | | | X |
| | TECHNICAL FIELD ASSISTANCE: | | | |
| 22 | TECHNICAL FIELD ASSISTANCE FOR ERECTION AND INSTALLATION | | | X |
| 23 | TECHNICAL FIELD ASSISTANCE FOR START-UP OF CATALYST | | | X |
| 24 | TECHNICAL FIELD ASSISTANCE FOR PERFORMANCE TESTS | | | X |

**FOSTER WHEELER ENERGY CORPORATION**
**SCR SYSTEM SCOPE OF SUPPLY**
**AQUEOUS AMMONIA INJECTION SYSTEM** 

| ITEM | DESCRIPTION | FWEC SCOPE | OPTION | NOT Included |
|---|---|---|---|---|
| 1 | AMMONIA INJECTION GRID WITH NOZZLES OR ORIFICES | X | | |
| 2 | INJECTION GRID HOUSING AND SUPPORT | | | X |
| | AMMONIA INJECTION HEADER ASSEMBLY (MOUNTED AT GRADE): | | | |
| 3 | AMMONIA INJECTION HEADER | X | | |
| 4 | MANUAL TRIM VALVES | X | | |
| 5 | FLOW INDICATORS | X | | |
| 6 | MANUAL SHUT-OFF VALVES | X | | |
| 7 | SUPPORT OF INJECTION HEADER | X | | |
| | AQUEOUS AMMONIA EVAPORATION & FLOW CONTROL SKID: | | | |
| 8 | DILUTION AIR FANS WITH MOTOR (QTY. 2) | X | | |
| 9 | ELECTRIC AIR HEATER (2) | X | | |
| 10 | AMMONIA VAPORIZER/MIXER WITH INJECTION NOZZLE | X | | |
| 11 | ALL AMMONIA/AIR PIPING AND VALVES ON SKID | X | | |
| 12 | ALL CONTROL INSTRUMENTATION | X | | |
| 13 | TUBING AND WIRING ON SKID | X | | |
| 14 | INSULATION ON SKID | X | | |
| 15 | PROVISIONS FOR NITROGEN PURGE OF AMMONIA INJECTION SYSTEM | | X | |
| | AQUEOUS AMMONIA STORAGE AND FORWARDING EQUIPMENT: | | | |
| 16 | AQUEOUS AMMONIA STORAGE TANK | X | | |
| 17 | AQUEOUS AMMONIA TRUCK OFF-LOADING STA. | X | | |
| 18 | AQUEOUS AMMONIA FORWARDING PUMPS | X | | |
| 19 | AQUEOUS AMMONIA STRAINER | X | | |
| | EXTERNAL PIPING: | | | |
| 20 | PIPING FROM FORWARDING SYSTEM TO AMMONIA INJECTION SKID | X | | |
| 21 | PIPING FROM AMMONIA INJECTION SKID TO AMMONIA INJECTION HEADER | X | | |

**FOSTER WHEELER ENERGY CORPORATION**
**SCR SYSTEM SCOPE OF SUPPLY**
**AQUEOUS AMMONIA INJECTION SYSTEM** 

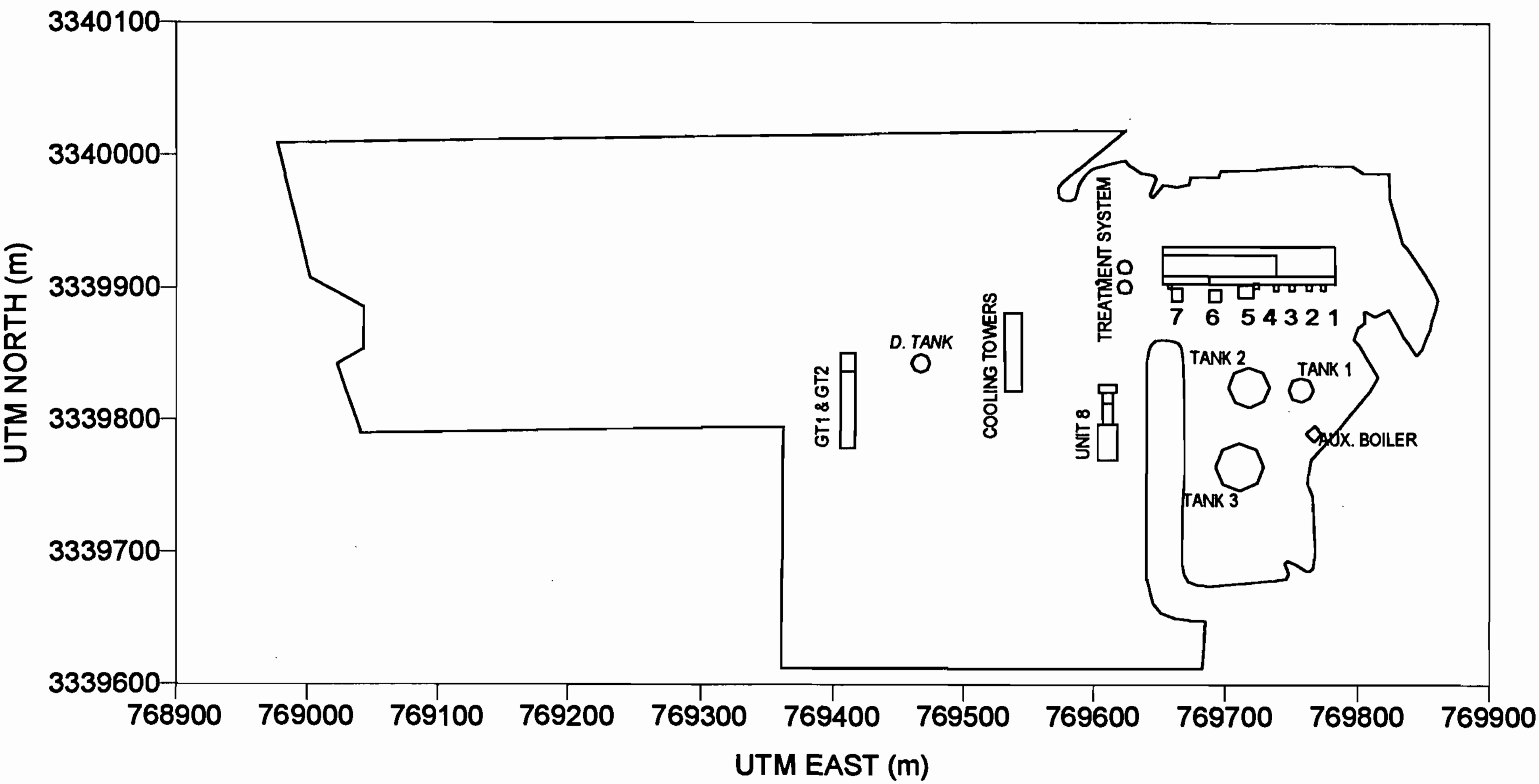
| | | | | |
|---|---|---|---|---|
| 22 | PIPING FROM AMMONIA INJECTION HEADER TO HRSG DUCT (INJECTION GRID) | X | | |
| 23 | AMMONIA FLOW CONTROL VALVE | X | | |
| 24 | AMMONIA SHUT-OFF VALVE (SOLENOID OPERATED) | X | | |
| 25 | AMMONIA FLOW TRANSMITTER | X | | |
| 26 | DILUTION/VAPORIZING AIR FLOW TRANSMITTER | X | | |
| 27 | ALL MANUAL BYPASS AND ISOLATION VALVES ON SKID | X | | |
| 28 | PRESSURE/TEMPERATURE TRANSMITTERS FOR CONTROL | X | | |
| 29 | LOCAL PRESSURE/TEMPERATURE INDICATORS | X | | |
| 30 | ALL INSTRUMENTATION AND VALVES FOR CONTROL OF EQUIPMENT ON INJECTION SKID | X | | |
| 31 | FLUE GAS INLET TEMPERATURE TRANSMITTER | | | X |
| 32 | CATALYST PRESSURE DROP TRANSMITTER (1 FOR EACH CATALYST BED) (WITH HEAD INDICATOR) | | | X |
| 33 | LOCAL CATALYST PRESSURE DROP INDICATOR (1 FOR EACH CATALYST BED) | | | X |
| 34 | CONTROL LOGIC | X | | |
| 35 | CONTROL SYSTEM HARDWARE | | | X |
| 36 | MOTOR CONTROL CENTER | | | X |
| 37 | POWER SUPPLY OF ELECTRICAL EQUIPMENT | | | X |
| | FLUE GAS ANALYZERS: | | | |
| 38 | SCR INLET NOX/O2 ANALYZER WITH PROBE AND SAMPLING LINE | | | X |
| 39 | SCR OUTLET NOX/O2 ANALYZER WITH PROBE AND SAMPLING LINE | | | X |
| 40 | SCR OUTLET NH3 ANALYZER WITH PROBE AND SAMPLING LINE | | | X |
| | GAS SAMPLING PORTS: | | | |
| 41 | INLET NOX/O2 PORT | | | X |
| 42 | STACK SAMPLING PORTS | | | X |



CUSTOMER SUPPLIED
STACK NOx VALUE (PPMVD)
FLUE GAS TEMPERATURE ENTERING CATALYST (°F)
FLUE GAS $O_2$ CONCENTRATION (% $O_2$ DRY)
FLUE GAS FLOW RATE (LBS./HR.)
AMMONIA FLOW CONTROL
CONTROL AIR SOURCE
I/P
STRAINER
FILTER
ATOMIZING AIR SUPPLY
AIR ATOMIZING NOZZLE
FILTER & SILENCER
BLOWER
PRIMARY
SPARE
HEATER
HEATER CONTROL SCR
VAPORIZER
FIELD PIPING (BY OTHERS)
AQUEOUS AMMONIA DILUTION SKID BOUNDARY
480 VAC 3Ø POWER SUPPLY
BALANCING SKID
AMMONIA INJECTION GRID
AQUEOUS AMMONIA SYSTEM PROCESS & INSTRUMENTATION DIAGRAM WITH ELECTRIC HEATER
L 935-39
A

# APPENDIX I

# BPIP PROGRAM - INPUT/OUTPUT




SOURCE: FOSTER WHEELER ENVIRONMENTAL CORPORATION

CITY OF TALLAHASSEE

# PURDOM 8 BUILDING / STRUCTURE LOCATIONS USED IN BUILDING DOWNWASH ANALYSIS

PURDOM UNIT 8 PROJECT - ST MARKS, FLORIDA

D:/SPIP/P8BLDG.SRF (DISK1)
02/27/97 13:04:30

```
'CITY OF TALLAHASSEE UNIT 8 (CT1/2 REMOVED - PROGRAM LIMIT)(p8bpip11.inp)'
'ST'
'METERS' 1.0
'UTMY' 360
12
'TANK 1' 1 0.00
8   12.8
 769766.2       3339823
 769763.4       3339830
 769756.8       3339832
 769750.4       3339830
 769747.8       3339823
 769750.6       3339816
 769757.2       3339814
 769763.6       3339817
'TANK 2' 1 0.00
8   12.2
 769733.3       3339825
 769728.6       3339836
 769717.8       3339840
 769707         3339836
 769702.7       3339825
 769707.4       3339814
 769718.3       3339810
 769729         3339815
'TANK 3' 1 0.00
8   12.2
 769729         3339765
 769723.5       3339778
 769710.7       3339783
 769698.1       3339778
 769693         3339765
 769698.5       3339752
 769711.4       3339747
 769724         3339753
'MAIN'   4    0.00
4   6
769653              3339931
769783              3339931
769783              3339903
769653              3339903
4    18.6
769653              3339925
769738              3339925
769738              3339909
769653              3339909
4        11.7
769653              3339909
769688              3339909
769688              3339903
769653              3339903
4        15.2
769688              3339909
769783              3339909
769783              3339903
769688              3339903
'UNIT 5'    2    0.00
8        26.2
769710              3339902
769721              3339902
```

```
769721            3339904
769725            3339904
769725            3339900
769721            3339900
769721            3339893
769710            3339893
4       32.3
769721            3339904
769725            3339904
769725            3339900
769721            3339900
'UNIT 6'     1    0.00
4        25.9
769688            3339899
769697            3339899
769697            3339890
769688            3339890
'UNIT 7'     2    0.00
8    29.6
769657            3339903
769660            3339903
769660            3339900
769668            3339900
769668            3339890
769660            3339890
769660            3339900
769657            3339900
4   35.0
769657            3339903
769660            3339903
769660            3339900
769657            3339900
'D-TANK'  1      0.00
8      12.2
769474      3339843
769472      3339848
769467      3339850
769462      3339848
769460      3339843
769462      3339838
769467      3339836
769472      3339838
'AUXBOIL'  1     0.00
4    6.1
769761      3339790
769767      3339784
769773      3339790
769767      3339796
'HSRG'  1    0.00
4       24.0
769603.5    3339769.5
769603.5    3339796.5
769618.5    3339796.5
769618.5    3339769.5
'UNIT8'   3     0.00
8      7.2
769607.1        3339796.5
769607.1        3339820.9
769604.2        3339820.9
769604.2        3339826.8
```

```
769617.8         3339826.8
769617.8         3339820.9
769614.9         3339820.9
769614.9         3339796.5
4         13.6
769607.1         3339813
769607.1         3339820.9
769614.9         3339820.9
769614.9         3339813
4        18.7
769604.2         3339820.9
769604.2         3339826.8
769617.8         3339826.8
769617.8         3339820.9
'cooltwr' 1  0.00
4        13.4
769532          3339822
769532          3339881
769545          3339881
769545          3339822
3
'AUXBOIL'     0.0    9.2  769767    3339784
'UNIT5'       0.0   38.2  769706    3339889
'UNIT6'       0.0   38.2  769706    3339889
```

BPIP (Dated: 95086)

DATE : 11/ 4/96
TIME : 12:43:24
CITY OF TALLAHASSEE UNIT 8 (CT1/2 REMOVED - PROGRAM LIMIT)(p8bpip11.inp)

============================
BPIP PROCESSING INFORMATION:
============================

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 360.00 degrees with respect to True North.

CITY OF TALLAHASSEE UNIT 8 (CT1/2 REMOVED - PROGRAM LIMIT)(p8bpip11.inp)

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| AUXBOIL | 9.20 | .00 | 64.75 | 65.00 |
| UNIT5 | 38.20 | .00 | 64.75 | 65.00 |
| UNIT6 | 38.20 | .00 | 64.75 | 65.00 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)

DATE : 11/ 4/96
TIME : 12:43:24

CITY OF TALLAHASSEE UNIT 8 (CT1/2 REMOVED - PROGRAM LIMIT)(p8bpip11.inp)

BPIP output is in meters

```
SO BUILDHGT AUXBOIL      6.10     6.10     6.10     6.10    12.20    12.20
SO BUILDHGT AUXBOIL     12.20    12.20    12.20     6.10     6.10    12.20
SO BUILDHGT AUXBOIL     12.20    25.90    25.90    25.90    12.80    12.80
SO BUILDHGT AUXBOIL      6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT AUXBOIL      6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDHGT AUXBOIL      6.10     6.10     6.10     6.10     6.10     6.10
SO BUILDWID AUXBOIL     11.82    11.28    10.39     9.19    35.80    34.60
SO BUILDWID AUXBOIL     34.07    35.57    36.00    11.82    11.28    29.65
SO BUILDWID AUXBOIL     30.48    37.34    39.04    39.56    18.12    18.40
SO BUILDWID AUXBOIL     11.82    11.28    10.39     9.19     9.19    10.39
SO BUILDWID AUXBOIL     11.28    11.82    12.00    11.82    11.28    10.39
SO BUILDWID AUXBOIL      9.19     9.19    10.39    11.28    11.82    12.00

SO BUILDHGT UNIT5       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT5       18.60    18.60    29.60    25.90    25.90    25.90
SO BUILDHGT UNIT5       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT5       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT5       18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT5       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDWID UNIT5       36.26    34.43    31.58    29.14    25.81    21.70
SO BUILDWID UNIT5       44.11    37.07    13.00    20.21    25.81    30.62
SO BUILDWID UNIT5       34.51    37.34    39.04    39.56    38.87    37.00
SO BUILDWID UNIT5       36.26    34.43    31.58    29.14    25.81    21.70
SO BUILDWID UNIT5       44.11    37.07    32.00    20.21    25.81    30.62
SO BUILDWID UNIT5       34.51    37.34    39.04    39.56    38.87    37.00

SO BUILDHGT UNIT6       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT6       18.60    18.60    29.60    25.90    25.90    25.90
SO BUILDHGT UNIT6       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT6       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDHGT UNIT6       18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT6       25.90    25.90    25.90    25.90    25.90    25.90
SO BUILDWID UNIT6       36.26    34.43    31.58    29.14    25.81    21.70
SO BUILDWID UNIT6       44.11    37.07    13.00    20.21    25.81    30.62
SO BUILDWID UNIT6       34.51    37.34    39.04    39.56    38.87    37.00
SO BUILDWID UNIT6       36.26    34.43    31.58    29.14    25.81    21.70
SO BUILDWID UNIT6       44.11    37.07    32.00    20.21    25.81    30.62
SO BUILDWID UNIT6       34.51    37.34    39.04    39.56    38.87    37.00
```

```
'CITY OF TALLAHASSEE UNIT 8 {aux boil removed  prog.limits } (p8bpip13.inp)'
'ST'
'METERS' 1.0
'UTMY' 360
12
'TANK 1' 1 0.00
8   12.8
 769766.2       3339823
 769763.4       3339830
 769756.8       3339832
 769750.4       3339830
 769747.8       3339823
 769750.6       3339816
 769757.2       3339814
 769763.6       3339817
'TANK 2' 1 0.00
8   12.2
 769733.3       3339825
 769728.6       3339836
 769717.8       3339840
 769707         3339836
 769702.7       3339825
 769707.4       3339814
 769718.3       3339810
 769729         3339815
'TANK 3' 1 0.00
8   12.2
 769729         3339765
 769723.5       3339778
 769710.7       3339783
 769698.1       3339778
 769693         3339765
 769698.5       3339752
 769711.4       3339747
 769724         3339753
'MAIN'   4    0.00
4   6
769653                  3339931
769783                  3339931
769783                  3339903
769653                  3339903
4    18.6
769653                  3339925
769738                  3339925
769738                  3339909
769653                  3339909
4       17.7
769653                  3339909
769688                  3339909
769688                  3339903
769653                  3339903
4       15.2
769688                  3339909
769783                  3339909
769783                  3339903
769688                  3339903
'UNIT 5'   2   0.00
8       26.2
769710                  3339902
769721                  3339902
```

```
769721            3339904
769725            3339904
769725            3339900
769721            3339900
769721            3339893
769710            3339893
4      32.3
769721            3339904
769725            3339904
769725            3339900
769721            3339900
'UNIT 6'    1     0.00
4       25.9
769688            3339899
769697            3339899
769697            3339890
769688            3339890
'UNIT 7'    2    0.00
8    29.6
769657            3339903
769660            3339903
769660            3339900
769668            3339900
769668            3339890
769660            3339890
769660            3339900
769657            3339900
4   35.0
769657            3339903
769660            3339903
769660            3339900
769657            3339900
'D-TANK'  1     0.00
8      12.2
769474      3339843
769472      3339848
769467      3339850
769462      3339848
769460      3339843
769462      3339838
769467      3339836
769472      3339838
'CTs'  2     0.00
4    9.1
769406      3339851
769417      3339851
769417      3339779
769406      3339779
4    4.0
769406      3339851
769417      3339851
769417      3339837
769406      3339837
'HSRG'  1    0.00
4       24.0
769603.5    3339769.5
769603.5    3339796.5
769618.5    3339796.5
769618.5    3339769.5
'UNIT8'   3     0.00
```

```
8       7.2
769607.1         3339796.5
769607.1         3339820.9
769604.2         3339820.9
769604.2         3339826.8
769617.8         3339826.8
769617.8         3339820.9
769614.9         3339820.9
769614.9         3339796.5
4         13.6
769607.1         3339813
769607.1         3339820.9
769614.9         3339820.9
769614.9         3339813
4        18.7
769604.2         3339820.9
769604.2         3339826.8
769617.8         3339826.8
769617.8         3339820.9
'cooltwr' 1  0.00
4        13.4
769532         3339822
769532         3339881
769545         3339881
769545         3339822
3
'CT1'        0.0    11.7 769421    3339825
'CT2'        0.0    11.7 769421    3339813
'UNIT8'      0.0    60.0 769611.5 3339767
```

DATE : 2/ 6/97
TIME : 10:48:23
CITY OF TALLAHASSEE UNIT 8 (aux boil removed prog.limits ) (p8bpip13.inp)

============================
BPIP PROCESSING INFORMATION:
============================

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 360.00 degrees with respect to True North.

CITY OF TALLAHASSEE UNIT 8 (aux boil removed prog.limits ) (p8bpip13.inp)

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| CT1 | 11.70 | .00 | 30.50 | 65.00 |
| CT2 | 11.70 | .00 | 30.50 | 65.00 |
| UNIT8 | 60.00 | .00 | 60.00 | 65.00 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.



DATE : 2/ 6/97
TIME : 10:48:23

CITY OF TALLAHASSEE UNIT 8 (aux boil removed  prog.limits ) (p8bpip13.inp)

BPIP output is in meters

```
   SO BUILDHGT CT1         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT1         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT1         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT1         9.10    9.10    9.10    9.10    9.10   12.20
   SO BUILDHGT CT1        12.20   12.20    9.10    9.10    9.10    9.10
   SO BUILDHGT CT1         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDWID CT1        23.34   34.96   45.53   54.71   62.23   67.85
   SO BUILDWID CT1        71.42   72.82   72.00   72.82   71.42   67.85
   SO BUILDWID CT1        62.23   54.71   45.53   34.96   23.34   11.00
   SO BUILDWID CT1        23.34   34.96   45.53   54.71   62.23   13.66
   SO BUILDWID CT1        13.16   13.79   72.00   72.82   71.42   67.85
   SO BUILDWID CT1        62.23   54.71   45.53   34.96   23.34   11.00

   SO BUILDHGT CT2         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT2         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT2         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT2         9.10    9.10    9.10    9.10   12.20   12.20
   SO BUILDHGT CT2        12.20    9.10    9.10    9.10    9.10    9.10
   SO BUILDHGT CT2         9.10    9.10    9.10    9.10    9.10    9.10
   SO BUILDWID CT2        23.34   34.96   45.53   54.71   62.23   67.85
   SO BUILDWID CT2        71.42   72.82   72.00   72.82   71.42   67.85
   SO BUILDWID CT2        62.23   54.71   45.53   34.96   23.34   11.00
   SO BUILDWID CT2        23.34   34.96   45.53   54.71   14.09   13.66
   SO BUILDWID CT2        13.16   72.82   72.00   72.82   71.42   67.85
   SO BUILDWID CT2        62.23   54.71   45.53   34.96   23.34   11.00

   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDHGT UNIT8      24.00   24.00   24.00   24.00   24.00   24.00
   SO BUILDWID UNIT8      19.46   23.33   26.49   28.85   30.33   30.88
   SO BUILDWID UNIT8      30.50   29.19   27.00   29.19   30.50   30.88
   SO BUILDWID UNIT8      30.33   28.85   26.49   23.33   19.46   15.00
   SO BUILDWID UNIT8      19.46   23.33   26.49   28.85   30.33   30.88
   SO BUILDWID UNIT8      30.50   29.19   27.00   29.19   30.50   30.88
   SO BUILDWID UNIT8      30.33   28.85   26.49   23.33   19.46   15.00
```

```
'COT UNIT 8 {aux boil/CT/D-TANK/cool-twr removed  prog.limits }(p8bpip14.inp)'
'ST'
'METERS' 1.0
'UTMY' 360
12
'TANK 1' 1 0.00
8   12.8
 769766.2       3339823
 769763.4       3339830
 769756.8       3339832
 769750.4       3339830
 769747.8       3339823
 769750.6       3339816
 769757.2       3339814
 769763.6       3339817
'TANK 2' 1 0.00
8   12.2
 769733.3       3339825
 769728.6       3339836
 769717.8       3339840
 769707         3339836
 769702.7       3339825
 769707.4       3339814
 769718.3       3339810
 769729         3339815
'TANK 3' 1 0.00
8   12.2
 769729         3339765
 769723.5       3339778
 769710.7       3339783
 769698.1       3339778
 769693         3339765
 769698.5       3339752
 769711.4       3339747
 769724         3339753
'MAIN'   4    0.00
4   6
769653               3339931
769783               3339931
769783               3339903
769653               3339903
4    18.6
769653               3339925
769738               3339925
769738               3339909
769653               3339909
4       17.7
769653               3339909
769688               3339909
769688               3339903
769653               3339903
4       15.2
769688               3339909
769783               3339909
769783               3339903
769688               3339903
'UNIT 5'   2   0.00
8       26.2
769710               3339902
769721               3339902
```

```
769721              3339904
769725              3339904
769725              3339900
769721              3339900
769721              3339893
769710              3339893
4        32.3
769721              3339904
769725              3339904
769725              3339900
769721              3339900
'UNIT 6'     1      0.00
4         25.9
769688              3339899
769697              3339899
769697              3339890
769688              3339890
'UNIT 7'     2     0.00
8    29.6
769657              3339903
769660              3339903
769660              3339900
769668              3339900
769668              3339890
769660              3339890
769660              3339900
769657              3339900
4   35.0
769657              3339903
769660              3339903
769660              3339900
769657              3339900
'HSRG'   1     0.00
4        24.0
769603.5    3339769.5
769603.5    3339796.5
769618.5    3339796.5
769618.5    3339769.5
'UNIT8'    3      0.00
8       7.2
769607.1          3339796.5
769607.1          3339820.9
769604.2          3339820.9
769604.2          3339826.8
769617.8          3339826.8
769617.8          3339820.9
769614.9          3339820.9
769614.9          3339796.5
4         13.6
769607.1          3339813
769607.1          3339820.9
769614.9          3339820.9
769614.9          3339813
4        18.7
769604.2          3339820.9
769604.2          3339826.8
769617.8          3339826.8
769617.8          3339820.9
'CONDTANK'    1   0.00
8         8.5
```

```
 769629.3       3339916
 769627.7       3339920
 769623.9       3339921
 769620.2       3339920
 769618.7       3339916
 769620.3       3339912
 769624.1       3339911
 769627.8       3339912
 'DISTTANK'  1  0.00
8        5.3
 769629.3       3339901
 769627.7       3339905
 769623.9       3339906
 769620.2       3339905
 769618.7       3339901
 769620.3       3339897
 769624.1       3339896
 769627.8       3339897
 'EVAPORAT'   1    0.00
8  10.0
 769603.8       3339904
 769603.5       3339905
 769603         3339905
 769602.4       3339905
 769602.3       3339904
 769602.5       3339904
 769603         3339903
 769603.6       3339904
1
'UNIT7'       0.0    54.9 769653    3339883
```

BPIP (Dated: 95086)

DATE : 11/14/96
TIME : 11:51:20
COT UNIT 8 (aux boil/CT/D-TANK/cool-twr removed  prog.limits )(p8bpip14.inp)

============================
BPIP PROCESSING INFORMATION:
============================

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 360.00 degrees with respect to True North.

