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# **Environmental Compliance Plan**

**For**

**Pensacola Christian College  
Pensacola, FL**

**November 2007  
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# **Table of Contents**

Introduction

Management Commitment

Operator Training

Facility Monitoring

Compliance Method

Operation and Maintenance Plan

Records

Periodic Plan Review

Abnormal Events

Forms

## **Introduction**

This plan provides additional information demonstrating the owner's commitment to operating this facility in compliance. This Plan provides reasonable assurance that the continued operation of the facility will be in accord with applicable laws and rules.

The detail of the Plan is consistent with the complexity of the system. The Plan was developed in accordance with the unique requirements of the individual facility and provides the operator with adequate information and description regarding the design, operation and maintenance features of the facility. The Plan includes basic engineering design criteria for the facility. In addition, information concerning process control and performance evaluation for the facility, as well as equipment and procedural descriptions (including any notification/report requirements of appropriate agencies) for emergency operating conditions, is included. Regular maintenance and repair instructions for plant equipment and monitoring procedures are also included.

## **Management Commitment**

Pensacola Christian College adheres to a strong, facility-wide environmental program which was developed to ensure the highest commitment and quality from the business operation as well as from employees, to protect and enhance the environment. This program includes an environmental policy, environmental auditing procedures and employee education and involvement. .

## **Operator Training**

This Plan represents continuing education program for all personnel concerning facility operation, permit and other regulatory requirements. A copy of the approved Plan will be available to the operators and maintenance personnel.

Personnel will be trained to operate facility in accordance to factory training manual and this Plan. Consequently, new employees will be trained within 90 days after commencement of employment and prior to unsupervised plant(s) operation. In addition, periodic safety meetings are planned for all pertinent personnel and often cover environmental topics including air permit requirements.

Environmental education is key to maintaining successful environmental