COT UNIT 8 (aux boil/CT/D-TANK/cool-twr removed  prog.limits )(p8bpip14.inp)

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| UNIT7 | 54.90 | .00 | 60.00 | 65.00 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)

DATE : 11/14/96
TIME : 11:51:20

COT UNIT 8 (aux boil/CT/D-TANK/cool-twr removed  prog.limits )(p8bpip14.inp)

BPIP output is in meters

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SO | BUILDHGT | UNIT7 | 29.60 | 24.00 | 24.00 | 29.60 | 29.60 | 29.60 |
| SO | BUILDHGT | UNIT7 | 29.60 | 29.60 | 18.60 | 18.60 | 18.60 | .00 |
| SO | BUILDHGT | UNIT7 | 8.50 | 8.50 | 8.50 | 18.60 | 18.60 | 18.60 |
| SO | BUILDHGT | UNIT7 | 29.60 | 29.60 | 29.60 | 29.60 | 29.60 | 29.60 |
| SO | BUILDHGT | UNIT7 | 29.60 | 29.60 | 18.60 | 18.60 | 18.60 | .00 |
| SO | BUILDHGT | UNIT7 | .00 | .00 | .00 | 18.60 | 18.60 | 18.60 |
| SO | BUILDWID | UNIT7 | 13.09 | 23.33 | 26.49 | 16.78 | 17.03 | 16.76 |
| SO | BUILDWID | UNIT7 | 15.98 | 14.71 | 35.00 | 48.01 | 59.57 | .00 |
| SO | BUILDWID | UNIT7 | 10.88 | 10.81 | 10.41 | 85.35 | 86.49 | 85.00 |
| SO | BUILDWID | UNIT7 | 13.09 | 14.78 | 16.03 | 16.78 | 17.03 | 16.76 |
| SO | BUILDWID | UNIT7 | 15.98 | 14.71 | 35.00 | 48.01 | 59.57 | .00 |
| SO | BUILDWID | UNIT7 | .00 | .00 | .00 | 85.35 | 86.49 | 85.00 |

```
'COT UNIT 8 (aux/ P8/CT/D-TANK/cool-twr removed  prog.limits )(p8bpip15.inp)'
'ST'
'METERS' 1.0
'UTMY' 360
11
'TANK 1' 1 0.00
8   12.8
 769766.2       3339823
 769763.4       3339830
 769756.8       3339832
 769750.4       3339830
 769747.8       3339823
 769750.6       3339816
 769757.2       3339814
 769763.6       3339817
'TANK 2' 1 0.00
8   12.2
 769733.3       3339825
 769728.6       3339836
 769717.8       3339840
 769707         3339836
 769702.7       3339825
 769707.4       3339814
 769718.3       3339810
 769729         3339815
'TANK 3' 1 0.00
8   12.2
 769729         3339765
 769723.5       3339778
 769710.7       3339783
 769698.1       3339778
 769693         3339765
 769698.5       3339752
 769711.4       3339747
 769724         3339753
'MAIN'   4    0.00
4   6
769653               3339931
769783               3339931
769783               3339903
769653               3339903
4    18.6
769653               3339925
769738               3339925
769738               3339909
769653               3339909
4       17.7
769653               3339909
769688               3339909
769688               3339903
769653               3339903
4       15.2
769688               3339909
769783               3339909
769783               3339903
769688               3339903
'UNIT 5'   2   0.00
8       26.2
769710               3339902
769721               3339902
```

```
769721              3339904
769725              3339904
769725              3339900
769721              3339900
769721              3339893
769710              3339893
4        32.3
769721              3339904
769725              3339904
769725              3339900
769721              3339900
'UNIT 6'     1      0.00
4         25.9
769688              3339899
769697              3339899
769697              3339890
769688              3339890
'UNIT 7'     2     0.00
8    29.6
769657              3339903
769660              3339903
769660              3339900
769668              3339900
769668              3339890
769660              3339890
769660              3339900
769657              3339900
4   35.0
769657              3339903
769660              3339903
769660              3339900
769657              3339900
'UNIT1'  1    0.00
4        21.9
769736              3339903
769740              3339903
769740              3339898
769736              3339898
'UNIT2'  1    0.00
4        21.9
769748              3339903
769752              3339903
769752              3339898
769748              3339898
'UNIT3'  1    0.00
4        21.9
769761              3339903
769765              3339903
769765              3339898
769761              3339898
'UNIT4'  1    0.00
4        21.9
769772              3339903
769776              3339903
769776              3339898
769772              3339898
4
'UNIT1'      0.0    26 769738    3339891
'UNIT2'      0.0    26 769750    3339891
'UNIT3'      0.0    26 769763    3339891
```

'UNIT4'   0.0   26 769774   3339891

DATE : 12/19/96
TIME :  7:46:42
COT UNIT 8 {aux/ P8/CT/D-TANK/cool-twr removed  prog.limits }(p8bpip15.inp)

============================
BPIP PROCESSING INFORMATION:
============================

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS     will be converted to meters using
a conversion factor of    1.0000.  Output will be in meters.

The UTMP variable is set to UTMY.  The input is assumed to be in UTM coordinates.  BPIP will move the UTM origin to the first pair of UTM coordinates read.  The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 360.00 degrees with respect to True North.

COT UNIT 8 {aux/ P8/CT/D-TANK/cool-twr removed  prog.limits }(p8bpip15.inp)

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| UNIT1 | 26.00 | .00 | 64.75 | 65.00 |
| UNIT2 | 26.00 | .00 | 64.75 | 65.00 |
| UNIT3 | 26.00 | .00 | 63.63 | 65.00 |
| UNIT4 | 26.00 | .00 | 60.34 | 65.00 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document.  Determinant 3 may be investigated for additional stack height credit.  Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document.  Values have been adjusted for any stack-building base elevation differences.

Note:  Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)

DATE : 12/19/96
TIME :  7:46:42

COT UNIT 8 (aux/ P8/CT/D-TANK/cool-twr removed  prog.limits )(p8bpip15.inp)

BPIP output is in meters

```
SO BUILDHGT UNIT1      21.90    21.90    21.90    21.90    25.90    25.90
SO BUILDHGT UNIT1      18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT1      25.90    25.90    25.90    25.90    25.90    21.90
SO BUILDHGT UNIT1      21.90    21.90    21.90    21.90    25.90    25.90
SO BUILDHGT UNIT1      18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT1      25.90    25.90    25.90    25.90    25.90    21.90
SO BUILDWID UNIT1      30.24    29.56    27.98    25.55    25.81    21.70
SO BUILDWID UNIT1      55.13    41.70    25.00    20.21    25.81    30.62
SO BUILDWID UNIT1      34.51    37.34    39.04    39.56    38.87    30.00
SO BUILDWID UNIT1      30.24    29.56    27.98    25.55    25.81    21.70
SO BUILDWID UNIT1      55.13    41.70    25.00    20.21    25.81    30.62
SO BUILDWID UNIT1      34.51    37.34    39.04    39.56    38.87    30.00

SO BUILDHGT UNIT2      18.60    18.60    18.60    18.60    18.60    18.60
SO BUILDHGT UNIT2      18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT2      25.90    25.90    21.90    21.90    21.90    21.90
SO BUILDHGT UNIT2      18.60    18.60    18.60    18.60    18.60    18.60
SO BUILDHGT UNIT2      18.60    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT2      25.90    25.90    21.90    21.90    21.90    21.90
SO BUILDWID UNIT2     102.18   102.26    99.24    93.19    84.32    72.88
SO BUILDWID UNIT2      59.23    41.70    25.00    20.21    25.81    30.62
SO BUILDWID UNIT2      34.51    37.34    30.98    31.61    31.28    30.00
SO BUILDWID UNIT2     102.18   102.26    99.24    93.19    84.32    72.88
SO BUILDWID UNIT2      59.23    41.70    25.00    20.21    25.81    30.62
SO BUILDWID UNIT2      34.51    37.34    30.98    31.61    31.28    30.00

SO BUILDHGT UNIT3      15.20    15.20    15.20    15.20    15.20    15.20
SO BUILDHGT UNIT3      15.20    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT3      21.90    21.90    18.60    18.60    18.60    15.20
SO BUILDHGT UNIT3      15.20    15.20    15.20    15.20    15.20    15.20
SO BUILDHGT UNIT3      15.20    18.60    18.60    25.90    25.90    25.90
SO BUILDHGT UNIT3      21.90    21.90    18.60    18.60    18.60    15.20
SO BUILDWID UNIT3      94.60    91.32    85.27    76.63    65.66    52.70
SO BUILDWID UNIT3      38.13    43.32    25.00    20.21    25.15    25.15
SO BUILDWID UNIT3      26.94    29.41    81.61    90.98    96.45    95.00
SO BUILDWID UNIT3      94.60    91.32    85.27    76.63    65.66    52.70
SO BUILDWID UNIT3      38.13    43.32    25.00    20.21    25.15    25.15
SO BUILDWID UNIT3      26.94    29.41    81.61    90.98    96.45    95.00

SO BUILDHGT UNIT4      15.20    15.20    15.20    15.20    15.20    15.20
SO BUILDHGT UNIT4      15.20    15.20    18.60    25.90    25.90    21.90
SO BUILDHGT UNIT4      18.60    18.60    15.20    15.20    15.20    15.20
SO BUILDHGT UNIT4      15.20    15.20    15.20    15.20    15.20    15.20
SO BUILDHGT UNIT4      15.20    15.20    18.60    21.90    25.90    21.90
SO BUILDHGT UNIT4      18.60    18.60    15.20    15.20    15.20    15.20
SO BUILDWID UNIT4      94.60    91.32    85.27    76.63    65.66    52.70
SO BUILDWID UNIT4      40.43    26.11    25.00    20.21    22.96    23.66
SO BUILDWID UNIT4      66.89    75.40    85.27    91.32    94.60    95.00
SO BUILDWID UNIT4      94.60    91.32    85.27    76.63    65.66    52.70
SO BUILDWID UNIT4      40.43    26.11    25.00    21.83    22.96    23.66
SO BUILDWID UNIT4      66.89    75.40    85.27    91.32    94.60    95.00
```

```
'COT UNIT 8 { Tank#1 AND  units 1-6 removed  prog.limits }(p8bpip16.inp)'
'ST'
'METERS' 1.0
'UTMY' 360
12
'TANK 2' 1 0.00
8   12.2
 769733.3       3339825
 769728.6       3339836
 769717.8       3339840
 769707         3339836
 769702.7       3339825
 769707.4       3339814
 769718.3       3339810
 769729         3339815
'TANK 3' 1 0.00
8   12.2
 769729         3339765
 769723.5       3339778
 769710.7       3339783
 769698.1       3339778
 769693         3339765
 769698.5       3339752
 769711.4       3339747
 769724         3339753
'D-TANK'  1      0.00
8      12.2
769474      3339843
769472      3339848
769467      3339850
769462      3339848
769460      3339843
769462      3339838
769467      3339836
769472      3339838
'CTs'  2      0.00
4    9.1
769406      3339851
769417      3339851
769417      3339779
769406      3339779
4    4.0
769406      3339851
769417      3339851
769417      3339837
769406      3339837
'cooltwr' 1  0.00
4        13.4
769532        3339822
769532        3339881
769545        3339881
769545        3339822
'MAIN'   4     0.00
4   6
769653              3339931
769783              3339931
769783              3339903
769653              3339903
4    18.6
769653              3339925
```

| | | |
|---|---|---|
| 769738 | | 3339925 |
| 769738 | | 3339909 |
| 769653 | | 3339909 |
| 4 | 17.7 | |
| 769653 | | 3339909 |
| 769688 | | 3339909 |
| 769688 | | 3339903 |
| 769653 | | 3339903 |
| 4 | 15.2 | |
| 769688 | | 3339909 |
| 769783 | | 3339909 |
| 769783 | | 3339903 |
| 769688 | | 3339903 |
| 'UNIT 7' | 2 | 0.00 |
| 8 | 29.6 | |
| 769657 | | 3339903 |
| 769660 | | 3339903 |
| 769660 | | 3339900 |
| 769668 | | 3339900 |
| 769668 | | 3339890 |
| 769660 | | 3339890 |
| 769660 | | 3339900 |
| 769657 | | 3339900 |
| 4 | 35.0 | |
| 769657 | | 3339903 |
| 769660 | | 3339903 |
| 769660 | | 3339900 |
| 769657 | | 3339900 |
| 'HSRG' | 1 | 0.00 |
| 4 | 24.0 | |
| 769603.5 | 3339769.5 | |
| 769603.5 | 3339796.5 | |
| 769618.5 | 3339796.5 | |
| 769618.5 | 3339769.5 | |
| 'UNIT8' | 3 | 0.00 |
| 8 | 7.2 | |
| 769607.1 | | 3339796.5 |
| 769607.1 | | 3339820.9 |
| 769604.2 | | 3339820.9 |
| 769604.2 | | 3339826.8 |
| 769617.8 | | 3339826.8 |
| 769617.8 | | 3339820.9 |
| 769614.9 | | 3339820.9 |
| 769614.9 | | 3339796.5 |
| 4 | 13.6 | |
| 769607.1 | | 3339813 |
| 769607.1 | | 3339820.9 |
| 769614.9 | | 3339820.9 |
| 769614.9 | | 3339813 |
| 4 | 18.7 | |
| 769604.2 | | 3339820.9 |
| 769604.2 | | 3339826.8 |
| 769617.8 | | 3339826.8 |
| 769617.8 | | 3339820.9 |
| 'CONDTANK' | 1 | 0.00 |
| 8 | 8.5 | |
| 769629.3 | 3339916 | |
| 769627.7 | 3339920 | |
| 769623.9 | 3339921 | |
| 769620.2 | 3339920 | |

```
 769618.7       3339916
 769620.3       3339912
 769624.1       3339911
 769627.8       3339912
 'DISTTANK'  1  0.00
8       5.3
 769629.3       3339901
 769627.7       3339905
 769623.9       3339906
 769620.2       3339905
 769618.7       3339901
 769620.3       3339897
 769624.1       3339896
 769627.8       3339897
 'EVAPORAT'   1    0.00
8  10.0
 769603.8       3339904
 769603.5       3339905
 769603         3339905
 769602.4       3339905
 769602.3       3339904
 769602.5       3339904
 769603         3339903
 769603.6       3339904
1
'COOLT'      0.0    13.4 769538.5    3339852
```

BPIP (Dated: 95086)

DATE : 12/19/96
TIME : 17: 7:10
COT UNIT 8 { Tank#1 AND units 1-6 removed prog.limits }(p8bpip16.inp)

============================
BPIP PROCESSING INFORMATION:
============================

The ST flag has been set for processing for an ISCST2 run.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 360.00 degrees with respect to True North.

COT UNIT 8 { Tank#1 AND units 1-6 removed prog.limits }(p8bpip16.inp)

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| COOLT | 13.40 | .00 | 60.00 | 65.00 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

BPIP (Dated: 95086)

DATE : 12/19/96
TIME : 17: 7:10

COT UNIT 8 { Tank#1 AND units 1-6 removed prog.limits }(p8bpip16.inp)

BPIP output is in meters

```
SO BUILDHGT COOLT      13.40    13.40    13.40    13.40    13.40    13.40
SO BUILDHGT COOLT      13.40    13.40    13.40    13.40    13.40    13.40
SO BUILDHGT COOLT      13.40    13.40    13.40    13.40    13.40    13.40
SO BUILDHGT COOLT      13.40    13.40    13.40    13.40    13.40    13.40
SO BUILDHGT COOLT      13.40    13.40    13.40    13.40    13.40    24.00
SO BUILDHGT COOLT      24.00    24.00    13.40    13.40    13.40    13.40
SO BUILDWID COOLT      23.05    32.40    40.76    47.88    53.55    57.60
SO BUILDWID COOLT      59.89    60.36    59.00    60.36    59.89    57.60
SO BUILDWID COOLT      53.55    47.88    40.76    32.40    23.05    13.00
SO BUILDWID COOLT      23.05    32.40    40.76    47.88    53.55    57.60
SO BUILDWID COOLT      59.89    60.36    59.00    60.36    59.89    30.88
SO BUILDWID COOLT      30.33    28.85    40.76    32.40    23.05    13.00
```

**Attachment PGS-07**

In developing the initial Title V application, the City of Tallahassee's consultant, Foster Wheeler Environmental Corporation, conducted a comprehensive emissions unit inventory of the Purdom Generating Station. The attached future inventory (File: PURREI.XLS) includes the initial Title V inventory with the addition of the proposed Unit 8 combustion turbine, cooling tower, auxiliary boiler, zero discharge facility, and the removal of units which will no longer be operated. The revised inventory includes the same fifteen emissions unit areas as the initial Title V inventory. These areas included the following:

1. Steam Generator (Boiler) Operations;
2. Gas Turbine Operations;
3. Emergency Generator;
4. Fuel Farm (Waste Water Storage);
5. Fuel Dispensing Operations;
6. Space Heating;
7. Evaporative Loss Sources;
8. Cooling Towers;
9. Water Treatment;
10. Laboratory;
11. Central Vacuum System;
12. Maintenance Activities;
13. Plant Operations;
14. Fugitive Particulate; and
15. Gasoline Engines.

The future inventory has attempted to identify every remaining and new emissions unit at the facility as a result of the project. The attached inventory provides descriptions of each emissions unit and lists its regulatory classification. The regulatory classifications encompass four categories. These categories include: 1) Regulated (with or without emissions limitations); 2) Unregulated; and 3) Proposed to be exempt under criteria listed in Rule 62-213.430(6), F.A.C.. All trivial emissions units and activities have been omitted from the inventory list per FDEP guidance dated March 15, 1996.

The PSD and revised Title V application includes all regulated emissions units, and the unregulated particulate matter and VOC sources. The regulated emissions units have specific emission limitations. The unregulated particulate matter dust and VOC sources are considered unregulated emissions units with no specific emission limited pollutants. The new cooling tower has been included under the unregulated particulate matter emissions unit.

The list of emissions units also includes those which met either the specific exemption criteria of Rule 62-210.300(3) or 62-213.430(6), F.A.C. The City of Tallahassee based its exemption request for these units on the regulations and requirements of the Title V Operating Permit Program.

The list of emissions units also contains several unpermitted emissions units which have been in operation since the facility started-up. These activities were operating under the temporary exemption of Rule 62-210.300(3)(b), F.A.C. The City of Tallahassee had requested that all of the existing unpermitted activities at the Purdom Generating Station be exempted from the permit requirements of Rule 62-210.300, F.A.C. under the authority provided to the FDEP in Rule 62-4.040(1)(b), F.A.C. The emissions units included the following:

- Fugitive Dust - Exemption was requested for the heavy construction activities listed under this category. Emissions from these activities are of the Fugitive Area type generated by the operation of heavy equipment on site. This activity has also been included in the revised Title V application within Emissions Unit No. 1 (EU01). The request was based on the fugitive nature of the emissions and the low quantities associated with these activities.

- Evaporative Loss Sources - Exemption for the small parts washers was requested based on their limited use, size and potential emissions. The units are typically vendor supplied (e,g., Safety-Kleen) on an as needed basis and considered unregulated. These units have been included in the revised Title V application within Emissions Unit No. 2 (EU02). Exemption was also requested for the surface coating operations at the facility based on the fugitive nature of the emissions and low quantities of surface coating material used. Surface coating activities have been included in the Title V application within EU02.

The initial list and the above comments were part of the initial Title V application and were intended to meet the requirements of Rule 62-213.420(3)(m), F.A.C. The list and attachment served as the official request for the exemption of all the units listed as unregulated from the requirements of Rule 62-210.300, F.A.C. For purposes of the proposal project, the City is requesting the Department to exempt additional units from the construction and Title V permit requirements. These units are noted in the attached list.

**CITY OF TALLAHASSEE ELECTRIC DEPARTMENT**
**FUTURE EMISSIONS UNIT INVENTORY**
**SOURCE - PURDOM GENERATING STATION**

| Unit No. | Emissions Unit | Emissions Unit Description | Regulatory [1,2] Classification | Emission Unit Status |
|---|---|---|---|---|
| 1 | CT #1 | Combustion Turbine - 228 mmBtu/hr | Regulated - Permit # AO37-242825 | Existing |
| 1a | Oil Vapor Extractor | Oil Vapor Extractor | Exempted Under Rule 62-213.430(6) | Existing |
| 1b | Fuel Oil Piping | Fuel Oil Piping | Exempted Under Rule 62-213.430(6) | Existing |
| 1c | Lube Oil Tank | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 2 | CT #2 | Combustion Turbine - 228 mmBtu/hr | Regulated - Permit # AO37-242825 | Existing |
| 2a | Oil Vapor Extractor | Oil Vapor Extractor | Exempted Under Rule 62-213.430(6) | Existing |
| 2b | Fuel Oil Piping | Fuel Oil Piping | Exempted Under Rule 62-213.430(6) | Existing |
| 2c | Lube Oil Tank | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 5 | Steam Generator No. 7 | Steam Generator - 621 mmBtu/hr | Regulated - Permit # AO37-242831 | Existing |
| 5a | Fuel Oil Piping | Fuel Oil Piping | Exempted Under Rule 62-213.430(6) | Existing |
| 5b | Hydrogen Gas Vents | Hydrogen Gas Vents | Exempted Under Rule 62-213.430(6) | Existing |
| 5c | Deareator Tank Vents | Deareator Tank Vents | Exempted Under Rule 62-213.430(6) | Existing |
| 5d | Oil Vapor Extractors | Oil Vapor Extractors | Exempted Under Rule 62-213.430(6) | Existing |
| 5e | Lube Oil Tank ( storage) | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 5f | Lube/Fuel Oil Drip Pans | Lube/Fuel Oil Drip Pans | Exempted Under Rule 62-213.430(6) | Existing |
| 5g | Noncondensable Gas | Noncondensable Gas Extractor | Exempted Under Rule 62-213.430(6) | Existing |
| 6 | Emergency Generator | Diesel Engine <400 hrs/yr | Exempt per Rule 62-210.300(3)(a)21 | Existing |
| 6a | Diesel Driven Fire Pump | Diesel Engine <400 hrs/yr | Exempt per Rule 62-210.300(3)(a)21 | New |
| 7 | Fuel Farm | Fuel Oil Tank No. 1 | Exempted Under Rule 62-213.430(6) | Existing |
| 7a | Fuel Farm | Fuel Oil Tank No.3 | Exempted Under Rule 62-213.430(6) | Existing |
| 7b | Fuel Farm | Waste Water Tank | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 7d | Fuel Farm | Waste Oil Tank | Exempted Under Rule 62-213.430(6) | Existing |
| 8 | No. 2 Fuel Oil Tank | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 8a | Diesel Tank (300 gallons) | Organic Liquid Storage | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 8b | Truck Loading/Unloading | Fuel Dispensing Operation | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 9 | Gasoline Tank | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 9a | Fuel Dispensing Operation | Fuel Dispensing Operation | Exempted Under Rule 62-213.430(6) | Existing |
| 10 | Diesel Tank | Organic Liquid Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 10a | Fuel Dispensing Operation | Fuel Dispensing Operation | Exempted Under Rule 62-213.430(6) | Existing |
| 11 | Barge Unloading Station | Fuel Dispensing Operation | Exempted Under Rule 62-213.430(6) | Existing |
| 12 | Fuel Dispensing Operation | Truck Loading/Unloading Rack 1 | Exempted Under Rule 62-213.430(6) | Existing |
| 12a | Fuel Dispensing Operation | Truck Loading/Unloading Rack 2 | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 13 | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13a | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13b | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |

**CITY OF TALLAHASSEE ELECTRIC DEPARTMENT**
**FUTURE EMISSIONS UNIT INVENTORY**
**SOURCE - PURDOM GENERATING STATION**

| Unit No. | Emissions Unit | Emissions Unit Description | Regulatory (1) (2) Classification | Emission Unit Status |
|---|---|---|---|---|
| 13c | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13d | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13e | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13f | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13g | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13h | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13i | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13j | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13k | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13l | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13m | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 13n | Solvent Cleaning | Parts Washer - Nonhalogenated | Exempted Under Rule 62-213.430(6) | Existing |
| 14 | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14a | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14b | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14c | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14d | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14e | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 14f | Space Heater | Space Heater | Exempt Rule 62-210.300(3)(a)12 | Existing |
| 15 | Fugitive Dust | Paved Roads | Exempted Under Rule 62-213.430(6) | Existing |
| 15a | Fugitive Dust | Unpaved Roads | Exempted Under Rule 62-213.430(6) | Existing |
| 15b | Fugitive Dust | Heavy Construction Activities | Unregulated | Existing |
| 15c | Fugitive Dust | Heavy Construction Activities (Unit 8) | Unregulated | Temporary (New) |
| 15d | Fugitive Dust | Aggregate Handling & Storage | Exempted Under Rule 62-213.430(6) | Existing |
| 17 | Laboratory | Laboratory Equipment | Exempt Rule 62-210.300(3)(a)15 | Existing |
| 17a | Laboratory | Chemical Usage | Exempted Under Rule 62-213.430(6) | Existing |
| 17b | Laboratory | Vacuum Pumps | Exempt Rule 62-210.300(3)(a)9 | Existing |
| 17c | Laboratory | Laboratory Fume Hoods | Exempted Under Rule 62-213.430(6) | Existing |
| 18 | Central Vacuum System | Central Vacuum System | Exempted Under Rule 62-213.430(6) | Existing |
| 19 | Maintenance Activities | Welding | Exempt Rule 62-210.300(3)(a)16 | Existing |
| 20 | Plant Operations | Lube Oil Storage Tanks | Exempted Under Rule 62-213.430(6) | Existing |
| 20a | Plant Operations | Surface Coating Operations | Unregulated | Existing |
| 20b | Plant Operations | Surface Coating Operations (Unit 8) | Unregulated | Temporary (New) |
| 20a | Plant Operations | Propane Storage Tanks | Exempted Under Rule 62-213.430(6) | Existing |
| 21 | Auxiliary Boiler | Steam Generator - 16.74 mmBtu/hr | Regulated - Permit # 1290001-002-AC | Existing |
| 21a | Hydrogen Gas Vents | Hydrogen Gas Vents | Exempted Under Rule 62-213.430(6) | Existing |
| 21b | Deareator Tank Vents | Deareator Tank Vents | Exempted Under Rule 62-213.430(6) | Existing |

CITY OF TALLAHASSEE ELECTRIC DEPARTMENT
FUTURE EMISSIONS UNIT INVENTORY
SOURCE - PURDOM GENERATING STATION

| Unit No. | Emissions Unit | Emissions Unit Description | Regulatory [1] [2] Classification | Emission Unit Status |
|---|---|---|---|---|
| 21c | Noncondensable Gas | Noncondensable Gas Extractor | Exempted Under Rule 62-213.430(6) | Existing |
| 22 | Unit 8 | Combustion Turbine | Regulated | New |
| 22a | Unit 8 | Oil Vapor Extractor | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22b | Unit 8 | Fuel Oil Piping | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22c | Unit 8 | Organic Liquid Storage | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22d | Unit 8 | Heat Recovery Steam Generator | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22e | Unit 8 | Fuel Oil Piping | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22f | Unit 8 | Hydrogen Gas Vents | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22g | Unit 8 | Deareator Tank Vents | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22h | Unit 8 | Oil Vapor Extractors | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22i | Unit 8 | Organic Liquid Storage | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22j | Unit 8 | Lube/Fuel Oil Drip Pans | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 22k | Unit 8 | Noncondensable Gas Extractor | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 23 | Water Treatment | Zero Discharge Facility | Unregulated - Propose exemption under Rules 62-4.040 & 62-213.430(6) | New |
| 23a | Water Treatment | Cooling Tower | Unregulated | New |

[1]Note: The designation "proposed exemption under critieria in Rule 62-213.430(6)" indicates that an exemption is requested for this unit pursuant to Rule 62-213.420(3)(m), F.A.C., in accordance with the provisions of Rule 62-213.430(6), F.A.C.

[2]Note: All trivial emissions units and activities are omitted per FDEP 3/15/96 guidance memo. In addition, all mobil sources are omitted as outside the scope of Title V stationary source permitting.

**Attachment PGS-08**

This application package constitutes a supplemental Title V application to address the operation of the facility under the facility-wide emission caps upon completion of the compliance testing of Unit 8. These facility-wide emission caps will be federally enforceable through the PSD permit and Site Certification which will authorize construction of Unit 8. Until Unit 8 compliance testing has been completed, the City will continue to operate the facility as described in the initial Title V application.

**Attachment PGS-09**

The application seeks facility-wide emission caps for oxides of nitrogen ($NO_x$) and sulfur dioxide ($SO_2$) of 467 and 80 tons per year, respectively. Compliance with the emission caps will be ensured through an effective compliance strategy as addressed in PGS-10.

The facility-wide emission caps are associated with the Prevention of Significant Deterioration (PSD) application. The emission caps reflect "actual" annual emissions for the most recent two year period. The emission caps reflect an intent to hold emissions of these two pollutants at their current actual levels. By holding emissions at the current annual levels PSD review for these two pollutants has been avoided. Therefore, a federally enforceable permit condition which caps emissions of $NO_x$ and $SO_2$ at these levels is requested.

**Attachment PGS-10**

The initial Title V Operating Permit application included a Compliance Report and Plan which noted that the facility was in compliance with the applicable regulations listed in each of the emissions unit sections. This remains true for the current operations; however, for the proposed project several new regulations and requirements will be triggered. Since the project is in the preconstruction phase, a certification of compliance with these future applicable regulations and additional requirements cannot be made at this time.

Once initial compliance testing has been completed, compliance with the annual emission caps on sulfur dioxide ($SO_2$)and oxides of nitrogen ($NO_x$) will be ensured through a program which accurately monitors and tracks fuel usage, fuel quality, and emissions. For compliance purposes, the proposed program consists of the following:

Combustion Turbine Nos. 1 & 2: Based on the power generation logs, fuel quality data, and the AP-42 emission factors, emission estimates will be developed for $SO_2$ and $NO_x$. These emission estimates will be based on a pound per megawatt factor developed for each unit. Fuel quality data will be supplied by the fuel vendors and as with Unit 8 an assumed 95 percent conversion of sulfur to $SO_2$ will be made.

Unit 7 Steam Generator: Continue monitoring and tracking $SO_2$ and $NO_x$ emissions in accordance with the Acid Rain Program. This includes 40 CFR Part 75, Appendix D for $SO_2$, and a continuous emission monitoring system (CEMS) for $NO_x$. Fuel quality data for natural gas will be supplied by the fuel vendors.

Auxiliary Boiler: Monitor and track $SO_2$ and $NO_x$ emissions based on fuel usage, AP-42 emission factors, and fuel vendor data for $SO_2$.

Unit 8 Combined Cycle: Monitor and track $SO_2$ and $NO_x$ emissions in accordance with the Acid Rain Program. This includes 40 CFR Part 75, Appendix D (although, consistent with the GE data sheets, assume 95 percent conversion of sulfur to $SO_2$) for $SO_2$, and a CEMS for $NO_x$. Fuel quality data for natural gas will be supplied by the fuel vendors.

For purposes of tracking compliance with the facility-wide emission caps monitoring and emissions data will be recorded and kept for a period of 5 years. The semiannual period corresponds to the requested custom fuel monitoring program approval.

## REQUEST FOR CUSTOM FUEL SAMPLING SCHEDULE

The Federal New Source Performance Standards (NSPS) for stationary combustion turbines establish emission limitations on oxides of nitrogen ($NO_x$) and sulfur dioxide ($SO_2$). For $NO_x$, the emission limitations provide an allowance for fuel bound nitrogen (FBN). For $SO_2$, emissions are limited to either a stack gas concentration or by the firing of fuels with a maximum fuel sulfur content of 0.8 percent by weight. For Unit 8, the combustion turbine will be fired with either clean pipeline quality natural gas or Number 2 (0.05 % sulfur) diesel fuel oil. The maximum sulfur content of the natural gas is set at 10 grains per 100 cubic feet of natural gas (0.033 % by weight) by the pipeline tariff. The maximum sulfur content of the Number 2 diesel fuel oil proposed for the project is set at 0.05 percent by weight.

Under 40 CFR 60.334(b), the owner or operator is required to monitor both the sulfur content and the nitrogen content of the fuels fired. The monitoring requirements include daily samples when the fuel is supplied without intermediate bulk storage. At the Purdom Generating Station, Number 2 diesel fuel oil will be supplied by a vendor and stored on site prior to use. Natural gas will be supplied by pipeline without any bulk storage capabilities. Since there are no bulk storage capabilities at Purdom Generating Station for natural gas, daily samples must be collected and analyzed for sulfur and nitrogen contents. 40 CFR 60.334(b)(2), which requires the daily sampling allows for the development of custom schedules for reducing the sampling frequency. In a 1987 memorandum, the U.S. Environmental Protection Agency (EPA) issued guidance on the approval of custom schedules. Based on this guidance, it is requested that the Florida Department of Environmental Protection seek EPA approval of the following proposed custom fuel sampling schedule for the Purdom Generating Station Unit 8.

The request for approval and the associated semiannual sampling schedule is based on the data available from the Florida Gas Transmission (FGT) company. The proposed program includes the following:

<u>No. 2 Fuel Oil</u>
For all bulk shipments of Number. 2 (0.05% sulfur) diesel fuel oil received at the Purdom Generating Station an analysis which reports the sulfur content and FBN content of the fuel shall be provided by the fuel vendor. The analysis shall also specify the methods by which the analyses were conducted and shall comply with the requirements of 40 CFR 60.335(d).

<u>Natural Gas</u>

1. Monitoring of natural gas nitrogen content shall not be required in accordance with page 2 of the EPA guidance memorandum, attached.

2. Sulfur Monitoring

   a. Analysis for the sulfur content of the natural gas shall be conducted using one of the EPA-approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternative method.

   b. Two years' worth of recent sulfur monitoring data is attached. These data indicate an average sulfur content of 0.32 grains per 100 cubic feet of natural gas. (The data presented were used to established the current actual emission levels for $SO_2$ and are based upon representative samples of natural gas used by the Purdom Generating Station taken by the Florida Gas Transmission Company in 1995 and 1996.) These data show little variability (Standard Deviation of 0.08 gr/100 CF) in the sulfur content and indicate consistent compliance with 40 CFR 60.333. Once the unit becomes operational, monitoring of the sulfur content of the natural gas shall be conducted semiannually.

c. Should any sulfur analysis indicate noncompliance with 40 CFR 60.333, the City will notify the Department of Environmental Protection of such excess emissions and the customized fuel monitoring schedule shall be reexamined. The sulfur content of the natural gas will be monitored weekly during the interim period while the monitoring schedule is reexamined

3. The City will notify the Department of Environmental Protection of any change in natural gas supply for reexamination of this monitoring schedule. A substantial change in natural gas quality (i.e., sulfur content variation of greater than 1 grain per 100 cubic foot of natural gas) shall be considered as a change in the natural gas supply. Sulfur content of the natural gas will be monitored weekly by the natural gas supplier during the interim period when this monitoring schedule is being reexamined

4. Records of sampling analysis and natural gas supply pertinent to this monitoring schedule shall be retained by the City for a period of three years, and shall be made available for inspection by the appropriate regulatory personnel.

5. The City will obtain the sulfur content of the natural gas from the fuel supplier (Florida Gas Transmission Company).

ATTACHMENT A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 14 1987

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Authority for Approval of Custom Fuel Monitoring Schedules Under NSPS Subpart GG

FROM: John B. Rasnic, Chief
Compliance Monitoring Branch

TO: Air Compliance Branch Chiefs
Regions II, III, IV, V, VI and IX

Air Programs Branch Chiefs
Regions I-X

The NSPS for Stationary Gas Turbines (Subpart GG) at 40 CFR 60.334(b)(2) allows for the development of custom fuel monitoring schedules as an alternative to daily monitoring of the sulfur and nitrogen content of fuel fired in the turbines. Regional offices have been forwarding custom fuel monitoring schedules to the Stationary Source Compliance Division (SSCD) for consideration since it was understood that authority for approval of these schedules was not delegated to the Regions. However, in consultation with the Emission Standards and Engineering Division, it has been determined that the Regional Offices do have the authority to approve Subpart GG custom fuel monitoring schedules. Therefore it is no longer necessary to forward these requests to Headquarters for approval.

Over the past few years, SSCD has issued over twenty custom schedules for sources using pipeline quality natural gas. In order to maintain national consistency, we recommend that any schedules Regional Offices issue for natural gas be no less stringent than the following: sulfur monitoring should be bimonthly, followed by quarterly, then semiannual, given at least six months of data demonstrating little variability in sulfur content and compliance with §60.333 at each monitoring frequency; nitrogen monitoring can be waived for pipeline quality natural gas, since there is no fuel-bound nitrogen and since the free nitrogen does not contribute appreciably to $NO_x$ emissions. Please see the attached sample custom schedule for details. Given the increasing trend in the use of pipeline quality natural gas, we are investigating the possibility of amending Subpart GG to allow for less frequent sulfur monitoring and a waiver of nitrogen monitoring requirements where natural gas is used.

Where sources using oil request custom fuel monitoring schedules, Regional Offices are encouraged to contact SSCD for consultation on the appropriate fuel monitoring schedule. However, Regions are not required to send the request itself to SSCD for approval.

If you have any questions, please contact Sally M. Farrell at FTS 382-2875.

Attachment

cc: John Cronshaw
George Walsh
Robert Ajax
Earl Salo

 Enclosure

Conditions for Custom Fuel Sampling Schedule for Stationary Gas Turbines

1. Monitoring of fuel nitrogen content shall not be required while natural gas is the only fuel fired in the gas turbine.

2. Sulfur Monitoring

   a. Analysis for fuel sulfur content of the natural gas shall be conducted using one of the approved ASTM reference methods for the measurement of sulfur in gaseous fuels, or an approved alternative method. The reference methods are: ASTM D1072-80; ASTM D3031-81; ASTM D3246-81; and ASTM D4084-82 as referenced in 40 CFR 60.335(b)(2).

   b. Effective the date of this custom schedule, sulfur monitoring shall be conducted twice monthly for six months. If this monitoring shows little variability in the fuel sulfur content, and indicates consistent compliance with 40 CFR 60.333, then sulfur monitoring shall be conducted once per quarter for six quarters.

   c. If after the monitoring required in item 2(b) above, or herein, the sulfur content of the fuel shows little variability and, calculated as sulfur dioxide, represents consistent compliance with the sulfur dioxide emission limits specified under 40 CFR 60.333, sample anaylsis shall be conducted twice per annum. This monitoring shall be conducted during the first and third quarters of each calendar year.

   d. Should any sulfur analysis as required in items 2(b) or 2(c) above indicate noncompliance with 40 CFR 60.333, the owner or operator shall notify the State Air Control Board ) of such excess emissions and the custom schedule shall be re-examined by the Environmental Protection Agency. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.

3. If there is a change in fuel supply, the owner or operator must notify the State of such change for re-examination of this custom schedule. A substantial change in fuel quality shall be considered as a change in fuel supply. Sulfur monitoring shall be conducted weekly during the interim period when this custom schedule is being re-examined.

4. Records of sample analysis and fuel supply pertinent to this custom schedule shall be retained for a period of three years, and be available for inspection by personnel of federal, state, and local air pollution control agencies.

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## EXCEL 5.0 CALCULATION SHEET

**By:** D. Graziani, P.E  **Date:** 02/27/97  **OFS No.:** 1584.0007
**Ckd. By:** C. Moore  **Date:** 02/27/97  **File:** FGTDATA.XLS
**Rvd. By:**  **Date:**  **Sheet:** Data Reduction

**Client:** City of Tallahassee
**Project:** Purdom Unit 8

| | Sulur Content | | | Sulur Content | |
|---|---|---|---|---|---|
| Reading | (gr/100 SCF) | (Xi-Xm)^2 | Reading | (gr/100 SCF) | (Xi-Xm)^2 |
| 1/11/95 | 0.33 | 0.00013770 | 6/4/96 | 0.23 | 0.00840957 |
| 1/17/95 | 0.25 | 0.00466014 | 6/5/96 | 0.18 | 0.01911728 |
| 2/7/95 | 0.27 | 0.00232953 | 6/14/96 | 0.30 | 0.00033362 |
| 2/15/95 | 0.24 | 0.00612545 | 6/18/96 | 0.34 | 0.00046557 |
| 2/20/95 | 0.24 | 0.00612545 | 6/20/96 | 0.31 | 0.00006831 |
| 1/2/96 | 0.35 | 0.00077676 | 6/28/96 | 0.36 | 0.00174179 |
| 1/9/96 | 0.41 | 0.00824540 | 6/28/96 | 0.38 | 0.00352091 |
| 1/16/96 | 0.43 | 0.01203065 | 7/2/96 | 0.42 | 0.00942793 |
| 1/30/96 | 0.39 | 0.00517307 | 7/5/96 | 0.34 | 0.00047240 |
| 1/31/96 | 0.22 | 0.00965606 | 7/12/96 | 0.27 | 0.00232953 |
| 2/6/96 | 0.38 | 0.00352091 | 7/16/96 | 0.22 | 0.00960343 |
| 2/13/96 | 0.47 | 0.02173990 | 7/18/96 | 0.25 | 0.00466014 |
| 2/20/96 | 0.49 | 0.03045237 | 7/22/96 | 0.22 | 0.00960343 |
| 2/28/96 | 0.24 | 0.00612545 | 7/25/96 | 0.26 | 0.00339484 |
| 3/5/96 | 0.38 | 0.00352091 | 7/30/96 | 0.16 | 0.02589874 |
| 3/7/96 | 0.26 | 0.00339484 | 8/1/96 | 0.26 | 0.00339484 |
| 3/12/96 | 0.55 | 0.05255944 | 8/6/96 | 0.20 | 0.01366029 |
| 3/13/96 | 0.31 | 0.00006831 | 8/8/96 | 0.28 | 0.00146423 |
| 3/19/96 | 0.39 | 0.00490505 | 8/13/96 | 0.27 | 0.00227053 |
| 3/20/96 | 0.39 | 0.00514587 | 8/15/96 | 0.30 | 0.00033362 |
| 3/26/96 | 0.46 | 0.01992366 | 8/20/96 | 0.44 | 0.01495021 |
| 3/28/96 | 0.39 | 0.00514587 | 8/22/96 | 0.31 | 0.00006831 |
| 4/2/96 | 0.46 | 0.01992366 | 8/29/96 | 0.31 | 0.00006831 |
| 4/4/96 | 0.31 | 0.00006831 | 9/5/96 | 0.34 | 0.00047240 |
| 4/9/96 | 0.48 | 0.02561002 | 9/12/96 | 0.32 | 0.00000301 |
| 4/11/96 | 0.22 | 0.00965606 | 9/19/96 | 0.31 | 0.00006831 |
| 4/16/96 | 0.42 | 0.01068968 | 9/25/96 | 0.32 | 0.00000301 |
| 4/18/96 | 0.33 | 0.00013770 | 10/2/96 | 0.34 | 0.00047240 |
| 4/23/96 | 0.40 | 0.00611797 | 10/10/96 | 0.30 | 0.00033362 |
| 4/25/96 | 0.35 | 0.00100709 | 10/17/96 | 0.28 | 0.00171038 |
| 4/30/96 | 0.40 | 0.00611797 | 10/24/96 | 0.29 | 0.00082771 |
| 5/2/96 | 0.25 | 0.00466014 | 10/31/96 | 0.25 | 0.00442627 |
| 5/7/96 | 0.22 | 0.00960343 | 11/7/96 | 0.29 | 0.00082771 |
| 5/9/96 | 0.29 | 0.00079892 | 11/15/96 | 0.30 | 0.00050520 |
| 5/14/96 | 0.21 | 0.01222879 | 11/22/96 | 0.31 | 0.00009781 |
| 5/15/96 | 0.30 | 0.00033362 | 11/28/96 | 0.32 | 0.00000727 |
| 5/20/96 | 0.19 | 0.01676092 | 12/4/96 | 0.42 | 0.00942793 |
| 5/23/96 | 0.29 | 0.00079892 | 12/12/96 | 0.40 | 0.00611797 |
| 5/29/96 | 0.21 | 0.01222879 | 12/19/96 | 0.32 | 0.00000065 |
| 5/30/96 | 0.27 | 0.00232953 | 12/28/96 | 0.36 | 0.00163678 |

| | |
|---|---|
| Number of Readings | 80 |
| Maximum | 0.55 |
| Minimum | 0.16 |
| Mean (Xm) | 0.32 |
| Sum (Xi-Xm)^2 | 0.51 |
| Standard Deviation | 0.08 |

**Attachment PGS-11**

## COMPLIANCE CERTIFICATION

In accordance with the instructions for the Florida Department of Environmental Protection's Form No. 62-210.900(1), F.A.C., and Rule 62-213.420(3)(j), F.A.C., a compliance statement must be included in each application for an air pollution permit (i.e., Construction, Modification, State Operating or Title V Operating Permit). This Compliance Certification is intended to meet the requirements of the instructions and the regulation.

## CERTIFICATION STATEMENT

"I, the undersigned, am the responsible official as defined in Chapter 62-210.200, F.A.C., of the PSD and Title V Source for which this report is being submitted. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made and data contained in this report are true, accurate and complete.

Signed

3/4/97
Date

## EMISSION UNIT - 01

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
### (Regulated and Unregulated Emissions Units)

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ X ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

### Emissions Unit Description and Status

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

   **Unregulated PM Units and Activities**

2. Emissions Unit Identification Number: [ X ] No Corresponding ID [ ] Unknown

| | | |
|---|---|---|
| 3. Emissions Unit Status Code: **A/C** | 4. Acid Rain Unit? [ ] Yes [ X ] No | 5. Emissions Unit Major Group SIC Code: **49** |

6. Emissions Unit Comment (limit to 500 characters):

   **This emissions unit includes the unregulated particulate matter units (Normal Heavy Construction Activities, Unit 8 Cooling Tower, and Heavy Construction Activities associated with Unit 8) and activities which emit or have a potential to emit more than five tons per year. The emissions unit does not include trivial or exempt units or activities.**

### Emissions Unit Control Equipment

**A.**

1. Description (limit to 200 characters):

   **New Cooling Tower - Drift Eliminators**

2. Control Device or Method Code: **015** **Drift Eliminator**

**B.**

| 1. Description (limit to 200 characters): |
|---|
| 2. Control Device or Method Code: |

**C.**

| 1. Description (limit to 200 characters): |
|---|
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | | |
|---|---|---|
| 1. Initial Startup Date: | | |
| 2. Long-term Reserve Shutdown Date: | | |
| 3. Package Unit:<br>Manufacturer: | Model Number: | |
| 4. Generator Nameplate Rating: | MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: | | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters): | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | hours/year |

## D. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

Rule Applicability Analysis (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
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## E. EMISSION POINT (STACK/VENT) INFORMATION
(Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: | |
| 2. Emission Point Type Code:<br>[ ] 1 [ ] 2 [ ] 3 [ ] 4 | |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [ ] V [ ] W | |
| 6. Stack Height: | feet |
| 7. Exit Diameter: | feet |
| 8. Exit Temperature: | °F |

| | |
|---|---|
| 9. Actual Volumetric Flow Rate: | acfm |
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone: East (km): North (km): | |
| 14. Emission Point Comment (limit to 200 characters): | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment: 1 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Heavy Construction Activities** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **Acre-Year** | |
| 4. Maximum Hourly Rate: **0** | 5. Maximum Annual Rate: **0** |
| 6. Estimated Annual Activity Factor: **5** | |
| 7. Maximum Percent Sulfur: | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Heavy construction includes such activities as ground excavation and building construction and demolition. Annual construction activities may either fall short of or exceed the esimated annual activity factor above. However, this estimated annual activity factor is reflective of ordinary construction activity at the Purdom Plant.** | |

**Segment Description and Rate:** Segment: **2** of **3**

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Cooling Tower (Fresh Water)** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **thousand of gallons** | |
| 4. Maximum Hourly Rate: **3,300** | 5. Maximum Annual Rate: **28,908,000** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: | |
| 10. Segment Comment (limit to 200 characters): **Emissions from the cooling tower are associated with drift loses. Drift loss emission include particulate matter and are a direct result of the dissolved solids contained within the the cooling tower water. Drift eliminators have been proposed as Best Avaiable Control Technolgy (BACT) for the cooling tower .** | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment: 3 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Heavy Construction Activities - Unit 8** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **Acre-Year** | |
| 4. Maximum Hourly Rate: **0** | 5. Maximum Annual Rate: **0** |
| 6. Estimated Annual Activity Factor: **16** | |
| 7. Maximum Percent Sulfur: | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Heavy construction includes such activities as ground excavation and building construction and demolition. Annual construction activities may either fall short of or exceed the esimated annual activity factor above. However, this estimated annual activity factor is reflective of anticipated construction activity on Unit 8 at the Purdom Plant. These emissions are considered temporary.** | |

## G. EMISSIONS UNIT POLLUTANTS
## (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| PM | 015 | | NS |
| PM | 061 | | NS |
| | | | |
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## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units Only - Emissions Limited Pollutants Only)

**Pollutant Detail Information:**

| |
|---|
| 1. Pollutant Emitted: |
| 2. Total Percent Efficiency of Control: % |
| 3. Potential Emissions: lb/hour tons/year |
| 4. Synthetically Limited?<br>[ ] Yes [ ] No |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year |
| 6. Emission Factor:<br>Reference: |
| 7. Emissions Method Code:<br>[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 |
| 8. Calculation of Emissions (limit to 600 characters): |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): |

**Allowable Emissions** (Pollutant identified on front of page)

**A.**

| | | |
|---|---|---|
| 1. Basis for Allowable Emissions Code: | | |
| 2. Future Effective Date of Allowable Emissions: | | |
| 3. Requested Allowable Emissions and Units: | | |
| 4. Equivalent Allowable Emissions: | lb/hour | tons/year |
| 5. Method of Compliance (limit to 60 characters): | | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): | | |

**B.**

| | | |
|---|---|---|
| 1. Basis for Allowable Emissions Code: | | |
| 2. Future Effective Date of Allowable Emissions: | | |
| 3. Requested Allowable Emissions and Units: | | |
| 4. Equivalent Allowable Emissions: | lb/hr | tons/year |
| 5. Method of Compliance (limit to 60 characters): | | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): | | |

## I. VISIBLE EMISSIONS INFORMATION
## (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| | | | |
|---|---|---|---|
| 1. Visible Emissions Subtype: | | | |
| 2. Basis for Allowable Opacity: | [ ] Rule | [ ] Other | |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % | Exceptional Conditions: % | | |
| Maximum Period of Excess Opacity Allowed: | | min/hour | |
| 4. Method of Compliance: | | | |
| 5. Visible Emissions Comment (limit to 200 characters): | | | |

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| | | | |
|---|---|---|---|
| 1. Visible Emissions Subtype: | | | |
| 2. Basis for Allowable Opacity: | [ ] Rule | [ ] Other | |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % | Exceptional Conditions: % | | |
| Maximum Period of Excess Opacity Allowed: | | min/hour | |
| 4. Method of Compliance: | | | |
| 5. Visible Emissions Comment (limit to 200 characters): | | | |

## J. CONTINUOUS MONITOR INFORMATION
**(Regulated Emissions Units Only)**

__Continuous Monitoring System:__ Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

__Continuous Monitoring System:__ Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
### (Regulated and Unregulated Emissions Units)

**PSD Increment Consumption Determination**

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ X ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?
   If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [X] C | [ ] E | [ ] Unknown |
| SO2 | [ ] C | [ ] E | [ ] Unknown |
| NO2 | [ ] C | [ ] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | lb/hour | tons/year |
| SO2 | | lb/hour | tons/year |
| NO2 | | | tons/year |

5. PSD Comment (limit to 200 characters):

**The cooling tower which is part of the proposed project consumes increment. Baseline, unregulated PM emissions have not been quantified.**

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
**(Regulated Emissions Units Only)**

**Supplemental Requirements for All Applications**

| | |
|---|---|
| 1. Process Flow Diagram<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested | |
| 2. Fuel Analysis or Specification<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested | |
| 3. Detailed Description of Control Equipment<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested | |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested | |
| 5. Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ ] Previously submitted, Date:______________<br>[ ] Not Applicable | |
| 6. Procedures for Startup and Shutdown<br>[ ] Attached, Document ID:________ [ ] Not Applicable | |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ ] Not Applicable | |
| 8. Supplemental Information for Construction Permit Application<br>[ ] Attached, Document ID:________ [ ] Not Applicable | |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:________ [ ] Not Applicable | |

**Additional Supplemental Requirements for Category I Applications Only**

| | |
|---|---|
| 10. Alternative Methods of Operation<br>[ ] Attached, Document ID:_______ [ ] Not Applicable | |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:_______ [ ] Not Applicable | |
| 12. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID:_______ [ ] Not Applicable | |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID:_______ [ ] Not Applicable | |
| 14. Acid Rain Application (Hard-copy Required)<br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:_______<br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:_______<br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:_______<br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:_______<br>[ ] Not Applicable | |

## EMISSION UNIT - 02

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
**(Regulated and Unregulated Emissions Units)**

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ X ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

**Emissions Unit Description and Status**

1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

   **Unregulated VOC Sources**

2. Emissions Unit Identification Number: [ X ] No Corresponding ID [ ] Unknown

| | | |
|---|---|---|
| 3. Emissions Unit Status Code: **A** | 4. Acid Rain Unit? [ ] Yes [ X ] No | 5. Emissions Unit Major Group SIC Code: **49** |

6. Emissions Unit Comment (limit to 500 characters):

   **This emissions unit includes the unregulated volatile organic compound units and activities (Surface Coating Activities) which emit or have the potential to emit five or more tons per year. This emission unit does not include trivial or exempt activities.**

**Emissions Unit Control Equipment**

**A.**

1. Description (limit to 200 characters):

   **None**

2. Control Device or Method Code: **0**

**B.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

**Emissions Unit Details**

| | | |
|---|---|---|
| 1. Initial Startup Date: | | |
| 2. Long-term Reserve Shutdown Date: | | |
| 3. Package Unit:<br>Manufacturer: | Model Number: | |
| 4. Generator Nameplate Rating: | MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | | <br>°F<br>seconds<br>°F |

**Emissions Unit Operating Capacity**

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: | | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters): | | |

**Emissions Unit Operating Schedule**

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | hours/year |

## D. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

**Rule Applicability Analysis** (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

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## E. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: | |
| 2. Emission Point Type Code:<br>[ ] 1 [ ] 2 [ ] 3 [ ] 4 | |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [ ] V [ ] W | |
| 6. Stack Height: | feet |
| 7. Exit Diameter: | feet |
| 8. Exit Temperature: | °F |

| | |
|---|---|
| 9. Actual Volumetric Flow Rate: | acfm |
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone: East (km): North (km): | |
| 14. Emission Point Comment (limit to 200 characters): | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
### (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment: 1 of 2

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Surface Coating - Normal Operations** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **0** | 5. Maximum Annual Rate: **0** |
| 6. Estimated Annual Activity Factor: **5065** | |
| 7. Maximum Percent Sulfur: | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Annual Activity Factor is based on maximum surface area coated.** | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
**(Regulated and Unregulated Emissions Units)**

**Segment Description and Rate:** Segment: 2 of 2

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Surface Coating - Unit 8** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **0** | 5. Maximum Annual Rate: **0** |
| 6. Estimated Annual Activity Factor: **2500** | |
| 7. Maximum Percent Sulfur: | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Activity Factor is based on estimated initial coating usage for Unit 8. After construction and the initial painting of Unit 8, emissions will return to levels associated with normal operations.** | |

## G. EMISSIONS UNIT POLLUTANTS
### (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| VOC | | | NS |
| HAPS | | | NS |
| H120 | | | NS |
| H169 | | | NS |
| H186 | | | NS |
| H123 | | | NS |
| H085 | | | NS |
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## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units Only - Emissions Limited Pollutants Only)

**Pollutant Detail Information:**

| | |
|---|---|
| 1. Pollutant Emitted: | |
| 2. Total Percent Efficiency of Control: % | |
| 3. Potential Emissions: lb/hour tons/year | |
| 4. Synthetically Limited?<br>[ ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year | |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[ ] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters): | |

<u>Allowable Emissions</u> (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hr tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

## I. VISIBLE EMISSIONS INFORMATION
### (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| | |
|---|---|
| 1. Visible Emissions Subtype: | |
| 2. Basis for Allowable Opacity: [ ] Rule [ ] Other | |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| | |
|---|---|
| 1. Visible Emissions Subtype: | |
| 2. Basis for Allowable Opacity: [ ] Rule [ ] Other | |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## J. CONTINUOUS MONITOR INFORMATION
**(Regulated Emissions Units Only)**

**Continuous Monitoring System:** Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

**Continuous Monitoring System:** Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION (Regulated and Unregulated Emissions Units)

**PSD Increment Consumption Determination**

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

   If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [ ] C | [ ] E | [ ] Unknown |
| SO2 | [ ] C | [ ] E | [ ] Unknown |
| NO2 | [ ] C | [ ] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | lb/hour | tons/year |
| SO2 | | lb/hour | tons/year |
| NO2 | | | tons/year |
| 5. PSD Comment (limit to 200 characters): | | | |

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
**(Regulated Emissions Units Only)**

**Supplemental Requirements for All Applications**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ ] Previously submitted, Date:______________<br>[ ] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 8. | Supplemental Information for Construction Permit Application<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:________ [ ] Not Applicable |

**Additional Supplemental Requirements for Category I Applications Only**

| |
|---|
| 10. Alternative Methods of Operation<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 12. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 14. Acid Rain Application (Hard-copy Required)<br><br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:________<br><br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:________<br><br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:________<br><br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:________<br><br>[ ] Not Applicable |

# EMISSION UNIT - 03

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
### (Regulated and Unregulated Emissions Units)

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

**Emissions Unit Description and Status**

| | | |
|---|---|---|
| 1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):<br>**Combustion Turbine No. 1** | | |
| 2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown<br>**008** | | |
| 3. Emissions Unit Status Code: **A** | 4. Acid Rain Unit? [ ] Yes [X] No | 5. Emissions Unit Major Group SIC Code: **49** |
| 6. Emissions Unit Comment (limit to 500 characters):<br>**The maximum allowable operating rate is 228 mmBtu/hr (lower heating value) at an ambient temperature of 80 degrees fahrenheit when firing fuel oil or natural gas. The maximum hours of operation are currently limited to 6,993. Following completion of compliance testing of Unit 8, combustion turbine No. 1 will operate under the alternative method of operation and annual emissions will be limited by the proposed facility wide caps on $SO_2$ and $NO_x$ emissions.** | | |

**Emissions Unit Control Equipment**

A.

| |
|---|
| 1. Description (limit to 200 characters):<br>**FUEL QUALITY**<br>**The City of Tallahassee is currently authorized to fire Number 2 fuel oil with a maximum sulfur content of 0.4 percent by weight. Following completion of compliance testing on Unit 8, only Number 2 (0.05% Sulfur) diesel fuel oil by weight) and natural gas will be fired in the combustion turbine.** |
| 2. Control Device or Method Code:<br>**Fuel Quality - No Code** |

**B.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

# C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | |
|---|---|
| 1. Initial Startup Date: | |
| 2. Long-term Reserve Shutdown Date: | |
| 3. Package Unit:<br>Manufacturer: **Westinghouse** | Model Number **W171G**: |
| 4. Generator Nameplate Rating: **12.3** MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: **228** mmBtu/hr | | |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters):<br>**The maximum heat input rate reflects operation at an ambient temperature of 80 degrees Fahrenheit based on the lower heating value of the fuels.** | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | **8,760** hours/year |

## D. EMISSIONS UNIT REGULATIONS
**(Regulated Emissions Units Only)**

**Rule Applicability Analysis** (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| **Rule 62-210.700(1),(4),(6) F.A.C.** | |
| **Rule 62-296.320(4),(b) F.A.C.** | |
| **Rule 62-297.310(2)(a) F.A.C.** | |
| **Rule 62-297.310(4)(a)2 (except a-c) F.A.C.** | |
| **Rule 62-297.310(7)(a)3,4a,8,9 F.A.C.** | |
| **Rule 62-297.310(8) F.A.C.** | |
| **40 CFR 72.6(b)(1)** | |
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## E. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

### Emission Point Description and Type

| |
|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: **EU03** |
| 2. Emission Point Type Code:<br>[X] 1 [ ] 2 [ ] 3 [ ] 4 |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**This emission point, EU03, represents the exhaust for Combustion Turbine No. 1.** |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [X] V [ ] W |
| 6. Stack Height: **38** feet |
| 7. Exit Diameter: **10** feet |
| 8. Exit Temperature: **880** °F |
| 9. Actual Volumetric Flow Rate: **395,080** acfm |

| | |
|---|---|
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone:16 769.421 East (km): 3339.825 North (km): | |
| 14. Emission Point Comment (limit to 200 characters):<br><br>**Emissions Units 03 and 04 were assumed to be collocated for long-term dispersion modelling.** | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment 1 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Natural Gas** | |
| 2. Source Classification Code (SCC): **20100201** | |
| 3. SCC Units: **mmSCF** | |
| 4. Maximum Hourly Rate: **0.252** | 5. Maximum Annual Rate: **2207.52** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.033 *** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **904 (LHV)** | |
| 10. Segment Comment (limit to 200 characters): *** Clean pipeline quality natural gas (10gr/100cf).** | |

**Segment Description and Rate:** Segment 2 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Number 2 (0.4% Sulfur) Fuel Oil** | |
| 2. Source Classification Code (SCC): **20100101** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **1,727** | 5. Maximum Annual Rate: **12,076,911** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.4** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **132,000 (LHV)** | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Maximum Annual Rate reflects current allowables. Following completion of compliance testing on Unit 8, the combustion turbine will be limited to firing Number 2 (0.05 % Sulfur) diesel fuel oil as reported in Segment 3.** | |

**Segment Description and Rate:** Segment 3 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Number 2 (0.05% Sulfur) Diesel Fuel Oil** | |
| 2. Source Classification Code (SCC): **20100101** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **1,727** | 5. Maximum Annual Rate: **10,147,075** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.05** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **132,000 (LHV)** | |
| 10. Segment Comment (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANTS
## (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| CO | | | NS |
| NOX | | | EL |
| PM | | | NS |
| PM10 | | | NS |
| SO2 | | | EL |
| VOC | | | NS |
| H106 | | | NS |
| H107 | | | NS |
| H133 | | | NS |
| HAPS | | | NS |
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |

## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units Only - Emissions Limited Pollutants Only)

**Pollutant Detail Information:**

1. Pollutant Emitted: **SO2**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **11.1** lb/hour, **CAP** tons/year

4. Synthetically Limited?
   [X] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:
   [ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor:
   Reference:

7. Emissions Method Code:
   [X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

   **Fuel Oil Sulfur Content: 0.05 % (wt)**
   **Fuel Oil Usage Rate: 1727 gal/hr**
   **MW $SO_2$: 64, MW S: 32**

   **lb/hr =(1727 gal/hr) x (6.75 lb/gal) x (0.05/100) x (64/32) x (95/100) = 11.1 lb/hr**

   **See Attachment EU03-01**

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

   **Potential emission rate reflects firing Number 2 (0.05% Sulfur) diesel fuel oil with 95 percent conversion of the sulfur to $SO_2$ following the completion of the compliance testing on Unit 8. Combustion turbine No. 1 will be part of the requested facility-wide $SO_2$ and $NO_x$ caps.**

Allowable Emissions (Pollutant identified on front of page)

**A.**

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: **ESCPSD** |
| 2. | Future Effective Date of Allowable Emissions: **Upon completion of Unit 8 Compliance Testing** |
| 3. | Requested Allowable Emissions and Units: **0.05 % sulfur (wt) and 80 TPY cap for the facility.** |
| 4. | Equivalent Allowable Emissions: lb/hour tons/year |
| 5. | Method of Compliance (limit to 60 characters): **Compliance will be based on unit specific emission factors (lb/MW), power generation logs, and vendor fuel data.** |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Annual emissions will be based on actual Sulfur content of the natural gas and Number 2 (0.05% Sulfur) diesel fuel oil.** |

**B.**

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: |
| 2. | Future Effective Date of Allowable Emissions: |
| 3. | Requested Allowable Emissions and Units: |
| 4. | Equivalent Allowable Emissions: lb/hr tons/year |
| 5. | Method of Compliance (limit to 60 characters): |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:**

| | |
|---|---|
| 1. Pollutant Emitted: **NOx** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **159.1** lb/hour, | **CAP** tons/year |
| 4. Synthetically Limited?<br>[**X**] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | ______ to ______ tons/year |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[ ] 0 [ ] 1 [ ] 2 [**X**] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**Maximum Firing Rate: 228 mmBtu/hr**<br>**Emission Factor: 0.698 lb/mmBtu**<br><br>**lb/hr =(228 mmBtu) x (0.698 lb-NOx/mmBtu) = 159.1 lb/hr**<br><br>**See Attachment EU03-01** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Future potential annual emissions will be part of the requested facility-wide cap on $NO_x$ emissions.** | |

**Allowable Emissions** (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions: **Upon Completion of Unit 8 Compliance Testing** |
| 3. Requested Allowable Emissions and Units: **467 TPY Cap for the facility** |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): **Compliance will be based on unit specific emission factors (lb/MW), power generation logs, AP-42 emission factors, and vendor fuel data.** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Annual emissions will be based on the AP-42 emission factors [0.44 lb/mmBtu - natural gas and 0.698 lb/mmBtu - No.2 diesel fuel oil].** |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hr tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

# I. VISIBLE EMISSIONS INFORMATION
## (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation **1** of **1**

| |
|---|
| 1. Visible Emissions Subtype: **VE20** |
| 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: < **20** % Exceptional Conditions: **100** %<br>Maximum Period of Excess Opacity Allowed: **60** min/hour |
| 4. Method of Compliance: **EPA Method 9 in any fiscal year in which the turbine operates greater than 400 hours.** |
| 5. Visible Emissions Comment (limit to 200 characters):<br><br>**In accordance with Rule 62-210.700(1),F.A.C., excess emissions resulting from startup, shutdown, or malfunction are permitted providing that the duration of excess emissions be minimized but in no case to exceed two hours in any 24 hour period unless authorized by the Department for longer duration.** |

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| |
|---|
| 1. Visible Emissions Subtype: |
| 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour |
| 4. Method of Compliance: |
| 5. Visible Emissions Comment (limit to 200 characters): |

## J. CONTINUOUS MONITOR INFORMATION
**(Regulated Emissions Units Only)**

<u>**Continuous Monitoring System:**</u> Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

<u>**Continuous Monitoring System:**</u> Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION (Regulated and Unregulated Emissions Units)

### PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ X ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

   If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ X ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [ ] C | [X ] E | [ ] Unknown |
| SO2 | [ ] C | [X ] E | [ ] Unknown |
| NO2 | [ ] C | [X ] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | **7.1** lb/hour | **0.07** tons/year |
| SO2 | | **66.4*** lb/hour | **0.5** tons/year |
| NO2 | | | **0.7** tons/year |
| 5. PSD Comment (limit to 200 characters): *** Baseline hourly emissions of $SO_2$ are based on firing Number 2 fuel oil with 0.3 percent sulfur and 95 percent conversion to $SO_2$. Firing rate is based on 182 mmBtu/hr at baseload adjusted to 188 mmBtu/hr for the local elevation.** | | | |

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements for All Applications**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ X ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ X ] Attached, Document ID: EU03-02 [ ] Not Applicable [ ] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[ ] Attached, Document ID:________ [ X ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:________ [ X ] Not Applicable [ ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ X ] Previously submitted, Date: *January 17, 1996*<br>[ ] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ X ] Attached, Document ID: EU03-03 [ ] Not Applicable |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |
| 8. | Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: EU03-04 [ ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |

## Additional Supplemental Requirements for Category I Applications Only

| |
|---|
| 10. Alternative Methods of Operation<br>[X] Attached, Document ID: EU03-05 [ ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID: ________ [X] Not Applicable |
| 12. Identification of Additional Applicable Requirements<br>[X] Attached, Document ID: EU03-06 [ ] Not Applicable |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID: ________ [X] Not Applicable |
| 14. Acid Rain Application (Hard-copy Required)<br><br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID: ________<br><br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID: ________<br><br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID: ________<br><br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID: ________<br><br>[X] Not Applicable |

**Attachment EU03-01**

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Client: City of Tallahassee
OFS No: 1584.0005.0008

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Sheet No.: 1 of 3
Calc. No.: 940819DH01

Rv'd: 02/26/97 By: D. Graziani, P.E.

**Emission Unit Description:**
The emissions unit is a Westinghouse combustion turbine designated CT 1. The unit is currently operating under a nonfederally enforceable permit (AO65-242827) issued by the FDEP pending final issuance of a Title V Operating permit for the facility. The unit is capable of firing No. 2 fuel oil and natural gas. The unit has a maximum heat input rate of 228 mmBtu/hr at an ambient temperature of 80 F and is rated for a nominal production capacity of 12.3 MW. The unit operates as a peaking or emergency unit in a simple cycle mode. The existing permit limits visible emissions (VE) and the sulfur content of the fuel oil (0.4% by weight). Following completion of compliance testing of Unit 8, the combustion turbine will fire the No. 2 (0.05% Sulfur by Weight) diesel fuel. This calculation documents hourly and annual emissions of sulfur dioxide and nitrogen oxides following the modification.

**References:**
No. 1 - FDEP Permit No. AO65-242827, Spec. Condition Nos. 3, 4, and 6.
No. 2 -FDEP Rule 62-296.320.(4)(b)1
No. 3 -City of Tallahassee Title V application (6-14-96)
No. 3 -City of Tallahassee (typical distillate oil analysis)
No. 4 -FGT Maximum Sulfur content allowed by Tariff

**Operating Parameters**

| | | |
|---|---|---|
| Annual Hours Of Operation (hrs/yr) | AHOP := 8760 | |
| Maximum Heat Input Rate on fuel oil (mmBtu/hr) - Ref. 3 | MHR1 := 228 | (lower heating value) |
| Maximum Heat Input Rate on Natural Gas (mmBtu/hr) - Ref. 3 | MHR2 := 228 | (lower heating value) |
| Fuel Oil Heat Content (Btu/Gal) | FOHC := 132000 | |
| Fuel Oil Density (lb/gal) - Ref. 4 | FOD := 6.75 | |
| Fuel Oil Sulfur Content (%wt) | FOSC := 0.05 | |
| Natural Gas Heat Content (Btu/CF) | NGHC := 904 | (lower heating value) |
| Natural Gas Sulfur Content (grains/CF) - Ref 5 | NGSC := 0.1 | |

Calculated Fuel Oil Usage Rate (lb/hr)

$$FOUR1 := MHR1 \cdot \frac{10^6}{FOHC} \cdot FOD \qquad FOUR1 = 1.17 \cdot 10^4$$

Calculated Fuel Oil Usage Rate (kgal/hr)

$$FOUR2 := \frac{FOUR1}{FOD \cdot 1000} \qquad FOUR2 = 1.727$$

Calculated Natural Gas Usage Rate (cf/hr)

$$FOUR3 := MHR2 \cdot \frac{10^6}{NGHC} \qquad FOUR3 = 2.52 \cdot 10^5$$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 2 of 3
Calc. No.: 940819DH01

**Emission Estimates**

The following emission estimates are provided as required by Rules 62-213.420(3)(c)1, 2, 3 and 4, FAC. The emission estimate is based on allowable emission limitations as specified by Rule or permit condition. The emissions estimates provide hourly rates (lbs/hr) denoted with an "H" and annual emission rates (tons/year) denoted with an "A".

**Emission Estimates - Segment No. 1 Natural Gas Firing**

Sulfur Dioxide - Mass Balance

$NGHSO2 := FOUR3 \cdot \frac{NGSC}{7000} \cdot \frac{64}{32} \cdot \frac{95}{100}$ $NGHSO2 = 6.8$ Assumes 95 Percent Conversion

$NGASO2 := NGHSO2 \cdot \frac{AHOP}{2000}$ $NGASO2 = 30$

**Emission Estimates - Segment No. 1 Natural Gas Firing**

Nitrogen Oxides - AP-42 Section 3.1 (Emission Factor = 0.44 lb/mmBtu)

$NGHNOX := MHR2 \cdot 0.44$ $NGHNOX = 100.3$

$NGANOX := NGHNOX \cdot \frac{AHOP}{2000}$ $NGANOX = 439.4$

**Emission Estimates - Segment No. 2 Fuel Oil Firing**

Sulfur Dioxide - Mass Balance

$FOHSO2 := FOUR1 \cdot \frac{FOSC}{100} \cdot \frac{64}{32} \cdot \frac{95}{100}$ $FOHSO2 = 11.1$ Assumes 95 Percent Conversion

$FOASO2 := FOHSO2 \cdot \frac{AHOP}{2000}$ $FOASO2 = 48.5$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008


Calc. No.: 940819DH01

**Emission Estimates - Segment No. 2 Fuel Oil Firing**

Nitrogen Oxides - AP-42 Section 3.1 (Emission Factor = 0.698 lb/mmBtu)

$FOHNOX := MHR1 \cdot 0.698$ $\quad$ $FOHNOX = 159.1$

$FOANOX := FOHNOX \cdot \frac{AHOP}{2000}$ $\quad$ $FOANOX = 697.1$

Based on the emission estimates, the combustion turbine's hours of operation at full load while firing No. 2 diesel fuel oil will be limited by the oxides of nitrogen cap.

**Attachment EU03-02**

The attached fuel sample analyses represent "typical" characterizations for the fuels combusted in EU03, Combustion Turbine No.1. Maximum values could be higher. The fuels represented by the analyses include clean pipeline quality natural gas and No. 2 (0.05% Sulfur) diesel fuel oil.

| TYPICAL NATURAL GAS ANALYSIS[1] | |
|---|---|
| **Analysis** | **Gravimetric Breakdown (%)** |
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur | 0 - 0.34 |
| Ash | 0.0 |
| Proximate Analysis | 99.65 - 100.0 |
| Volatile Matter | 0.0 |
| Fixed Carbon | 0.0 - 0.00138 |
| Moisture | 0.0 |
| Ash | 0.0 - 0.034 |
| Sulfur[2] | |

[1] Heating value (HHV): 964 - 1129 Btu/ft$^3$

[2] Total sulfur (maximum) 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**TYPICAL NUMBER 2 (0.05% S) DIESEL FUEL OIL ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 86.1 - 88.2 |
| Hydrogen | 11.8 - 13.9 |
| Oxygen | 0.0 |
| Nitrogen | 0.0 - 0.1 |
| Sulfur[2] | 0.0 - 0.05 |
| Ash | 0.0 - 0.05 |
| | |
| Proximate Analysis | |
| Volatile Matter | 99.05 - 99.5 |
| Fixed Carbon | 0.25 - 1.0 |
| Moisture | 0.0 - 0.1 |
| Ash | 0.0 - 0.05 |

(1) Higher heating value: 19,170 - 19,750 Btu/lb
(2) Total sulfur (maximum) 0.05%

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**Attachment EU03-03**

The City of Tallahassee follows best operational practices in the startup and shutdown of the gas turbines at the Purdom Generating Station. Under normal conditions, standard operating guidelines are followed for startup and shutdown of the gas turbines. Under any abnormal condition of operation, best operational practices are followed to minimize emissions and to minimize the duration of any excess emissions.

**Attachment EU03-04**

The City of Tallahassee has requested facility-wide caps on $SO_2$ and $NO_X$ emissions as part of the proposed project. In addition, combustion turbine No. 1 will fire No. 2 diesel fuel oil with a sulfur content of 0.05 percent sulfur by weight after the completion of compliance testing on Unit 8. Until that time, combustion turbine No. 1 will continue firing No. 2 (0.4% Sulfur) fuel oil as necessary.

Attachment EU03-05

Combustion Turbine No. 1 (EU03) is used as a peaking and emergency reserve unit. It is fueled by natural gas or No. 2 fuel oil. The alternative methods of operation (AMO) associated with the combustion turbine are related to the type of fuel being fired and rate of operation. The combustion turbine has a nominal production capacity of 12.3 MW. The current AMOs include the following:

Natural Gas Firing - Maximum Rate of 228 mmBtu/hr (LHV)

No. 2 Fuel Oil Firing - Maximum Rate of 228 mmBtu/hr (LHV)

The unit can vary load between 0 and 100 percent as required.

**Attachment EU03-06**

As part of its initial application for the Purdom Generating Station's Title V Operating Permit, the City of Tallahassee requested a specific revision to the existing operating permit No. A037-242825 (specific condition No. 2) pertaining to compliance testing. As part of the proposed project the City of Tallahassee requests that the revised Title V Operating Permit and the PSD Permit contain an additional specific condition revision limiting the maximum sulfur content of the fuel oil fired in Combustion Turbine No. 1 to 0.05 percent by weight.

The City of Tallahassee further requests that the condition become effective upon the completion of compliance testing on Unit 8.

# EMISSION UNIT - 04

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
### (Regulated and Unregulated Emissions Units)

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ **X** ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ **X** ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

### Emissions Unit Description and Status

| | | |
|---|---|---|
| 1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):<br><br>**Combustion Turbine No. 2** | | |
| 2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown<br>**008** | | |
| 3. Emissions Unit Status Code: **A** | 4. Acid Rain Unit?<br>[ ] Yes [X] No | 5. Emissions Unit Major Group SIC Code: **49** |
| 6. Emissions Unit Comment (limit to 500 characters):<br><br>**The maximum allowable operating rate is 228 mmBtu/hr (lower heating value) at an ambient temperature of 80 degrees fahrenheit when firing fuel oil or natural gas. The maximum hours of operation are currently limited to 6,993. Following completion of compliance testing of Unit 8, combustion turbine No. 1 will operate under the alternative method of operation and annual emissions will be limited by the proposed facility wide caps on $SO_2$ and $NO_x$ emissions.** | | |

### Emissions Unit Control Equipment

**A.**

| |
|---|
| 1. Description (limit to 200 characters):<br><br>**FUEL QUALITY**<br><br>**The City of Tallahassee is currently authorized to fire Number 2 fuel oil with a maximum sulfur content of 0.4 percent by weight. Following completion of compliance testing on Unit 8, only Number 2 (0.05% Sulfur) diesel fuel oil by weight) and natural gas will be fired in the combustion turbine.** |
| 2. Control Device or Method Code:<br>**Fuel Quality - No Code** |

**B.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | | |
|---|---|---|
| 1. Initial Startup Date: | | |
| 2. Long-term Reserve Shutdown Date: | | |
| 3. Package Unit:<br>Manufacturer: **Westinghouse** | Model Number **W171G**: | |
| 4. Generator Nameplate Rating: **12.3** MW | | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: **228** mmBtu/hr | | |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters):<br><br>**The maximum heat input rate reflects operation at an ambient temperature of 80 degrees fahreneit based on the lower heating value of the fuels.** | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | **8,760** hours/year |

## D. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

<u>Rule Applicability Analysis</u> (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

<u>List of Applicable Regulations</u> (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| **Rule 62-210.700(1),(4),(6) F.A.C.** | |
| **Rule 62-296.320(4),(b) F.A.C.** | |
| **Rule 62-297.310(2)(a) F.A.C.** | |
| **Rule 62-297.310(4)(a)2 (except a-c) F.A.C.** | |
| **Rule 62-297.310(7)(a)3,4a,8,9 F.A.C.** | |
| **Rule 62-297.310(8) F.A.C.** | |
| **40 CFR 72.6(b)(1)** | |
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## E. EMISSION POINT (STACK/VENT) INFORMATION
**(Regulated Emissions Units Only)**

### Emission Point Description and Type

| |
|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: **EU04** |
| 2. Emission Point Type Code:<br>[X] 1 [ ] 2 [ ] 3 [ ] 4 |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**This emission point, EU04, represents the exhaust for Combustion Turbine No. 2.** |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [X] V [ ] W |
| 6. Stack Height: **38** feet |
| 7. Exit Diameter: **10** feet |
| 8. Exit Temperature: **880** °F |
| 9. Actual Volumetric Flow Rate: **395,080** acfm |

| | |
|---|---|
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone: **16**    **769.421** East (km):    **3339.813** North (km): | |
| 14. Emission Point Comment (limit to 200 characters):<br><br>**Emissions Units 03 and 04 were assumed to be collocated for long-term modelling** | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment 1 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Natural Gas** | |
| 2. Source Classification Code (SCC): **20100201** | |
| 3. SCC Units: **mmSCF** | |
| 4. Maximum Hourly Rate: **0.252** | 5. Maximum Annual Rate: **2207.52** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.033 *** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **904 (LHV)** | |
| 10. Segment Comment (limit to 200 characters):<br><br>*** Clean pipeline quality natural gas (10gr/100cf).** | |

Segment Description and Rate: Segment 2 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Number 2 (0.4% Sulfur) Fuel Oil** | |
| 2. Source Classification Code (SCC): **20100101** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **1,727** | 5. Maximum Annual Rate: **12,076,911** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.4** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **132,000 (LHV)** | |
| 10. Segment Comment (limit to 200 characters): **Maximum Annual Rate reflects current allowables. Following completion of compliance testing on Unit 8, the combustion turbine will be limited to firing Number 2 (0.05% Sulfur) diesel fuel oil as reported in Segment 3.** | |

Segment Description and Rate: Segment 3 of 3

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Number 2 (0.05% Sulfur) Diesel Fuel Oil** | |
| 2. Source Classification Code (SCC): **20100101** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **1,727** | 5. Maximum Annual Rate: **10,147,075** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.05** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **132,000 (LHV)** | |
| 10. Segment Comment (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANTS
## (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| CO | | | NS |
| NOX | | | EL |
| PM | | | NS |
| PM10 | | | NS |
| SO2 | | | EL |
| VOC | | | NS |
| H106 | | | NS |
| H107 | | | NS |
| H133 | | | NS |
| HAPS | | | NS |
| | | | |
| | | | |
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| | | | |
| | | | |
| | | | |

## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units Only - Emissions Limited Pollutants Only)

**Pollutant Detail Information:**

1. Pollutant Emitted: **SO2**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **11.1** lb/hour, **CAP** tons/year

4. Synthetically Limited?
   [**X**] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:
   [ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor:
   Reference:

7. Emissions Method Code:
   [**X**] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

   **Fuel Oil Sulfur Content: 0.05 % (wt)**
   **Fuel Oil Usage Rate: 1727 gal/hr**
   **MW $SO_2$: 64, MW S: 32**

   **lb/hr =(1727 gal/hr) x (6.75 lb/gal) x (0.05/100) x (64/32) x (95/100) = 11.1 lb/hr**

   **See Attachment EU03-01**

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

   **Potential emission rate reflects firing Number 2 (0.05% Sulfur) diesel fuel oil with 95 percent conversion of the sulfur to $SO_2$ following the completion of the compliance testing on Unit 8. Combustion turbine No. 2 will be part of the requested facility-wide $SO_2$ and $NO_x$ caps.**

<u>Allowable Emissions</u> (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions: **Upon completion of Unit 8 Compliance Testing** |
| 3. Requested Allowable Emissions and Units: **0.05 % sulfur (wt) and 80 TPY cap for the facility.** |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): **Compliance will be based on unit specific emission factors (lb/MW), power generation logs, and vendor fuel data.** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Annual emissions will be based on actual Sulfur content of the natural gas and Number 2 (0.05% Sulfur) diesel fuel oil.** |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hr tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:**

| | |
|---|---|
| 1. Pollutant Emitted: **NOx** | |
| 2. Total Percent Efficiency of Control: % | |
| 3. Potential Emissions: **159.1** lb/hour, **CAP** tons/year | |
| 4. Synthetically Limited? [**X**] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions: [ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year | |
| 6. Emission Factor: Reference: | |
| 7. Emissions Method Code: [ ] 0 [ ] 1 [ ] 2 [**X**] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**Maximum Firing Rate: 228 mmBtu/hr**<br>**Emission Factor: 0.698 lb/mmBtu**<br><br>**lb/hr =(228 mmBtu) x (0.698 lb-NOx/mmBtu) = 159.1 lb/hr**<br><br>**See Attachment EU03-01** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Future potential annual emissions will be part of the requested facility-wide cap on $NO_x$ emissions.** | |

<u>Allowable Emissions</u> (Pollutant identified on front of page)

A.

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions: **Upon Completion of Unit 8 Compliance Testing** |
| 3. Requested Allowable Emissions and Units: **467 TPY Cap for the facility** |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): **Compliance will be based on unit specific emission factors (lb/MW), power generation logs, AP-42 emission factors, and vendor fuel data.** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Annual emissions will be based on the AP-42 emission factors [0.44 lb/mmBtu - natural gas and 0.698 lb/mmBtu - No.2 diesel fuel oil].** |

B.

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hr tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

# I. VISIBLE EMISSIONS INFORMATION
## (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 1

| | | |
|---|---|---|
| 1. Visible Emissions Subtype: **VE20** | | |
| 2. Basis for Allowable Opacity: | [ **X** ] Rule | [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **< 20** %   Exceptional Conditions: **100** %<br>Maximum Period of Excess Opacity Allowed: **60** min/hour | | |
| 4. Method of Compliance: **EPA Method 9 in any fiscal year in which the turbine operates greater than 400 hours.** | | |
| 5. Visible Emissions Comment (limit to 200 characters):<br><br>**In accordance with Rule 62-210.700(1),F.A.C., excess emissions resulting from startup, shutdown, or malfunction are permitted providing that the duration of excess emissions be minimized but in no case to exceed two hours in any 24 hour period unless authorized by the Department for longer duration.** | | |

**Visible Emissions Limitation:** Visible Emissions Limitation ______ of ______

| | | |
|---|---|---|
| 1. Visible Emissions Subtype: | | |
| 2. Basis for Allowable Opacity: | [ ] Rule | [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: %   Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | | |
| 4. Method of Compliance: | | |
| 5. Visible Emissions Comment (limit to 200 characters): | | |

## J. CONTINUOUS MONITOR INFORMATION
**(Regulated Emissions Units Only)**

**Continuous Monitoring System:** Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

**Continuous Monitoring System:** Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
### (Regulated and Unregulated Emissions Units)

**PSD Increment Consumption Determination**

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ X ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ X ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [ ] C | **[X ]** E | [ ] Unknown |
| SO2 | [ ] C | **[X ]** E | [ ] Unknown |
| NO2 | [ ] C | **[X ]** E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | **7.1** lb/hour | **0.07** tons/year |
| SO2 | | **66.4*** lb/hour | **0.5** tons/year |
| NO2 | | | **0.7** tons/year |

5. PSD Comment (limit to 200 characters):
*** Baseline hourly emissions of $SO_2$ are based on firing Number 2 fuel oil with 0.3 percent sulfur and 95 percent conversion to $SO_2$. Firing rate is based on 182 mmBtu/hr at baseload adjusted to 188 mmBtu/hr for the local elevation.**

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements for All Applications**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[ ] Attached, Document ID:________ [ ] Not Applicable [ X ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ X ] Attached, Document ID: EU04-02 [ ] Not Applicable [ ] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[ ] Attached, Document ID:________ [ X ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:________ [ X ] Not Applicable [ ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ X ] Previously submitted, Date: *January 17, 1996*<br>[ ] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ X ] Attached, Document ID: EU04-03 [ ] Not Applicable |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |
| 8. | Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: EU04-04 [ ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |

**Additional Supplemental Requirements for Category I Applications Only**

10. Alternative Methods of Operation
    [ X ] Attached, Document ID: **EU04-05** [ ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading)
    [ ] Attached, Document ID: ________ [ X ] Not Applicable

12. Identification of Additional Applicable Requirements
    [ X ] Attached, Document ID: **EU04-06** [ ] Not Applicable

13. Compliance Assurance Monitoring Plan
    [ ] Attached, Document ID: ________ [ X ] Not Applicable

14. Acid Rain Application (Hard-copy Required)

    [ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
    Attached, Document ID: ________

    [ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
    Attached, Document ID: ________

    [ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
    Attached, Document ID: ________

    [ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
    Attached, Document ID: ________

    [ X ] Not Applicable

Attachment EU04-01

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
## CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Client: City of Tallahassee
OFS No: 1584.0005.0008

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Sheet No.: 1 of 3
Calc. No.: 940819DH02

Rv'd: 02/26/97 By: D. Graziani, P.E.

**Emission Unit Description:**
The emissions unit is a Westinghouse combustion turbine designated CT 2. The unit is currently operating under a nonfederally enforceable permit (AO65-242827) issued by the FDEP pending final issuance of a Title V Operating permit for the facility. The unit is capable of firing No. 2 fuel oil and natural gas. The unit has a maximum heat input rate of 228 mmBtu/hr at an ambient temperature of 80 F and is rated for a nominal production capacity of 12.3 MW. The unit operates as a peaking or emergency unit in a simple cycle mode. The existing permit limits visible emissions (VE) and the sulfur content of the fuel oil (0.4% by weight). Following completion of compliance testing of Unit 8, the combustion turbine will fire the No. 2 (0.05% Sulfur by Weight) diesel fuel oil. This calculation documents hourly and annual emissions of sulfur dioxide and nitrogen oxides following the modification.

**References:**
No. 1 - FDEP Permit No. AO65-242827, Spec. Condition Nos. 3, 4, and 6.
No. 2 -FDEP Rule 62-296.320.(4)(b)1
No. 3 -City of Tallahassee Title V application (6-14-96)
No. 3 -City of Tallahassee (typical distillate oil analysis)
No. 4 -FGT Maximum Sulfur content allowed by Tariff

**Operating Parameters**

| | | |
|---|---|---|
| Annual Hours Of Operation (hrs/yr) | AHOP := 8760 | |
| Maximum Heat Input Rate on fuel oil (mmBtu/hr) - Ref. 3 | MHR1 := 228 | (lower heating value) |
| Maximum Heat Input Rate on Natural Gas (mmBtu/hr) - Ref. 3 | MHR2 := 228 | (lower heating value) |
| Fuel Oil Heat Content (Btu/Gal) | FOHC := 132000 | |
| Fuel Oil Density (lb/gal) - Ref. 4 | FOD := 6.75 | |
| Fuel Oil Sulfur Content (%wt) | FOSC := 0.05 | |
| Natural Gas Heat Content (Btu/CF) | NGHC := 904 | |
| Natural Gas Sulfur Content (grains/CF) - Ref 5 | NGSC := 0.1 | |

Calculated Fuel Oil Usage Rate (lb/hr)

$$FOUR1 := MHR1 \cdot \frac{10^6}{FOHC} \cdot FOD \qquad FOUR1 = 1.17 \cdot 10^4$$

Calculated Fuel Oil Usage Rate (kgal/hr)

$$FOUR2 := \frac{FOUR1}{FOD \cdot 1000} \qquad FOUR2 = 1.727$$

Calculated Natural Gas Usage Rate (cf/hr)

$$FOUR3 := MHR2 \cdot \frac{10^6}{NGHC} \qquad FOUR3 = 2.52 \cdot 10^5$$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 2 of 3
Calc. No.: 940819DH02

<u>Emission Estimates</u>

The following emission estimates are provided as required by Rules 62-213.420(3)(c)1, 2, 3 and 4, FAC. The emission estimate is based on allowable emission limitations as specified by Rule or permit condition. The emissions estimates provide hourly rates (lbs/hr) denoted with an "H" and annual emission rates (tons/year) denoted with an "A".

**Emission Estimates - Segment No. 1 Natural Gas Firing**

Sulfur Dioxide - Mass Balance

$$NGHSO2 := FOUR3 \cdot \frac{NGSC}{7000} \cdot \frac{64}{32} \cdot \frac{95}{100}$$ NGHSO2 =6.8 Assumes 95 Percent Conversion

$$NGASO2 := NGHSO2 \cdot \frac{AHOP}{2000}$$ NGASO2 =30

**Emission Estimates - Segment No. 1 Natural Gas Firing**

Nitrogen Oxides - AP-42 Section 3.1 (Emission Factor = 0.44 lb/mmBtu)

$$NGHNOX := MHR2 \cdot 0.44$$ NGHNOX =100.3

$$NGANOX := NGHNOX \cdot \frac{AHOP}{2000}$$ NGANOX =439.4

**Emission Estimates - Segment No. 2 Fuel Oil Firing**

Sulfur Dioxide - Mass Balance

$$FOHSO2 := FOUR1 \cdot \frac{FOSC}{100} \cdot \frac{64}{32} \cdot \frac{95}{100}$$ FOHSO2 =11.1 Assumes 95 Percent Conversion

$$FOASO2 := FOHSO2 \cdot \frac{AHOP}{2000}$$ FOASO2 =48.5

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 3 of 3
Calc. No.: 940819DH02

**Emission Estimates - Segment No. 2 Fuel Oil Firing**

Nitrogen Oxides - AP-42 Section 3.1 (Emission Factor = 0.698 lb/mmBtu)

$FOHNOX := MHR1 \cdot 0.698$ $\qquad$ $FOHNOX = 159.1$

$FOANOX := FOHNOX \cdot \frac{AHOP}{2000}$ $\qquad$ $FOANOX = 697.1$

Based on the emission estimates, the combustion turbine's hours of operation at full load while firing No. 2 diesel fuel oil will be limited by the oxides of nitrogen cap.

**Attachment EU04-02**

The attached fuel sample analyses represent "typical" characterizations for the fuels combusted in EU03, Combustion Turbine No. 2. Maximum values could be higher. The fuels represented by the analyses include clean pipeline quality natural gas and No. 2 (0.05% Sulfur) diesel fuel oil.

| TYPICAL NATURAL GAS ANALYSIS[1] | |
|---|---|
| **Analysis** | **Gravimetric Breakdown (%)** |
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur | 0 - 0.34 |
| Ash | 0.0 |
| | |
| Proximate Analysis | 99.65 - 100.0 |
| Volatile Matter | 0.0 |
| Fixed Carbon | 0.0 - 0.00138 |
| Moisture | 0.0 |
| Ash | 0.0 - 0.034 |
| Sulfur[2] | |

(1) Heating value (HHV): 964 - 1129 Btu/ft$^3$
(2) Total sulfur (maximum) 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**TYPICAL NUMBER 2 (0.05% S) DIESEL FUEL OIL ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 86.1 - 88.2 |
| Hydrogen | 11.8 - 13.9 |
| Oxygen | 0.0 |
| Nitrogen | 0.0 - 0.1 |
| Sulfur[2] | 0.0 - 0.05 |
| Ash | 0.0 - 0.05 |
| Proximate Analysis | |
| Volatile Matter | 99.05 - 99.5 |
| Fixed Carbon | 0.25 - 1.0 |
| Moisture | 0.0 - 0.1 |
| Ash | 0.0 - 0.05 |

[1] Higher heating value: 19,170 - 19,750 Btu/lb
[2] Total sulfur (maximum) 0.05%

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**Attachment EU04-03**

The City of Tallahassee follows best operational practices in the startup and shutdown of the gas turbines at the Purdom Generating Station. Under normal conditions, standard operating guidelines are followed for startup and shutdown of the gas turbines. Under any abnormal condition of operation, best operational practices are followed to minimize emissions and to minimize the duration of any excess emissions.

210.700(1)
(4)(6)

Attachment EU04-04

The City of Tallahassee has requested facility-wide caps on $SO_2$ and $NO_X$ emissions as part of the proposed project. In addition, combustion turbine No. 2 will fire No. 2 diesel fuel oil with a sulfur content of 0.05 percent sulfur by weight after the completion of compliance testing on Unit 8. Until that time, combustion turbine No. 2 will continue firing No. 2 (0.4% Sulfur) fuel oil as necessary.

**Attachment EU04-05**

Combustion Turbine No. 2 (EU04) is used as a peaking and emergency reserve unit. It is fueled by natural gas or No. 2 fuel oil. The alternative methods of operation (AMO) associated with the combustion turbine are related to the type of fuel being fired and rate of operation. The combustion turbine has a nominal production capacity of 12.3 MW. The current AMOs include the following:

Natural Gas Firing - Maximum Rate of 228 mmBtu/hr (LHV)

No. 2 Fuel Oil Firing - Maximum Rate of 228 mmBtu/hr (LHV)

The unit can vary load between 0 and 100 percent as required.

**Attachment EU04-06**

As part of its initial application for the Purdom Generating Station's Title V Operating Permit, the City of Tallahassee requested a specific revision to the existing operating permit No. A037-242825 (specific condition No. 2) pertaining to compliance testing. As part of the proposed project the City of Tallahassee requests that the revised Title V Operating Permit and the PSD Permit contain an additional specific condition revision limiting the maximum sulfur content of the fuel oil fired in Combustion Turbine No. 2 to 0.05 percent by weight.

The City of Tallahassee further requests that the condition become effective upon the completion of compliance testing on Unit 8.

# EMISSION UNIT - 11

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
### (Regulated and Unregulated Emissions Units)

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

**Emissions Unit Description and Status**

| | | |
|---|---|---|
| 1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):<br><br>**Boiler No. 7** | | |
| 2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown<br>**007** | | |
| 3. Emissions Unit Status Code: **A** | 4. Acid Rain Unit?<br>[ X ] Yes [ ] No | 5. Emissions Unit Major Group SIC Code: **49** |
| 6. Emissions Unit Comment (limit to 500 characters):<br><br>**The maximum allowable heat input is 621 mmBtu/hr (higher Heating Value {HHV}). The emissions unit will be subject to the facility wide cap on $SO_2$ and $NO_x$.** | | |

**Emissions Unit Control Equipment**

**A.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**B.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | |
|---|---|
| 1. Initial Startup Date: | |
| 2. Long-term Reserve Shutdown Date: | |
| 3. Package Unit:<br>Manufacturer: **Riley Stoker Corporation** | Model Number: **Type RX-33** |
| 4. Generator Nameplate Rating: **44** MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: **621** mmBtu/hr | | |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters):<br><br>**Annual operation, following completion of compliance testing of the Unit 8 combustion turbine will be limited by the facility-wide emission caps on $SO_2$ and $NO_x$.** | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | **8,760** hours/year |

## B. FACILITY REGULATIONS

**Rule Applicability Analysis** (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| **Rule 62-210.700(1),(2),(3),(4),(6) F.A.C.** | **40 CFR 72.23** |
| **Rule 62-214.300 F.A.C.** | **40 CFR 72.30(a),(c),(d)** |
| **Rule 62-214.350(2),(3),(5),(6) F.A.C.** | **40 CFR 72.32** |
| **Rule 62-214.430(1) F.A.C.** | **40 CFR 72.40(a)(c)(d)** |
| **Rule 62-296.405(1)(a),(b),(c)1,h, F.A.C.** | **40 CFR 72.51** |
| **Rule 62-296.405(1)(f)1,b,(e)1,2,3;(f)1a(i)** | **40 CFR 72.90** |
| **Rule 62-297.310(1) F.A.C.** | **40 CFR 73.33(c)(d)(e)** |
| **Rule 62-297.310(2)(b) F.A.C.** | **40 CFR 73.35(c)(1)** |
| **Rule 62-297.310(3) F.A.C.** | **40 CFR 75.4** |
| **Rule 62-297.310(4) F.A.C.** | **40 CFR 75.5** |
| **Rule 62-297.310(5) F.A.C.** | **40CFR 75.10(a)(1),(a)(2),(a)(3)(ii)(b)-(d),(f),(g)** |
| **Rule 62-297.310(6)(a),(c)-(g) F.A.C.** | **40 CFR 75.11(d)(2)** |
| **Rule 62-297.310(7)(a)2,3,4,5,9,(c) F.A.C.** | **40 CFR 75.12(a),(b)** |
| **Rule 62-297.310(8) F.A.C.** | **40 CFR 75.13(a),(b)** |
| **40 CFR 72.9(a),(b),(c)(1)-(3)(iii),(d)-(g)** | **40 CFR 75.14(c)** |
| **40 CFR 72.20(a)-(c)** | **40 CFR 75.20(a)(5),(b),(c),(d),(g)** |
| **40 CFR 72.21** | **40 CFR 75.21(a),(c)** |
| **40 CFR 72.22** | **62-204.800(14),(15),(16),(18), F.A.C.*** |

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| 40 CFR 75.22 | 40 CFR 75.64 |
| 40 CFR 75.24 | 40 CFR 75, Appendix A |
| 40 CFR 75.30(a)(3),(d)(2) | 40 CFR 75, Appendix B |
| 40 CFR 75.31 | 40 CFR 75, Appendix C |
| 40 CFR 75.32 | 40 CFR 75, Appendix D |
| 40 CFR 75.33(a),(c) | 40 CFR 75, Appendix G 2,4 |
| 40 CFR 75.53 | 40 CFR 75, Appendix H |
| 40 CFR 75.54 [except (f)] | 40 CFR 77.3** |
| 40 CFR 75.55(c) | 40 CFR 77.5(b)** |
| 40 CFR 75.56 | 40 CFR 77.6** |
| 40 CFR 75.60 | 40 CFR 72.80(b),(c),(d),(f),(g) |
| 40 CFR 75.61 | 40 CFR 72.31 |
| 40 CFR 75.62 | 40 CFR 75.36 |
| 40 CFR 75.63 | 40 CFR 72.81**<br>40 CFR 72.82** |
| 40 CFR 75.35 | 40 CFR 72.83**<br>40 CFR 72.84** |
| * State Only Requirement<br>** Potential Future Requirement | |

## E. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| |
|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: **EU11** |
| 2. Emission Point Type Code:<br>[X] 1 [ ] 2 [ ] 3 [ ] 4 |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**This emission point, EU11, represents the exhaust for Boiler No. 7.** |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [X] V [ ] W |
| 6. Stack Height: **180** feet |
| 7. Exit Diameter: **9.0** feet |
| 8. Exit Temperature: **300** °F |
| 9. Actual Volumetric Flow Rate: **180,798** acfm |

| | |
|---|---|
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone:**16** East (km):**769.653** North (km):**3339.883** | |
| 14. Emission Point Comment (limit to 200 characters): | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

**Segment Description and Rate:** Segment 1 of 4

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Natural Gas** | |
| 2. Source Classification Code (SCC): **10100601** | |
| 3. SCC Units: **mmSCF** | |
| 4. Maximum Hourly Rate: **0.597** | 5. Maximum Annual Rate:**see field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.033** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **1040 (HHV)** | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Maximum Annual Rate can vary based on facility-wide $SO_2$ and $NO_x$ caps and actual emissions.** | |

**Segment Description and Rate:** Segment 2 of 4

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Fuel Oil Nos. 2 through 6** | |
| 2. Source Classification Code (SCC): **10100401** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **4140** | 5. Maximum Annual Rate: **see field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **1.8*** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **150,000 (HHV)** | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Maximum Annual Rates can vary based on facility-wide $SO_2$ and $NO_x$ caps and actual emissions.**<br><br>***Maximum sulfur content will vary based on the fuel's higher heating value and density.** | |

Segment Description and Rate: Segment 3 of 4

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**On-Spec Used Oil** | |
| 2. Source Classification Code (SCC): **10100401** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **4140** | 5. Maximum Annual Rate: **See Field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **1.2*** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **0.15** | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Maximum Annual Rate scan vary based on facility-wide $SO_2$ and $NO_x$ caps and actual emissions.**<br><br>*** Maximum sulfur content will vary based on the fuel's higher heating value and density.** | |

Segment Description and Rate: Segment 4 of 4

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters):<br><br>**Any mixture of Fuel Oil No.6 (Residual Oil) ,On-Spec Used Oil, No. 2 Fuel Oil, or Natural Gas** | |
| 2. Source Classification Code (SCC): | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **4140 / 0.621** | 5. Max.Annual Rate **see field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **1.8*/0.033** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **150,000 / 1040 (HHV)** | |
| 10. Segment Comment (limit to 200 characters):<br><br>**Maximum Annual Rates can vary based on facility-wide caps and actual emissions.. The purpose of this segment is to indicate the potential to co-fire multiple fuels. In order to provide maximum hourly rates for the co-firing of a liquid and gaseous fuel, the maximum of each fuel is provided.**<br><br>***Maximum sulfur content will vary based on the fuel's higher heating value and density.** | |

## G. EMISSIONS UNIT POLLUTANTS
### (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| CO | | | NS |
| NOX | | | EL |
| PM | | | EL |
| PM10 | | | NS |
| SO2 | | | EL |
| HAPS | | | NS |
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## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units Only - Emissions Limited Pollutants Only)**

**Pollutant Detail Information:** Pollutant 1 of 3

| | |
|---|---|
| 1. Pollutant Emitted: **SO2** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **1.2 x $10^3$** lb/hour, | **80 (Cap)** tons/year |
| 4. Synthetically Limited?<br>[**X**] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | ______ to ______ tons/year |
| 6. Emission Factor: **1.87 lb/mmBtu**<br>Reference: **62-296.405(1)(c), F.A.C** | |
| 7. Emissions Method Code:<br>[**X**] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**Allowable Emission Rate: 1.87 lb/mmBtu**<br>**Max Heat Input Rate: 621 mmBtu/hr**<br><br>**lb/hr =(1.87 lb/mmBtu) x (621 mmBtu/hr) = 1.2 x $10^3$ lb/hr**<br><br>**See Attachment EU11-01** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**The current maximum allowable emission rate is 1.87 lb/mmBtu and the maximum heat input rate is 621 mmBtu/hr. Current allowablel $SO_2$ emissions are 5086 TPY.. Annual emissions will be limited based on the requested annual cap following compliance testing of the Unit 8 combustion turbine .** | |

**Allowable Emissions** (Pollutant identified on front of page)

A.

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **RULE** | |
| 2. Future Effective Date of Allowable Emissions: | |
| 3. Requested Allowable Emissions and Units: **1.87 lb/mmBtu** | |
| 4. Equivalent Allowable Emissions: **$1.2 \times 10^3$** lb/hour | **80 (Cap)** tons/year |
| 5. Method of Compliance (limit to 60 characters): **40 CFR Part 75, Appendix D** | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>**Emissions limitation entered in Field 3 reflects the maximum allowable emission rate per the SIP regulations (62-296.405(1)(c)1,h, F.A.C.).** | |

B.

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions:<br>**Upon completion of compliance testing on the Unit 8 combustion turbine.** |
| 3. Requested Allowable Emissions and Units:<br>**80 TPY** |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): **40 CFR Part 75, Appendix D** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>**Annual emissions will be limited by facility wide cap after completion of compliance testing on Unit 8.** |

**Pollutant Detail Information:** Pollutant 2 of 3

| | |
|---|---|
| 1. Pollutant Emitted: **PM** | |
| 2. Total Percent Efficiency of Control: % | |
| 3. Potential Emissions: **77.6** lb/hour, | **Caps** tons/year |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year | |
| 6. Emission Factor: **0.1 lb/mmBtu (0.3 lb/mmBtu during Excess Emissions)**<br>Reference: **62-296.405(1)(b) and 62-210.700, F.A.C.** | |
| 7. Emissions Method Code:<br>[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br>**Allowable Emission Rate: 0.1 lb/mmBtu and 0.3 lb/mmBtu during excess Emissions**<br>**Max Heat Input Rate = 621 mmBtu/hr**<br>**Estimated 12.5% Excess Emissions**<br><br>**lb/hr =(1-.125)x(621 mmBtu/hr x 0.1lb/mmBtu)+(.125)x(621 mmBtu/hr x 0.3 lb/mmBtu)**<br>**lb/hr = 77.6**<br><br>**See Attachment EU11-01** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**The maximum allowable emission rate is 0.1 lb/mmBtu and 0.3 lb/mmBtu during excess emissions for load changes and boiler cleaning. The maximum heat input rate is 621 mmBtu/hr. Potential PM emissions are estimated utilizing these allowable rates, the annual emissions are limited indirectly by the requested facility-wide emission caps on $SO_2$ and $NO_x$.** | |

**Allowable Emissions** (Pollutant identified on front of page)

A.

| |
|---|
| 1. Basis for Allowable Emissions Code: **RULE** |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.1 lb/mmBtu and 0.3 lb/mmBtu during excess emissions when firing fuel oil** |
| 4. Equivalent Allowable Emissions: **77.6** lb/hour **Caps** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Methods 1,2,3,5, or 17 in any fiscal year in which the fossil fuel system generator burns more than 400 hrs of fuel oil other than startup.** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Emissions limitations entered in Field 3 reflect the maximum allowable emission rates listed in the SIP regulations (62-296.405(1)(b) and 62-210.700(3), F.A.C.)** |

B.

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:** Pollutant 3 of 3

| | |
|---|---|
| 1. Pollutant Emitted: **NOx** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **204.93** lb/hour, | **Caps** tons/year |
| 4. Synthetically Limited?<br>[X] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | _______ to _______ tons/year |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[ ] 0 [ ] 1 [ ] 2 [X] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**Maximum Firing Rate: 621 mmBtu/hr**<br>**Emission Factor: 0.33 lb/mmBtu (CEMS Data)**<br><br>**lb/hr =(621 mmBtu) x (0.33 lb-NOx/mmBtu) = 204.93 lb/hr**<br><br>**See Attachment EU11-01** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Potential emissions will be capped by the requested facility wide emission limitation, following the completion of compliance testing of the Unit 8 combustion turbine.** | |

**Allowable Emissions** (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions: **Upon completion of compliance testing of the Unit 8 combustion turbine** |
| 3. Requested Allowable Emissions and Units: **467 TPY** |
| 4. Equivalent Allowable Emissions: **204.93** lb/hour **Cap** tons/year |
| 5. Method of Compliance (limit to 60 characters): **CEMS Data** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: lb/hr tons/year |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

## I. VISIBLE EMISSIONS INFORMATION
**(Regulated Emissions Units Only)**

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 2

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE20** | |
| 2. Basis for Allowable Opacity: | [X] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **20** % Exceptional Conditions: **40** %<br>Maximum Period of Excess Opacity Allowed: **2** min/hour | |
| 4. Method of Compliance: **Annual VE in accordance with EPA Method 9 using the maximum fuel oil to gas ratio used during the fiscal year.** | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

**Visible Emissions Limitation:** Visible Emissions Limitation 2 of 2

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE60** | |
| 2. Basis for Allowable Opacity: | [X] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **60** % Exceptional Conditions:**100** %<br>Maximum Period of Excess Opacity Allowed: ***See Field 5** | |
| 4. Method of Compliance | |
| 5. Visible Emissions Comment (limit to 200 characters):<br>**In accordance with 62-210.700(1),(2), &(3), F.A.C., excess emissions are allowed at the following opacities for the associated time periods: 60% - 3 hrs/ 24 hrs for boiler cleaning and load change, 100% - 2 hrs / 24 hrs for malfunction, 100 % - unlimited for start-up and shutdown** | |

## J. CONTINUOUS MONITOR INFORMATION
## (Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor 1 of 4

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): **Gas Fuel Flow** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: **Superior** Model Number: **GHFA 8" 600RF** | Serial Number: **94128** |
| 5. Installation Date: **12-31-94** | |
| 6. Performance Specification Test Date: **12-31-94** | |
| 7. Continuous Monitor Comment (limit to 200 characters): **Orifice Meter. Installed in accordance with Rule 62-214.320, F.A.C., Rule 62-214.330, F.A.C., and 40 CFR Part 75 Appendix D, Section 2.1.** **Note: The serial number reflects the primary unit.** | |

Continuous Monitoring System: Continuous Monitor 2 of 4

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): **Oil Fuel Flow Monitor (2)** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: **Micro Motion** Model Number: **CMF200M342NV & EX122A** | Serial Number:**319657 & 9210S0005062** |
| 5. Installation Date: **12-21-94 & 12-16-94** | |
| 6. Performance Specification Test Date: **12-21-94 & 12-16-94** | |
| 7. Continuous Monitor Comment (limit to 200 characters): **Coriolis Type Meter. Installed in accordance with Rule 62-214.320, F.A.C., Rule 62-214.330, F.A.C., and 40 CFR Part 75 Appendix D, Section 2.1.** **Note: The serial number reflects the primary unit.** | |

## J. CONTINUOUS MONITOR INFORMATION
## (Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor 3 of 4

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **NOx** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer: **Teco**<br>Model Number: **42D** | Serial Number: **42D45683274** |
| 5. Installation Date: **2-28-95** | |
| 6. Performance Specification Test Date: **5-24-95 (certification date)** | |
| 7. Continuous Monitor Comment (limit to 200 characters):<br><br>**Installed in accordance with Rule 62-214.320, F.A.C., Rule 62-214.330, F.A.C., and 40 CFR Part 75 Appendix D, Section 2.1.**<br><br>**Note: The serial number reflects the primary unit.** | |

Continuous Monitoring System: Continuous Monitor 4 of 4

| | |
|---|---|
| 1. Parameter Code: **CO2** | 2. Pollutant(s): **Carbon Dioxide** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer: **Teco**<br>Model Number: **41H** | Serial Number:**41H48548281** |
| 5. Installation Date: **2-28-96** | |
| 6. Performance Specification Test Date: **2-28-96** | |
| 7. Continuous Monitor Comment (limit to 200 characters):<br><br>**Installed in accordance with Rule 62-214.320, F.A.C., Rule 62-214.330, F.A.C., and 40 CFR Part 75 Appendix D, Section 2.1.**<br><br>**Note: The serial number reflects the primary unit.** | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
### (Regulated and Unregulated Emissions Units)

**PSD Increment Consumption Determination**

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [X] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ X ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [ ] C | [X] E | [ ] Unknown |
| SO2 | [ ] C | [X] E | [ ] Unknown |
| NO2 | [ ] C | [X] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | **77.63** lb/hour | **155** tons/year |
| SO2 | | **1707.75** lb/hour | **3390** tons/year |
| NO2 | | | **41.6** tons/year |
| 5. PSD Comment (limit to 200 characters): | | | |

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements for All Applications**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[ ] Attached, Document ID:______ [ ] Not Applicable [X ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ X ] Attached, Document ID: EU11-02 [ ] Not Applicable [ ] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[ ] Attached, Document ID:______ [ X ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:______ [ ] Not Applicable [X ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID:______<br>[ X ] Previously submitted, Date: September 19, 1996<br>[ ] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ X ] Attached, Document ID: EU11-03 [ ] Not Applicable |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID:______ [ X ] Not Applicable |
| 8. | Supplemental Information for Construction Permit Application<br>[ ] Attached, Document ID:______ [ X ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:______ [X ] Not Applicable |

**Additional Supplemental Requirements for Category I Applications Only**

| |
|---|
| 10. Alternative Methods of Operation<br>[ X ] Attached, Document ID: **EU11-04** [ ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:________ [ ] Not Applicable |
| 12. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID: ________ [ X ] Not Applicable |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID: ________ [ X ] Not Applicable |
| 14. Acid Rain Application (Hard-copy Required)<br><br>[ X ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID: **EU11-05**<br><br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:________<br><br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:________<br><br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:________<br><br>[ ] Not Applicable |

**Attachment EU11-01**

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 1 of 3
Calc. No.: 940819DH09

**Emission Unit Description:**
The emissions unit is a Riley steam generator designated Boiler No. 7. The unit is currently operating under a nonfederally enforceable operating permit issued by the FDEP and has been assigned the tracking number 10TLH65000107. The unit pre-dates the PSD regulations. The unit is capable of firing residual fuel oil, on-spec used oil, natural gas, any of the lighter fuel oils (i.e., fuel oil Nos. 5, 4, ..) or any combination thereof. The unit is rated for a maximum heat input rate of 621 mmBtu/hr when firing fuel oil or natural gas and a nominal 44 MW and 500,000 lbs/hr of steam. The existing operating permit allows continuous operation with restrictions on VE (20% & excess emissions), PM (0.1 lb.mmBtu - normal operation & 0.3 lb/mmBtu - soot blowing), and SO2 (1.87 lb/mmBtu & sulfur content of 1.8% by wt). The federally enforceable emission limitations established through the SIP are the same as those in the permit. Following the successful operation of Unit 8, annual emissions from Unit 7 will be limited by the requested facility wide caps on sulfur dioxide and nitrogen oxides.

**References:**
No. 1 - FDEP Permit No. AO37-242825, Spec. Condition Nos. 3, 4 & 6
No. 2 - FDEP Rules 62-210.700(1)(2) & (3), 62-296.405(1)(a),(b),(c),1,.h
No. 3 - FGT Maximum Sulfur Content allowed by Tariff
No. 4 - CEMS Data averages

**Operating Parameters**

| | | |
|---|---|---|
| Annual Hours Of Operation (hrs/yr) | AHOP := 8760 | |
| Maximum Heat Input Rate (mmBtu/hr) | MHR1 := 621 | (higher heating value) MHR2 := MHR1 |
| Fuel Oil Heat Content (Btu/Gal) | FOHC := 150000 | |
| Fuel Oil Sulfur Content (% wt) | FOSC := 1.8 | |
| Natural Gas Heat Content (Btu/CF) | NGHC := 1040 | |
| Natural Gasl Sulfur Content (gr/CF) | NGSC := 0.1 | |

Calculated Fuel Oil Usage Rate (kgal/hr)

$$FOUR := MHR1 \cdot \frac{10^6}{FOHC \cdot 1000} \qquad FOUR = 4$$

Calculated Natural Gas Usage Rate (mmCF/hr)

$$NGUR := MHR1 \cdot \frac{10^6}{NGHC \cdot 10^6} \qquad NGUR = 1$$

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 2 of 3
Calc. No.: 940819DH09

<u>Emission Estimates</u>

The following emission estimates are provided as required by Rules 62-213.420(3)(c)1, 2, 3 and 4, FAC. The emission estimates are based on allowable emission limitations as specified by Rule or permit condition. The emission estimates provide hourly rates (lbs/hr) denoted with a "H" and annual emission rates (tons/year) denoted with an "A".

**Emission Estimates - Segment No. 1 (Natural Gas Firing)**

Sulfur Dioxide (SO2) - Potential Emissions (Reference No. 3)

$$NGHSO2 := NGUR \cdot 10^{6} \cdot \frac{NGSC}{7000} \cdot \frac{64}{32} \qquad NGHSO2 = 17.1$$

$$NGASO2 := NGHSO2 \cdot \frac{AHOP}{2000} \qquad NGASO2 = 74.72$$

Nitrogen Oxides (NOx) - Potential Emissions (Reference No. 4)

$$NGHNOX := MHR2 \cdot 0.23 \qquad NGHNOX = 142.8$$

$$NGANOX := NGHNOX \cdot \frac{AHOP}{2000} \qquad NGANOX = 625.6$$

**Emission Estimates - Segment No. 2 (Fuel Oil Firing)**

Particulate Matter Emissions (Reference Nos. 1 & 2) based on 12.5% annual excess emissions.

$ER1PM := 0.1 \qquad ER2PM := 0.3$

$$H1PM := MHR1 \cdot ER1PM \qquad H1PM = 62$$ Allowable Emissions

$$H2PM := MHR1 \cdot ER2PM \qquad H2PM = 186$$ Excess Emissions

$$HPM := (1 - .125) \cdot H1PM + .125 \cdot H2PM$$ Annual Average

# FOSTER WHEELER ENVIRONMENTAL CORPORATION
# CALCULATION SHEET - MATHCAD 5.0+

By: D. Hackel
Date: 08/19/94

Ck'd By: D. Graziani, P.E.
Date: 08/26/94

Rv'd: 02/26/97 By: D. Graziani, P.E.

Client: City of Tallahassee
OFS No: 1584.0005.0008

Sheet No.: 3 of 3
Calc. No.: 940819DH09

**Emission Estimates - Segment No. 2 (Fuel Oil Firing)**

Sulfur Dioxide (SO2) - Federally Enforceable Limits (Reference No. 2)

$ER1SO2 := 1.87$

$FOHSO2 := MHR1 \cdot ER1SO2$ $\quad$ $FOHSO2 = 1161.27$

$FOASO2 := FOHSO2 \cdot \frac{AHOP}{2000}$ $\quad$ $FOASO2 = 5086.36$

Nitrogen Oxides (NOX) - Potential Emissions (Reference No. 4)

$ER1NOX := 0.33$

$FOHNOX := MHR1 \cdot ER1NOX$ $\quad$ $FOHNOX = 204.9$

$FOANOX := FOHNOX \cdot \frac{AHOP}{2000}$ $\quad$ $FOANOX = 897.6$

In both cases, Unit 7 is limited by NOx emissions and is also limited by SO2 emissions in the case of fuel oil firing. The proposed emission caps of 80 tons and 467 tons of SO2 and NOx mean that Unit 7 can not continuously operate at full load. These caps also indirectly limit maximum annual emissions of particulate matter.

**Attachment EU11-02**

The attached fuel sample analyses represent "typical" characterizations for the fuels combusted in EU11, Boiler No. 7. Maximum values may be higher. The fuels represented in the analyses are natural gas, fuel oil, and on-spec used oil.

**TYPICAL NATURAL GAS ANALYSIS[1]**

| Analysis | Gravimetric Breakdown (%) |
|---|---|
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur | 0 - 0.34 |
| Ash | 0.0 |
| Proximate Analysis | 99.65 - 100.0 |
| Volatile Matter | 0.0 |
| Fixed Carbon | 0.0 - 0.00138 |
| Moisture | 0.0 |
| Ash | 0.0 - 0.034 |
| Sulfur[2] | |

(1) Heating value (HHV): 964 - 1129 Btu/ft$^3$

(2) Total sulfur (maximum) 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

| TYPICAL NUMBER 6 FUEL OIL ANALYSIS[1], [2] | |
|---|---|
| **Analysis** | **Gravimetric Breakdown (%)** |
| Ultimate Analysis | |
| Carbon | 86.5 - 90.2 |
| Hydrogen | 9.5 - 12.0 |
| Oxygen | - |
| Nitrogen | - |
| Sulfur[3] | 0.7 - 3.5 |
| Ash | 0.01 - 0.5 |

(1) Higher heating value: 17,410 - 18,990 Btu/lb
(2) Density: 8.51 - 7.68 lb/gal
(3) Total sulfur (maximum) 1.8%

Source: Babcock & Wilcox, 1972

**Attachment EU11-03**

The City follows best operational practices in the start-up and shut-down of the boilers at the Purdom Generating Station. Under normal conditions, standard operating guidelines are followed for startup and shutdown of the boilers. Under any abnormal condition of operation, best operational practices are followed to minimize emissions and to minimize the duration of any excess emission.

Attachment EU11-04

Boiler No. 7 (EU11) located at the Purdom Generating Station has a maximum heat input capacity of 621 mmBtu/hour and produces 44 MW electricity. The alternative methods of operation (AMO) associated with the steam generator are related to the fuel type being fired and the operating rate. The current AMOs include the following:

Natural Gas - Up to Maximum Rate of 621 mmBtu/hour

Fuel Oil Firing - Up to Maximum Rate of 621 mmBtu/hour

Fuel Oil No. 6 (residual fuel oil)
Fuel Oil Nos. 2 through 6
On-Spec Used Oil
Co-firing any combination of Fuel Oil No. 6, Fuel Oil Nos. 2 through 6, On-Spec Used Oil, or Natural Gas up to 621 mmBtu/hr.

**Attachment EU11-05**

A new acid rain permit application is included as Attachment EU13-09. The new application includes Unit 7 (Existing Phase II Unit) and Unit 8 combustion turbine (New Unit).

## EMISSION UNIT - 12

# III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

## A. TYPE OF EMISSIONS UNIT
## (Regulated and Unregulated Emissions Units)

**Type of Emissions Unit Addressed in This Section**

1. Regulated or Unregulated Emissions Unit? Check one:

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

**Emissions Unit Description and Status**

| | | |
|---|---|---|
| 1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):<br><br>**Auxilary Boiler** | | |
| 2. Emissions Unit Identification Number: [ ] No Corresponding ID [ ] Unknown<br>**010** | | |
| 3. Emissions Unit Status Code: **C** | 4. Acid Rain Unit?<br>[ ] Yes [ X ] No | 5. Emissions Unit Major Group SIC Code: **49** |
| 6. Emissions Unit Comment (limit to 500 characters):<br><br>**Operation of Emissions Unit 12 (EU12) is restricted by a federally enforceable construction permit which limits operation to 2,000 hours per year, the firing of natural gas and only to periods when steam geneating units 5,6, and 7 are not operating. Following completion of compliance testing on Unit 8, the auxiliary boiler will be limited to operation only during periods when Units 7 and 8 are not operating.** | | |

**Emissions Unit Control Equipment**

**A.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**B.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | |
|---|---|
| 1. Initial Startup Date: **Pending** | |
| 2. Long-term Reserve Shutdown Date: | |
| 3. Package Unit:<br>Manufacturer: **Kewanee** Model Number: **H3S-400-G** | |
| 4. Generator Nameplate Rating: MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: **16.74** mmBtu/hr | | |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters):<br><br>**The maximum heat input rate reported was based on the manufacturer specifications and a heating value of 1,000 Btu/ft$^3$ of natural gas. The actual heat input may vary from the manufacturer specifications based upon the heat content of the natural gas.** | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | **2,000** hours/year |

## B. FACILITY REGULATIONS

**Rule Applicability Analysis** (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

List of Applicable Regulations (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| Rule 62-204.800(7)(b)4,(d) (as applicable) F.A.C. | |
| Rule 62-210.700(1),(4),(6) F.A.C. | |
| Rule 62-296.406, F.A.C. | |
| Rule 62-297.310(2)(b) F.A.C. | |
| Rule 62-297.310(4)(a)2 (except a-c) F.A.C. | |
| Rule 62-297.310(7)(a)1,4a*9 F.A.C. | |
| Rule 62-297.310(8)(a), (b) F.A.C. | |
| 40 CFR 60.7(a)(1),(2),(3),(b) | |
| 40 CFR 60.12 | |
| 40 CFR 60.48c(a),(g),(i) | |
| | |
| The City of Tallahassee has requested that FDEP authorize visible emissions compliance testing once every 5 years, pursuant to Rule 62-297.310(7)(a)4, rather than annual compliance testing required pursuant to Rule 62-297.310(7)(a)4a. | |
| | |
| | |
| | |
| | |
| | |
| | |

## E. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| |
|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: EU12 |
| 2. Emission Point Type Code:<br>[X] 1 [ ] 2 [ ] 3 [ ] 4 |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**This emission point, EU12, represents the exhaust for the Auxilary Boiler.** |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [ ] V [X] W |
| 6. Stack Height: 30 feet |
| 7. Exit Diameter: 2 feet |
| 8. Exit Temperature: 420 °F |
| 9. Actual Volumetric Flow Rate: 4,000 acfm |

| | |
|---|---|
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |
| 13. Emission Point UTM Coordinates:<br>Zone: **16** East (km): **769.767** North (km): **3,339.784** | |
| 14. Emission Point Comment (limit to 200 characters):<br><br>**The exhaust gas exit temperature and actual volumetric flow rate were estimated by a manufacturer service representative. The actual exit temperature and actual flow rate may vary.** | |

## F. SEGMENT (PROCESS/FUEL) INFORMATION
**(Regulated and Unregulated Emissions Units)**

**Segment Description and Rate:** Segment 1 of 1

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Natural Gas** | |
| 2. Source Classification Code (SCC): **1-02-006-02** | |
| 3. SCC Units: **mmSCF** | |
| 4. Maximum Hourly Rate: **0.017** | 5. Maximum Annual Rate: **33.5** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.033** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **1,000 (HHV)** | |
| 10. Segment Comment (limit to 200 characters): **Maximum Annual Rate is based on 2000 hours per year operation at manufacturer specification. Actual Maximum Hourly Rate and Maximum Annual Rate may vary slightly from manufactures specifications.** | |

## G. EMISSIONS UNIT POLLUTANTS
## (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| $SO_2$ | | | EL |
| $NO_x$ | | | EL |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
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| | | | |

## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units Only - Emissions Limited Pollutants Only)

**Pollutant Detail Information:** Pollutant 1 of 2

1. Pollutant Emitted: **$SO_2$**

2. Total Percent Efficiency of Control: %

3. Potential Emissions: **0.47** lb/hour, **Cap** tons/year

4. Synthetically Limited?
   [X ] Yes [ ] No

5. Range of Estimated Fugitive/Other Emissions:
   [ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year

6. Emission Factor:
   Reference:

7. Emissions Method Code:
   [ ] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5

8. Calculation of Emissions (limit to 600 characters):

   **lb/hr = (16.47 x $10^6$ Btu/hr) x (CF/1000 Btu) x (10 gr-S/100 CF) x (lb-S/7000 gr) x (64 lb-$SO_2$/lb-S)**
   **= 0.47 lb/hr**

9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):

   **Emissions unit will be subject to the proposed facility-wide cap following completion of compliance testing of the Unit 8 combustion turbine.**

**Allowable Emissions** (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions:<br>**Upon completion of compliance testing on the Unit 8 combustion turbine.** |
| 3. Requested Allowable Emissions and Units: **facility-wide cap (80 TPY)*** |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters):.<br>**FGT data on sulfur content and fuel flow meter** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>*** Auxiliary boiler is limited to firing natural gas and 2000 hours of operation per year by its construction permit. Its emissions are included in within the cap.** |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units Only - Emissions Limited Pollutants Only)**

**Pollutant Detail Information:** Pollutant 2 of 2

| | | | | | |
|---|---|---|---|---|---|
| 1. Pollutant Emitted: **$NO_x$** | | | | | |
| 2. Total Percent Efficiency of Control: | | | | % | |
| 3. Potential Emissions: | | **2.3** lb/hour, | | **Cap** tons/year | |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | | | | | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 ______ to ______ tons/year | | | | | |
| 6. Emission Factor: **140 lb/mmCF**<br>Reference: **AP-42** | | | | | |
| 7. Emissions Method Code: | | | | | |
| [ ] 0 | [ ] 1 | [X] 2 | [ ] 3 | [ ] 4 | [ ] 5 |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr = (16.47 x $10^6$ Btu/hr) x (CF/1000 Btu) x (mmCF/$10^6$ CF) x (140 lb/mmCF) = 2.3 lb/hr** | | | | | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Emissions unit will be subject to the proposed facility-wide cap following completion of compliance testing of the Unit 8 combustion turbine.** | | | | | |

<u>Allowable Emissions</u> (Pollutant identified on front of page)

**A.**

| |
|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** |
| 2. Future Effective Date of Allowable Emissions: <br> **Upon completion of compliance testing on the Unit 8 combustion turbine.** |
| 3. Requested Allowable Emissions and Units: **Facility-wide cap 467 TPY** |
| 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters):. <br> **AP-42 emission factor (140 lb-$NO_x$/mmCF) and fuel flow meter.** |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): <br><br> *** Auxiliary boiler is limited to firing natural gas and 2000 hours of operation per year by its construction permit. Its emissions are included in within the cap.** |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

## I. VISIBLE EMISSIONS INFORMATION
## (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 2

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE20** | |
| 2. Basis for Allowable Opacity: [X] Rule | [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **20 %** Exceptional Conditions: **40 %**<br>Maximum Period of Excess Opacity Allowed: **2 min/hour** | |
| 4. Method of Compliance: **VE in accordance with EPA Method 9**<br>**Requested once prior to renewal** | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

**Visible Emissions Limitation:** Visible Emissions Limitation of

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE99** | |
| 2. Basis for Allowable Opacity: [X ] Rule | [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: Exceptional Conditions: **100%**<br>Maximum Period of Excess Opacity Allowed: **2 hours/24-hour period** | |
| 4. Method of Compliance | |
| 5. Visible Emissions Comment (limit to 200 characters):<br>**In accordance with 62-210.700(1),F.A.C., excess emissions resulting from startup, shutdown or malfunction are permitted providing that the duration of excess emissions be minimized but in no case to exceed two hours in any 24 hour period unless authorized by the Department for longer duration.** | |

## J. CONTINUOUS MONITOR INFORMATION
## (Regulated Emissions Units Only)

**Continuous Monitoring System:** Continuous Monitor of

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: 1 | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

**Continuous Monitoring System:** Continuous Monitor of

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## . PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION
## (Regulated and Unregulated Emissions Units)

**PSD Increment Consumption Determination**

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

   If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

   [ ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

   [X] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

   [ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[X ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [X ] C | [ ] E | [ ] Unknown |
| SO2 | [X ] C | [ ] E | [ ] Unknown |
| NO2 | [X ] C | [ ] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | 0 lb/hour | 0 tons/year |
| SO2 | | 0 lb/hour | 0 tons/year |
| NO2 | | | 0 tons/year |
| 5. PSD Comment (limit to 200 characters): | | | |

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements for All Applications**

| |
|---|
| 1. Process Flow Diagram<br>[ ] Attached, Document ID: _______ [ ] Not Applicable [X ] Waiver Requested |
| 2. Fuel Analysis or Specification<br>[ ] Attached, Document ID: _______ [ ] Not Applicable [X ] Waiver Requested |
| 3. Detailed Description of Control Equipment<br>[ ] Attached, Document ID:________ [ X ] Not Applicable [ ] Waiver Requested |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID: [X ] Not Applicable [ ] Waiver Requested |
| 5. Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ ] Previously submitted, Date:___________<br>[X ] Not Applicable |
| 6. Procedures for Startup and Shutdown<br>[ X ] Attached, Document ID: EU12-01 [ ] Not Applicable |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |
| 8. Supplemental Information for Construction Permit Application<br>[ ] Attached, Document ID:________ [X] Not Applicable |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:__________[X] Not Applicable |

## Additional Supplemental Requirements for Category I Applications Only

| |
|---|
| 10. Alternative Methods of Operation<br>[ ] Attached, Document ID:_______ [X ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:_______ [ X ] Not Applicable |
| 12. Identification of Additional Applicable Requirements<br>[X ] Attached, Document ID:EU12-02 [ ] Not Applicable |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID: ________ [ X] Not Applicable |
| 14. Acid Rain Application (Hard-copy Required)<br><br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:________<br><br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:________<br><br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:________<br><br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:________<br><br>[ X ] Not Applicable |

**Attachment EU12-01**

The City of Tallahassee follows best operational practices in the startup and shutdown of the boilers at the Purdom Generating Station. Under normal conditions, standard operating guidelines are followed for startup and shutdown of the boilers. Under any abnormal condition of operation, best operational practices are followed to minimize emissions and to minimize the duration of any excess emissions.

**Attachment EU12-02**

Following completion of compliance testing on the Unit 8 combustion turbine the auxiliary boiler's $SO_2$ and $NO_x$ emisions will be subject to the facility-wide caps. This is an additional requirement outside the scope of the regulations. The City requests that a condition be included within the PSD permit, which will become effective upon the completion of compliance testing on Unit 8, which includes $SO_2$ and $NO_x$ emissions within the facility-wide caps.

## EMISSION UNIT - 13

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through L as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application. Some of the subsections comprising the Emissions Unit Information Section of the form are intended for regulated emissions units only. Others are intended for both regulated and unregulated emissions units. Each subsection is appropriately marked.

### A. TYPE OF EMISSIONS UNIT
### (Regulated and Unregulated Emissions Units)

<u>**Type of Emissions Unit Addressed in This Section**</u>

1. Regulated or Unregulated Emissions Unit? Check one:

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

2. Single Process, Group of Processes, or Fugitive Only? Check one:

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

## B. GENERAL EMISSIONS UNIT INFORMATION
## (Regulated and Unregulated Emissions Units)

### Emissions Unit Description and Status

| | | |
|---|---|---|
| 1. Description of Emissions Unit Addressed in This Section (limit to 60 characters):<br>**Unit 8 - Combined Cycle Combustion Turbine** | | |
| 2. Emissions Unit Identification Number: [ ] No Corresponding ID [ X ] Unknown | | |
| 3. Emissions Unit Status Code: **C** | 4. Acid Rain Unit? [X ] Yes [ ] No | 5. Emissions Unit Major Group SIC Code: **49** |
| 6. Emissions Unit Comment (limit to 500 characters): | | |

### Emissions Unit Control Equipment

**A.**

| |
|---|
| 1. Description (limit to 200 characters):<br>**Oxides of Nitrogen**<br>**Dry Low NOx Combustors - Natural Gas Firing** |
| 2. Control Device or Method Code: **025** |

**B.**

| |
|---|
| 1. Description (limit to 200 characters):<br><br>**<u>Oxides of Nitrogen</u>**<br>**Water Injection - Fuel Oil Firing** |
| 2. Control Device or Method Code: **028** |

**C.**

| |
|---|
| 1. Description (limit to 200 characters): |
| 2. Control Device or Method Code: |

## C. EMISSIONS UNIT DETAIL INFORMATION
## (Regulated Emissions Units Only)

### Emissions Unit Details

| | |
|---|---|
| 1. Initial Startup Date: | |
| 2. Long-term Reserve Shutdown Date: | |
| 3. Package Unit:<br>Manufacturer: **General Electric** | Model Number: **MS7001FA** |
| 4. Generator Nameplate Rating: **Nominal 160** MW | |
| 5. Incinerator Information:<br>Dwell Temperature:<br>Dwell Time:<br>Incinerator Afterburner Temperature: | <br>°F<br>seconds<br>°F |

### Emissions Unit Operating Capacity

| | | |
|---|---|---|
| 1. Maximum Heat Input Rate: **1914.1** mmBtu/hr | | |
| 2. Maximum Incineration Rate: | lb/hr | tons/day |
| 3. Maximum Process or Throughput Rate: | | |
| 4. Maximum Production Rate: | | |
| 5. Operating Capacity Comment (limit to 200 characters):<br>**The total generating capacity of the unit has been set at a nominal 250 MW (GT-160 MW and ST - 90 MW). Attachment EU13-01 contains the General Electric data sheets for the proposed unit. These data sheets provide the heat input rates for various loads, ambient temperatures and fuels. The maximum heat input occurs while firing distillate fuel oil at 100 percent load. At 20 °F this corresponds to 1914.1 mmBtu/hr for Number 2 (0.05% Sulfur) diesel fuel oil and 1682.2 mmBtu/hr for natural gas. Upon completion of compliance testing, the City will provide temperature and heat input curves.** | | |

### Emissions Unit Operating Schedule

| | | |
|---|---|---|
| Requested Maximum Operating Schedule: | | |
| | hours/day | days/week |
| | weeks/year | **8,760** hours/year |

DEP Form No. 62-210.900(1) - Form
Effective: 3/21/96

## B. FACILITY REGULATIONS

<u>**Rule Applicability Analysis**</u> (Required for Category II applications and Category III applications involving non Title-V sources. See Instructions.)

<u>List of Applicable Regulations</u> (Required for Category I applications and Category III applications involving Title-V sources. See Instructions.)

| | |
|---|---|
| Rule 62-204.800(7)(b)38,(d), F.A.C.* | 40 CFR 60.13 (a),(b),(d)(1),(e),(f),(h) |
| Rule 62-204.800(14);(15);(16);(18), F.A.C. | 40 CFR 60.332 (a)(1),(3); (b);(f);(i) |
| Rule 62-210.300(1), F.A.C. | 40 CFR 60.333 |
| Rule 62-210.550, F.A.C. | 40 CFR 60.334 |
| Rule 62-210.650, F.A.C. | 40 CFR 60.335 |
| Rule 62-210.700(1),(4),(6) , F.A.C. | 40 CFR 72.6(a)(3)(i) |
| Rule 62-214.300, F.A.C. | 40 CFR 72.9 |
| Rule 62-214.320(1)(b),(2) F.A.C | 40 CFR 72.20 (a)-(c) |
| Rule 62-214.330(1), F.A.C. | 40 CFR 72.21 |
| Rule 62-214.350(2),(3),(5),(6), F.A.C. | 40 CFR 72.22 |
| Rule 62-296.320(4)(b), F.A.C. | 40 CFR 72.23 |
| Rule 62-297.310(1),(2),(3),(4),(5), F.A.C. | 40 CFR 72.24 |
| Rule 62-297.310(6)(a),(c)-(g) F.A.C. | 40 CFR 72.30(a),(b)(2)(ii),(c),(d) |
| Rule 62-297.310(7)(a)1,3,4,5,8,9,(c) F.A.C. | 40 CFR 72.31 |
| Rule 62-297.310(8) F.A.C. | 40 CFR 72.32 |
| 40 CFR 60.7(a)(1),(2),(3),(4),(5) | 40 CFR 72.40(a)(1) |
| 40 CFR 60.7(b),(c),(d),(f) | 40 CFR 72.51 |
| 40 CFR 60.8(a),(b),(c),(d),(e),(f) | 40 CFR 72.80(b),(c),(d),(f),(g) |
| 40 CFR 60.11(a),(b),(c);(e)(1),(2) | 40 CFR 72.81** |
| 40 CFR 60.12 | 40 CFR 72.82** |

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving TitleV sources. See Instructions.)

| | |
|---|---|
| **40 CFR 72.83**** | **40 CFR 75.33(a),(c)** |
| **40 CFR 72.84**** | **40 CFR 75.35** |
| **40 CFR 72.90** | **40 CFR 75.36** |
| **40 CFR Part 72, Appendices A and B** | **40 CFR 75.50(a),(b),(d),(e)** |
| **40 CFR 75.4(b)(2)** | **40 CFR 75.53** |
| **40 CFR 75.5** | **40 CFR 75.54 [except (c) & (f)]** |
| **40 CFR 75.10(a)(1),(2),(3)** | **40 CFR 75.55(c)** |
| **40 CFR 75.10(b),(c),(d),(f),(g)** | **40 CFR 75.56** |
| **40 CFR 75.11(d)(2)** | **40 CFR 75.60** |
| **40 CFR 75.12 (a),(b)** | **40 CFR 75.61** |
| **40 CFR 75.13** | **40 CFR 75.62** |
| **40 CFR 75.14(c)** | **40 CFR 75.63** |
| **40 CFR 75.20(a)** | **40 CFR 75.64** |
| **40 CFR 75.20(b),(c),(d),(g)** | **40 CFR 75, Appendix A** |
| **40 CFR 75.22** | **40 CFR 75, Appendix B** |
| **40 CFR 75.24** | **40 CFR 75, Appendix C** |
| **40 CFR 75.30** | **40 CFR 75, Appendix D** |
| **40 CFR 75.31** | **40 CFR 75, Appendix G, 2,4** |
| **40 CFR 75.32** | **40 CFR 75, Appendix H** |

**List of Applicable Regulations** (Required for Category I applications and Category III applications involving TitleV sources. See Instructions.)

| | |
|---|---|
| **40 CFR 77.3**** | |
| **40 CFR 77.5(b)**** | |
| **40 CFR 77.6**** | |
| **40 CFR 73.33(c),(d),(e)** | |
| **40 CFR 73.35** | |
| **40 CFR 75.52** | |
| **40 CFR 72.21(a),(c)** | |
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*** - State Only Requirements**
**** - Potential Future Regulations**

## E. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| |
|---|
| 1. Identification of Point on Plot Plan or Flow Diagram: **EU13** |
| 2. Emission Point Type Code:<br>[X] 1 [ ] 2 [ ] 3 [ ] 4 |
| 3. Descriptions of Emissions Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**This emission point, EU13, represents the exhaust for the Unit 8 combustion turbine.** |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: |
| 5. Discharge Type Code:<br>[ ] D [ ] F [ ] H [ ] P<br>[ ] R [X] V [ ] W |
| 6. Stack Height: **200 Above Ground Level** feet |
| 7. Exit Diameter: **16.5** feet |
| 8. Exit Temperature: **171 - 203** °F |
| 9. Actual Volumetric Flow Rate: **622,306 - 1,119,935** acfm |

| | |
|---|---|
| 10. Percent Water Vapor : | % |
| 11. Maximum Dry Standard Flow Rate: | dscfm |
| 12. Nonstack Emission Point Height: | feet |

13. Emission Point UTM Coordinates:
Zone: **16** East (km): **769.611** North (km): **3339.767**

14. Emission Point Comment (limit to 200 characters):

## F. SEGMENT (PROCESS/FUEL) INFORMATION
## (Regulated and Unregulated Emissions Units)

Segment Description and Rate: Segment 1 of 2

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **Natural Gas** | |
| 2. Source Classification Code (SCC): **10100601** | |
| 3. SCC Units: **mmSCF** | |
| 4. Maximum Hourly Rate: **1.9** 1,900,000 | 5. Maximum Annual Rate: **see field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.033** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **904 (LHV)** | |
| 10. Segment Comment (limit to 200 characters): **Maximum hourly usage rate is based on full load operation at an ambient temperature of 20 °F. Actual hourly rate will vary depending on ambient conditions.** **Actual Annual Rate will vary based on the requested facility-wide caps** | |

**Segment Description and Rate:** Segment 2 of 2

| | |
|---|---|
| 1. Segment Description (Process/Fuel Type and Associated Operating Method/Mode) (limit to 500 characters): **No. 2 (0.05% Sulfur) Diesel Fuel Oil** | |
| 2. Source Classification Code (SCC): **10100401** | |
| 3. SCC Units: **Gallons** | |
| 4. Maximum Hourly Rate: **14,500** | 5. Maximum Annual Rate: **see field 10** |
| 6. Estimated Annual Activity Factor: | |
| 7. Maximum Percent Sulfur: **0.05** | 8. Maximum Percent Ash: |
| 9. Million Btu per SCC Unit: **132,000 (LHV)** .132 mmBtu/gal | |
| 10. Segment Comment (limit to 200 characters): **Maximum hourly usage rate is based on full load operation at an ambient temperature of 20 °F. Actual hourly rate will vary depending on ambient conditions.** **Actual Annual Rate will vary based on the requested facility-wide caps** | |

## G. EMISSIONS UNIT POLLUTANTS
## (Regulated and Unregulated Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| CO | | | NS |
| PM | | | NS |
| PM10 | | | NS |
| NOx | | | EL |
| SO2 | | | EL |
| VOC | | | NS |
| H106 | | | NS |
| H133 | | | NS |
| HAPS | | | NS |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## H. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units Only - Emissions Limited Pollutants Only)**

**Pollutant Detail Information:** Pollutant 1 of 6

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **192** lb/hour, | **(See Field 9)** tons/year |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | _______ to _______ tons/year |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr - See Appendix A of the PSD Application.**<br><br>**See Field 9** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Actual hourly emissions will vary based on load and ambient temperature. Actual annual emissions will be limited indirectly by the facility-wide emission caps on $SO_2$ and $NO_x$.** | |

Allowable Emissions (Pollutant identified on front of page)

A.

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **Rule - BACT (62-212.400 (5) (c)), F.A.C.** | |
| 2. Future Effective Date of Allowable Emissions:<br>**Upon completion of compliance testing** | |
| 3. Requested Allowable Emissions and Units: **See Field 6** | |
| 4. Equivalent Allowable Emissions: lb/hour | tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>**BACT for this unit is "good combustion practices," no short-term emission limits are proposed.** | |

B.

| |
|---|
| 1. Basis for Allowable Emissions Code: |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:** Pollutant 2 of 6

| | |
|---|---|
| 1. Pollutant Emitted: **PM** | |
| 2. Total Percent Efficiency of Control: % | |
| 3. Potential Emissions: **17** lb/hour, **(*See Field 9)** tons/year | |
| 4. Synthetically Limited?<br>[**X**] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year | |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[**X**] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr - See Appendix A of the PSD Application.** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Actual annual emissions will be limited indirectly by the facility-wide emission caps on $SO_2$ and $NO_x$.** | |

Allowable Emissions (Pollutant identified on front of page)

A.

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: : **RULE - BACT (62-212.400(5)(c), F.A.C.)** | |
| 2. Future Effective Date of Allowable Emissions:<br>**Upon completion of compliance testing** | |
| 3. Requested Allowable Emissions and Units: | |
| 4. Equivalent Allowable Emissions: lb/hour | tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>**BACT for this unit is combustion turbine inlet air filtration, good combustion practices and fuel quality. No emission limits are proposed.** | |

B.

| |
|---|
| 1. Basis for Allowable Emissions Code: : |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:** Pollutant 3 of 6

| | |
|---|---|
| 1. Pollutant Emitted: **PM10** | |
| 2. Total Percent Efficiency of Control: % | |
| 3. Potential Emissions: **17** lb/hour, **(*See Field 9)** tons/year | |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 _______ to _______ tons/year | |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[X] 0 [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr - See Appendix A of the PSD Application.** | |
| 9. Pollutant Potential/Estimated Emissions Comment (limit to 200 characters):<br><br>**Actual annual emissions will be limited indirectly by facility-wide emission caps on $SO_2$ and $NO_x$.** | |

Allowable Emissions (Pollutant identified on front of page)

**A.**

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: : **RULE - BACT (62-212.400(5)(c).F.A.C.)** | |
| 2. Future Effective Date of Allowable Emissions:<br>**Upon completion of compliance testing** | |
| 3. Requested Allowable Emissions and Units: | |
| 4. Equivalent Allowable Emissions: lb/hour | tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters):<br><br>**BACT for this unit is combustion turbine inlet air filtration, good combustion practices, and fuel quality. No emission limits are proposed.** | |

**B.**

| |
|---|
| 1. Basis for Allowable Emissions Code: : |
| 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: |
| 4. Equivalent Allowable Emissions: |
| 5. Method of Compliance (limit to 60 characters): |
| 6. Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:** Pollutant 3 of 6

| | |
|---|---|
| 1. Pollutant Emitted: **NOx** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **347** lb/hour, | **Cap** tons/year |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | _______ to _______ tons/year |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr - See Appendix A of the PSD Application.**<br><br>**TPY=467 TPY - Facility Wide Cap** | |
| 9. Pollutant Potential Estimated Emissions Comment (limit to 200 characters):<br><br>**Potential hourly emissions based on 100 percent load at an ambient temperature of 20 °F while firing fuel oil. These short term potentials do not include start-up, shut-down or malfunctions which are included within the requested annual cap. Information in Appendix A of the PSD application regarding short term NOx emission rates reflects operations at steady-state and does not include allowances for fuels containing fuel bound nitrogen levels above 0.015 percent. Predicted short-term steady-state emission levels follow 2-4 hour start-up periods.** | |

<u>Allowable Emissions</u> (Pollutant identified on front of page)

A.

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: **Rule** |
| 2. | Future Effective Date of Allowable Emissions: **Upon Completion of Compliance Testing** |
| 3. | Requested Allowable Emissions and Units: **NSPS Emission Limits** |
| 4. | Equivalent Allowable Emissions: lb/hour tons/year |
| 5. | Method of Compliance (limit to 60 characters): **EPA Reference Method 20** |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **This unit is subject to 40 CFR Part 60, Subpart GG. Maximum short-term rates, excluding start-up, shutdown and malfunction must meet the limits of 40 CFR 60.332(a)(1), and (3). Actual annual emissions are limited by the proposed facility-wide caps on $NO_x$ and $SO_2$.** |

B.

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: **ESCPSD** |
| 2. | Future Effective Date of Allowable Emissions: **Upon completion of compliance testing** |
| 3. | Requested Allowable Emissions and Units: **467 TPY** |
| 4. | Equivalent Allowable Emissions: |
| 5. | Method of Compliance (limit to 60 characters): **CEMS Data** |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

**Pollutant Detail Information:** Pollutant 3 of 6

| | |
|---|---|
| 1. Pollutant Emitted: **SO2** | |
| 2. Total Percent Efficiency of Control: | % |
| 3. Potential Emissions: **98** lb/hour, | **Cap** tons/year |
| 4. Synthetically Limited?<br>[X ] Yes [ ] No | |
| 5. Range of Estimated Fugitive/Other Emissions:<br>[ ] 1 [ ] 2 [ ] 3 | _______ to _______ tons/year |
| 6. Emission Factor:<br>Reference: | |
| 7. Emissions Method Code:<br>[] 0 [ ] 1 [X] 2 [ ] 3 [ ] 4 [ ] 5 | |
| 8. Calculation of Emissions (limit to 600 characters):<br><br>**lb/hr - See Appendix A of the PSD application**<br><br>**TPY=80 TPY - Facility Wide Cap** | |
| 9. Pollutant Potential Estimated Emissions Comment (limit to 200 characters):<br><br>**Potential hourly emissions are based on 100 percent load at an ambient temperature of 20 °F while firing No. 2 diesel fuel oil with a maximum sulfur content of 0.05 percent by weight, based on 95 percent conversion of the sulfur to $SO_2$ per the GE data sheets.** | |

<u>Allowable Emissions</u> (Pollutant identified on front of page)

A.

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: **Rule** |
| 2. | Future Effective Date of Allowable Emissions: **Upon start-up of Unit 8** |
| 3. | Requested Allowable Emissions and Units: **Maximum Fuel Sulfur Content of 0.8 percent by weight.** |
| 4. | Equivalent Allowable Emissions: lb/hour tons/year |
| 5. | Method of Compliance (limit to 60 characters): **Custom Fuel Monitoring Schedule (See Appendix PGS-10)** |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): **Short-term emissions are limited by 40 CFR 60.333(b) which limits fuel oil sulfur content to 0.8 percent by weight. Actual annual emissions are limited by the facility-wide caps on $SO_2$ and $NO_x$.** |

B.

| | |
|---|---|
| 1. | Basis for Allowable Emissions Code: **ESCPSD** |
| 2. | Future Effective Date of Allowable Emissions: **Upon completion of compliance testing** |
| 3. | Requested Allowable Emissions and Units: **80 tons/yr** |
| 4. | Equivalent Allowable Emissions: |
| 5. | Method of Compliance (limit to 60 characters): **40 CFR Part 75 Appendix D with a 95 percent conversion factor based on the custom fuel monitoring schedule.** |
| 6. | Pollutant Allowable Emissions Comment (Desc. of Related Operating Method/Mode) (limit to 200 characters): |

## VISIBLE EMISSIONS INFORMATION
## (Regulated Emissions Units Only)

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 1

| |
|---|
| 1. Visible Emissions Subtype: **VE20** |
| 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: **20 %** Exceptional Conditions: **100 %**<br>Maximum Period of Excess Opacity Allowed: **2 hours/24 hours** |
| 4. Method of Compliance: **EPA Reference Method 9** |
| 5. Visible Emissions Comment (limit to 200 characters):<br><br>**Excess emissions allowed per Rule 62-210.700(1), F.A.C.** |

**Visible Emissions Limitation:** Visible Emissions Limitation _ of _

| |
|---|
| 1. Visible Emissions Subtype: |
| 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: Exceptional Conditions<br>Maximum Period of Excess Opacity Allowed: * |
| 4. Method of Compliance |
| |

## J. CONTINUOUS MONITOR INFORMATION
## (Regulated Emissions Units Only)

Continuous Monitoring System: Continuous Monitor 1 of 3

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **$NO_x$** |
| 3. CMS Requirement: | [X] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**See Attachment EU13-01.**<br>**(Acid Rain Regulations)** | |

Continuous Monitoring System: Continuous Monitor 2 of 3

| | |
|---|---|
| 1. Parameter Code: **$O_2$ or $CO_2$** | 2. Pollutant(s): |
| 3. CMS Requirement: | [X ] Rule [] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**See Attachment EU13-01.**<br>**(Acid Rain Regulations)** | |

## J. CONTINUOUS MONITOR INFORMATION
## (Regulated Emissions Units Only)

<u>Continuous Monitoring System:</u> Continuous Monitor 3 of 3

| | |
|---|---|
| 1. Parameter Code: **WTF** | 2. Pollutant(s): |
| 3. CMS Requirement: | [X] Rule    [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date:) | |
| 7. Continuous Monitor Comment (limit to 200 characters):<br><br>**See Attachment EU13-01.**<br><br>**(NSPS Regulations)** | |

<u>Continuous Monitoring System:</u> Continuous Monitor of

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule    [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: | Serial Number: |
| 5. Installation Date: | |
| 6. Performance Specification Test Date: | |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## K. PREVENTION OF SIGNIFICANT DETERIORATION (PSD) INCREMENT TRACKING INFORMATION (Regulated and Unregulated Emissions Units)

### PSD Increment Consumption Determination

1. Increment Consuming for Particulate Matter or Sulfur Dioxide?

If the emissions unit addressed in this section emits particulate matter or sulfur dioxide, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for particulate matter or sulfur dioxide. Check the first statement, if any, that applies and skip remaining statements.

[X ] The emissions unit is undergoing PSD review as part of this application, or has undergone PSD review previously, for particulate matter or sulfur dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after January 6, 1975. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after January 6, 1975, but before December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after December 27, 1977. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

2. Increment Consuming for Nitrogen Dioxide?

If the emissions unit addressed in this section emits nitrogen oxides, answer the following series of questions to make a preliminary determination as to whether or not the emissions unit consumes PSD increment for nitrogen dioxide. Check first statement, if any, that applies and skip remaining statements.

[ ] The emissions unit addressed in this section is undergoing PSD review as part of this application, or has undergone PSD review previously, for nitrogen dioxide. If so, emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source pursuant to paragraph (c) of the definition of "major source of air pollution" in Chapter 62-213, F.A.C., and the emissions unit addressed in this section commenced (or will commence) construction after February 8, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] The facility addressed in this application is classified as an EPA major source, and the emissions unit began initial operation after February 8, 1988, but before March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ ] For any facility, the emissions unit began (or will begin) initial operation after March 28, 1988. If so, baseline emissions are zero, and emissions unit consumes increment.

[ **X** ] None of the above apply. If so, the baseline emissions of the emissions unit are nonzero. In such case, additional analysis, beyond the scope of this application, is needed to determine whether changes in emissions have occurred (or will occur) after the baseline date that may consume or expand increment.

| | | | |
|---|---|---|---|
| 3. Increment Consuming/Expanding Code: | | | |
| PM | [**X** ] C | [ ] E | [ ] Unknown |
| SO2 | [**X** ] C | [ ] E | [ ] Unknown |
| NO2 | [**X** ] C | [ ] E | [ ] Unknown |
| 4. Baseline Emissions: | | | |
| PM | | **0** lb/hour | **0** tons/year |
| SO2 | | **0** lb/hour | **0** tons/year |
| NO2 | | | **0** tons/year |
| 5. PSD Comment (limit to 200 characters): | | | |

## L. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements for All Applications**

| |
|---|
| 1. Process Flow Diagram<br>[ X ] Attached, Document ID: EU13-02 [ ] Not Applicable [ ] Waiver Requested |
| 2. Fuel Analysis or Specification<br>[ X ] Attached, Document ID: EU13-03 [ ] Not Applicable [ ] Waiver Requested |
| 3. Detailed Description of Control Equipment<br>[X ] Attached, Document ID: EU13-04 [ ] Not Applicable [ ] Waiver Requested |
| 4. Description of Stack Sampling Facilities<br>[ X ] Attached, Document ID: EU13-05 [ ] Not Applicable [ ] Waiver Requested |
| 5. Compliance Test Report<br>[ ] Attached, Document ID:________<br>[ ] Previously submitted, Date:______<br>[ X ] Not Applicable:____________ |
| 6. Procedures for Startup and Shutdown<br>[ X ] Attached, Document ID: EU13-06 [ ] Not Applicable |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID:________ [ X ] Not Applicable |
| 8. Supplemental Information for Construction Permit Application **PSD**<br>[X ] Attached, Document ID: PGS07 [ ] Not Applicable |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID: ________[X ] Not Applicable |

**Additional Supplemental Requirements for Category I Applications Only**

| |
|---|
| 10. Alternative Methods of Operation<br>[ X ] Attached, Document ID: EU13-07 [ ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:________[X ] Not Applicable |
| 12. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID: [ X ] Not Applicable |
| 13. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID: ________[ X ] Not Applicable |
| 14. Acid Rain Application (Hard-copy Required)<br><br>[ X ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID: EU13-08<br><br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:________<br><br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:<br><br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:________<br><br>[ ] Not Applicable |

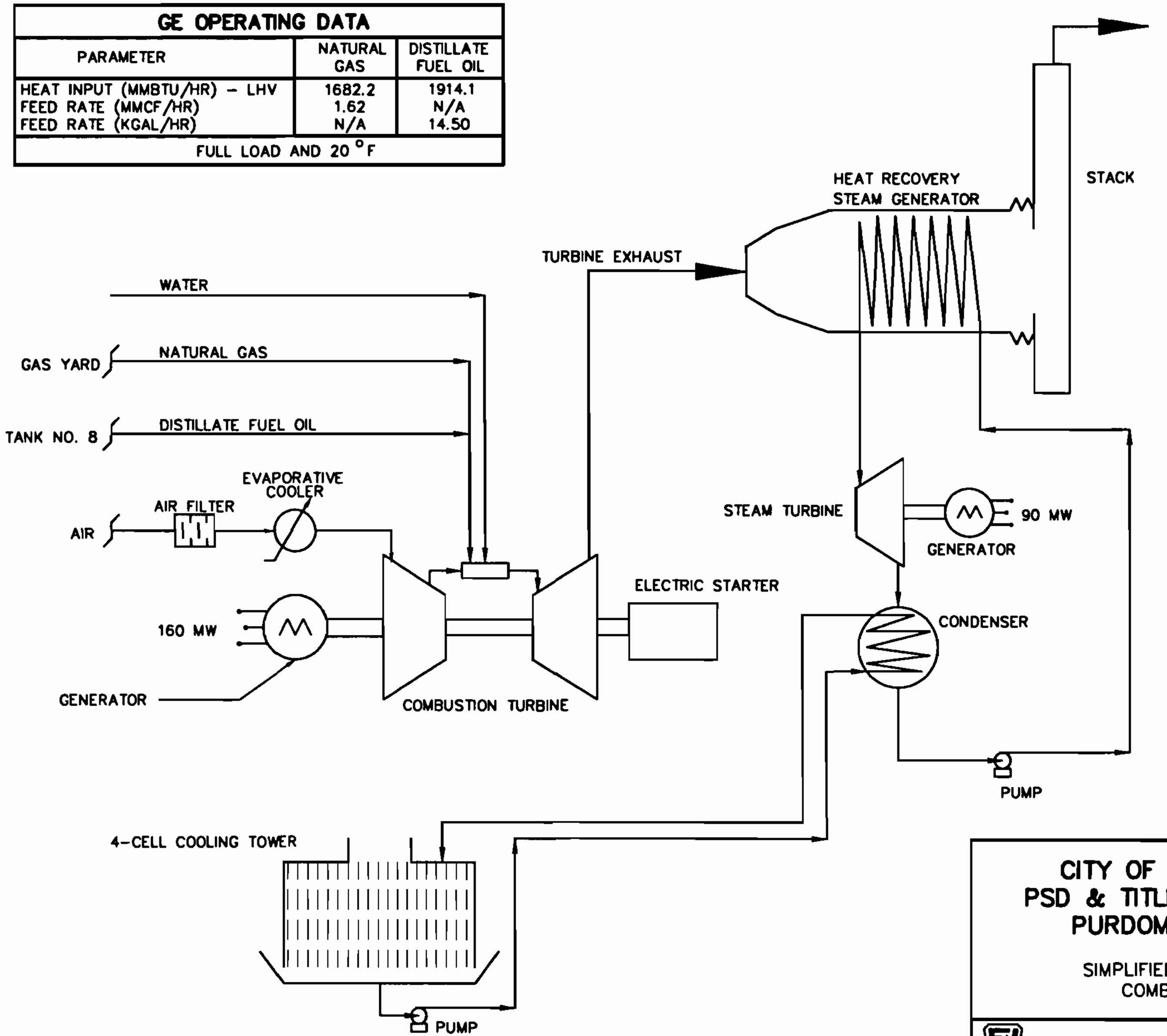
**Attachment EU13-01**

The Unit 8 combustion turbine will be subject to the Acid Rain regulations and required to implement a continuous emissions monitoring program. Currently the pollutants expected to monitored include oxidies of nitrogen ($NO_x$) and a diluent gas ($CO_2$). In addition, a water-to-fuel ratio monitoring system will be required when firing Number 2 oil under Subpart GG. The City plans to submit a monitoring protocol prior to start-up of Unit 8. The specific parameters to monitored and equipment used for the monitoring will be provided in this protocol.

Attachment EU13-02

| GE OPERATING DATA | | |
|---|---|---|
| PARAMETER | NATURAL GAS | DISTILLATE FUEL OIL |
| HEAT INPUT (MMBTU/HR) – LHV | 1682.2 | 1914.1 |
| FEED RATE (MMCF/HR) | 1.62 | N/A |
| FEED RATE (KGAL/HR) | N/A | 14.50 |
| FULL LOAD AND 20 °F | | |

| EU13 – EXHAUST PARAMETERS |
|---|
| EXHAUST TEMP. – 171 TO 203 °F |
| STACK HEIGHT – 200' |
| SO2 EMISSIONS – 80 TPY |
| NOx EMISSIONS – 467 TPY |
| OPACITY – 20% EXCEPT AS ALLOWED |




| CITY OF TALLAHASSEE, FLORIDA<br>PSD & TITLE V PERMIT APPLICATIONS<br>PURDOM GENERATING STATION<br><br>SIMPLIFIED PROCESS FLOW DIAGRAM<br>COMBINED CYCLE – UNIT 8 | | |
|---|---|---|
| FOSTER WHEELER ENVIRONMENTAL CORPORATION | | |
| SCALE: N/A<br>DATE: 02/27/97 | BY: DJG<br>CKD' BY: DF<br>REV. BY: djg | CAD FILE NO. PUNIT8.DWG<br>FIGURE NO. EU13-02 |

SOURCE: FOSTER WHEELER ENVIRONMENTAL CORPORATION, 1997

Attachment EU13-03

The attached fuel sample analyses represent "typical" characterizations for the fuels combusted in the Unit 8 combustion turbine. Actual values may vary, The fuels represented in the analyses include natural gas and Number 2 (0.05% Sulfur) diesel fuel Oil

| TYPICAL NATURAL GAS ANALYSIS[1] | |
|---|---|
| **Analysis** | **Gravimetric Breakdown (%)** |
| Ultimate Analysis | |
| Carbon | 64.84 - 75.25 |
| Hydrogen | 20.85 - 23.53 |
| Oxygen | 0 - 1.58 |
| Nitrogen | 0.76 - 12.90 |
| Sulfur | 0 - 0.34 |
| Ash | 0.0 |
| Proximate Analysis | 99.65 - 100.0 |
| Volatile Matter | 0.0 |
| Fixed Carbon | 0.0 - 0.00138 |
| Moisture | 0.0 |
| Ash | 0.0 - 0.034 |
| Sulfur[2] | |

(1) Heating value (HHV): 964 - 1129 Btu/$ft^3$
(2) Total sulfur (maximum) 10 grains/100 SCF

Source: Babcock & Wilcox, 1972 and RE&C, 1997

| TYPICAL NUMBER 2 (0.05% S) DIESEL FUEL OIL ANALYSIS[1] | |
|---|---|
| **Analysis** | **Gravimetric Breakdown (%)** |
| Ultimate Analysis | |
| Carbon | 86.1 - 88.2 |
| Hydrogen | 11.8 - 13.9 |
| Oxygen | 0.0 |
| Nitrogen | 0.0 - 0.1 |
| Sulfur[2] | 0.0 - 0.05 |
| Ash | 0.0 - 0.05 |
| Proximate Analysis | |
| Volatile Matter | 99.05 - 99.5 |
| Fixed Carbon | 0.25 - 1.0 |
| Moisture | 0.0 - 0.1 |
| Ash | 0.0 - 0.05 |

(1) Higher heating value: 19,170 - 19,750 Btu/lb
(2) Total sulfur (maximum) 0.05%

Source: Babcock & Wilcox, 1972 and RE&C, 1997

**Attachment EU13-04**

For the Unit 8 combustion turbine the proposed air pollution controls based on the evaluation of Best Available Control Technology (BACT) included the following:

- For the primary control of CO and VOC, good combustion practices which maximize $NO_x$ reductions while minimizing CO, VOC, and $PM_{10}$ emissions is proposed as BACT.
- For the primary control of $PM_{10}$, trace metals, and total fluorides combustion inlet air filtration coupled with good combustion practices and fuel quality is proposed as BACT. The use of clean pipeline quality natural gas and Number 2 (0.05% Sulfur) diesel fuel oil is the most stringent control technology available.
- For the primary control of $NO_x$, combustion controls including dry-low $NO_x$ combustors and wet injection techniques coupled with fuel quality is representative of BACT given the regulatory status of $NO_x$ emissions.
- For the primary control of $SO_2$, and $H_2SO_4$, and the secondary control of $NO_x$ and $PM_{10}$, clean pipeline quality natural gas and Number 2 (0.05% Sulfur) diesel fuel oil is the most stringent control technology available.

The overall control strategy is based on the use of clean fuels and good combustion practices which are necessary for the proper operation of the combustion turbine. Appendix A of the PSD application contains a GE paper which further describes the operation of the Dry-Low NOx combustors.

**Attachment EU13-05**

Combined Cycle Unit 8 (EU13) will be required to conduct compliance testing of the stack gas emissions for oxides of nitrogen per 40 CFR 60 Subpart GG. Therefore, the project will include stack sampling facilities pursuant to Section 62-297.310(6), Florida Administrative Code (F.A.C.), on the stack. The final design of these facilities will meet the requirements of Rules 62-297.310(6)(a), (c), (d), (e), (f), and (g), or be capable of meeting the requirements on a temporary basis as allowed by Rule 62-297.310(6)(b).

**Attachment EU13-06**

The City of Tallahassee proposes to follow best operational practices in the startup and shutdown of the Unit 8 combined cycle at the Purdom Generating Station. Under normal conditions, standard operating guidelines will be followed for startup and shutdown of the unit. Under any abnormal condition of operation, best operational practices will followed to minimize emissions and to minimize the duration of any excess emissions. Available information indicates that the start-up of Unit 8, including the combustion turbine and the nonfired heat recovery steam generator will require more than the two hour time limit allowed to achieve steady-state operation.

**Attachment EU13-07**

The Unit 8 combustion turbine (EU13) is planned to be used as a base loaded unit. It will be fueled by either clean pipeline quality natural gas or Number 2 (0.05% Sulfur) diesel fuel oil. The alternative methods of operation (AMO) associated with the combustion turbine are related to the type of fuel being fired and the rate of operation. The current AMOs include the following:

Natural Gas Firing

No. 2 Fuel Oil Firing

The unit can also vary load between 50 and 100 percent as required.

**Attachment EU13-08**

The Acid Rain permit application is attached.

# FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
# DIVISION OF AIR RESOURCES MANAGEMENT

INSTRUCTIONS FOR DEP FORM NO. 62-210.900(1)(a)
AIR PERMIT APPLICATION FORM
ACID RAIN PART (PHASE II)

The Acid Rain Program regulations require that the designated representative submit an Acid Rain Part application for each Acid Rain source with an Acid Rain unit. The Acid Rain Part application is binding on the owners and operators of the Acid Rain source and is enforceable in the absence of a Title V permit until the Department either issues a permit to the source or disapproves the application. You must submit the Acid Rain Part application for an initial Title V permit for Acid Rain sources no later than the deadlines for Title V permit applications under Rule 62-213.420, F.A.C.

**STEP 1**

Please type the required entries in the form.

If you need more space, make copies of the pertinent page(s).

When you have completed the form, indicate the page order and total number of pages (e.g., 1 of 4, 2 of 4, etc.) on each page of the submission.

The alternate designated representative may sign in lieu of the designated representative.

If you need further assistance, contact the office listed below.

**STEP 2**

The monitor certification deadline is the date on which the tabulation of emissions for purposes of compliance begins. You must determine this date in accordance with 40 CFR 75.4. If the commence operation date or monitor certification date changes, you must notify the Department under the administrative Acid Rain Part correction procedures of Rule 62-214.370, F.A.C.

**Submission Instructions**

Mail one form and any required attachments with original signatures, and three photocopies of the entire submission, to the following address:

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**
Division of Air Resources Management
Bureau of Air Regulation
**MAIL STATION #5505**
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

FLORIDA DEP LOGO

# Department of Environmental Protection

## DIVISION OF AIR RESOURCES MANAGEMENT

### AIR PERMIT APPLICATION FORM
### ACID RAIN PART (PHASE II)

For more information, see instructions, and refer to 40 CFR 72.30 and 72.31

This submission is: [ ] New [x ] Revised Copy [ ] of [ ]

**STEP 1**

Identify the source by plant name, State, and ORIS code from the National Allowance Data Base (NADB).

| Plant Name | State | ORIS* Code |
|---|---|---|
| Sam O. Purdom | FL | 689 |

*Office of Regulatory Information Systems

**STEP 2**

Enter boiler ID# from NADB for each unit, and indicate whether a repowering plan is applicable by entering "yes" or "no" at column b. For **new units**, enter requested information in columns c and d.

| a<br>Boiler ID# | b<br>Repowering Plan? | c<br>**New Units** Commence Operation Date | d<br>**New Units** Monitor Certification Deadline |
|---|---|---|---|
| 7 | NO | | |
| 8 | NO | 02/21/00 | 05/24/00 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**STEP 3**

If you responded "yes" in column b of Step 2 for any unit, mark the box

[ ] For each unit that will be repowered, the Repowering Extension Plan form is included and the Repowering Technology Petition form has been submitted, is included, or will be submitted by June 1, 1996.

| |
|---|
| Plant Name (from Step 1)<br>Sam O Purdom |

**STEP 4**

Read the **Standard Requirements** and **Certification**, enter the name of the designated representative, and sign and date.

**Standard Requirements**

Permit Requirements.

(1) The designated representative of each Acid Rain source and each Acid Rain unit at the source shall:

(a) Submit a complete Acid Rain part, including a compliance plan, under this part in accordance with the deadlines specified in Rule 62-213.420, F.A.C.; and Rule 62-214.320, F.A.C.

(b) Submit in a timely manner any supplemental information that the State determines is necessary in order to review an Acid Rain part application and issue or deny a Title V permit;

(2) The owners and operators of each Acid Rain source and each Acid Rain unit at the source shall:

(a) Operate the unit in compliance with a complete Acid Rain part application or a superseding Title V permit issued by the Department; and

(b) Have a Title V permit with an Acid Rain part.

Monitoring Requirements.

(1) The owners and operators and, to the extent applicable, designated representative of each Acid Rain source, and each Acid Rain unit at the source shall comply with the monitoring requirements as provided in 40 CFR Parts 75 and 76.

(2) The emissions measurements recorded and reported in accordance with 40 CFR Parts 75 and 76 shall be used to determine compliance by the unit with the Acid Rain emissions limitations and emissions reduction requirements for sulfur dioxide and nitrogen oxides under the Acid Rain Program.

(3) The requirements of 40 CFR Parts 75 and 76 shall not affect the responsibility of the owners and operators to monitor emissions of other pollutants or other emissions characteristics at the unit under other applicable requirements of the Act and other provisions of the operating permit for the source.

Sulfur Dioxide Requirements.

(1) The owners and operators of each Acid Rain source and each Acid Rain unit at the source shall:

(a) Hold allowances, as of the allowance transfer deadline, in the unit's compliance subaccount, after deductions by EPA under 40 CFR 73.34(c), not less than the total annual emissions of sulfur dioxide from the unit for the previous calendar year; and

(b) Comply with the applicable Acid Rain emissions limitations for sulfur dioxide.

(2) Each ton of sulfur dioxide emitted in excess of the Acid Rain emissions limitations for sulfur dioxide shall constitute a separate violation of the Act.

| |
|---|
| Plant Name (from Step 1)<br>Sam O. Purdom |

Sulfur Dioxide Requirements (Continued).

(3) An Acid Rain unit shall be subject to the requirements under Rule 62-214.330(1), F.A.C., and 40 CFR 72.9(c)(1) as follows:

(a) Starting January 1, 2000, an Acid Rain unit under 40 CFR 72.6(a)(2) that is not a substitution or compensating unit; or

(b) Starting on the later of January 1, 2000 or the deadline for monitor certification under 40 CFR Part 75, an Acid Rain Unit under 40 CFR 72.6(a)(3) that is not a substitution or compensating unit.

(4) Allowances shall be held in, deducted from, or transferred among Allowance Tracking System accounts by EPA in accordance with the Acid Rain Program.

(5) An allowance shall not be deducted in order to comply with the requirements under 40 CFR 72.9(c)(1)i prior to the calendar year for which the allowance was allocated.

(6) An allowance allocated by EPA under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the Title V permit application that includes the Acid Rain Part, the Title V permit that includes the Acid Rain Part, or the written exemption under Rule 62-214.340, F.A.C., and 40 CFR 72.7 and 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.

(7) An allowance allocated by EPA under the Acid Rain Program does not constitute a property right.

Nitrogen Oxides Requirements.

The owners and operators of the Acid Rain source and each Acid Rain unit at the source shall comply with the applicable Acid Rain emissions limitation for nitrogen oxides, pursuant to 40 CFR Part 76.

Excess Emissions Requirements.

(1) The designated representative of an Acid Rain unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR Part 77.

(2) The owners and operator of an Acid Rain unit that has excess emissions in any calendar year shall:

(a) Pay without demand the penalty required, and pay upon demand the interest on that penalty, as required by 40 CFR Part 77; and

(b) Comply with the terms of an approved offset plan, as required by 40 CFR Part 77.

Recordkeeping and Reporting Requirements.

(1) Unless otherwise provided, the owners and operators of the Acid Rain source and each Acid Rain unit at the source shall keep on-site at the source each of the following documents for a period of 5 years from the date the document is created. This period may by extended for cause in writing by EPA, at any time prior to the end of the 5 years.

| Plant Name (from Step 1) Sam O. Purdom |
|---|

Recordkeeping and Reporting Requirements (Continued).

(a) The certificate of representation for the designated representative for the source and each Acid Rain unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR 72.24; provided that the certificate and documents shall be retained on-site at the source beyond such 5-year period until such documents are superseded because of a new certificate of representation changing the designated representative;

(b) All emissions monitoring information, in accordance with 40 CFR Part 75;

(c) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program; and

(d) Copies of all documents used to complete the Acid Rain Part application, and any other submission under the Acid Rain Part, or to demonstrate compliance with the Acid Rain Program.

(2) The designated representative of an Acid Rain source and each Acid Rain unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR Part 72 subpart I and 40 CFR Part 75.

Liability.

(1) Any person who knowingly violates any requirement or prohibition of the Acid Rain Program, a complete Acid Rain Part application, a Title V permit with an Acid Rain Part, or a written exemption under Rule 62-214.340, F.A.C., or 40 CFR 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to 42 U.S.C. 7413(c).

(2) Any person who knowingly makes a false, material statement in any record, submission, or report under the Acid Rain Program shall be subject to criminal enforcement pursuant to 42 U.S.C. 7413(c) and 18 U.S.C. section 1001.

(3) No permit revision shall excuse any violation of the requirements of the Acid Rain Program that occurs prior to the date that the revision takes effect.

(4) Each Acid Rain source and each Acid Rain unit shall meet the requirements of the Acid Rain Program, including Chapter 62-214, F.A.C.

(5) Any provision of the Acid Rain Program that applies to an Acid Rain source, including a provision applicable to the designated representative of an Acid Rain source, shall also apply to the owners and operators of such source and the Acid Rain units of the source.

(6) Any provision of the Acid Rain Program that applies to an Acid Rain unit, including a provision applicable to the designated representative of an Acid Rain unit, shall also apply to the owners and operators of such unit. Except as provided under 40 CFR 72.44, Phase II repowering extension plans, and 40 CFR Part 76, and except with regard to the requirements applicable to units with a common stack under 40 CFR Part 75, including 40 CFR 75.16, 75.17, and 75.18, the owners and operators and the designated representative of one Acid Rain unit shall not be liable for any violation by any other Acid Rain unit of which they are not owners or operators or the designated representative and that is located at a source of which they are not owners or operators or the designated representative.

| Plant Name (from Step 1) |
| --- |
| Sam O. Purdom |

Liability (Continued).

(7) Each violation of a provision of 40 CFR Parts 72, 73, 75, 76, 77, 78, or Chapter 62-214, F.A.C., by an Acid Rain source or Acid Rain unit, or by an owner or operator or designated representative of such source or unit, shall be a separate violation of the Act.

Effect on Other Authorities.

No provision of the Acid Rain Program, an Acid Rain Part application, a Title V permit with Acid Rain Part, or a written exemption under 40 CFR 72.7 or 72.8 shall be construed as:

(1) Except as expressly provided in Title IV of the Act, exempting or excluding the owners and operators and, to the extent applicable, the designated representative of an Acid Rain source or Acid Rain unit from compliance with any other provisions of the Act, including the provisions of Title I of the Act relating to applicable National Ambient Air Quality Standards or State Implementation Plans;

(2) Limiting the number of allowances a unit can hold; **provided**, that the number of allowances held by the unit shall not affect the source's obligation to comply with any other provisions of the Act;

(3) Requiring a change of any kind in any State law regulating electric utility rates and charges, affecting any State law regarding such State regulation, or limiting such State regulation, including any prudence review requirements under such State law;

(4) Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act; or,

(5) Interfering with or impairing any program of competitive bidding for power supply in a State in which such program is established.

**Certification**

I am authorized to make this submission on behalf of the owners and operators of the Acid Rain source or Acid Rain units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information, or omitting required statements and information, including the possibility of fine or imprisonment.

| Name: Robert E. McGarrah | |
| --- | --- |
| Signature | Date 3/4/97 |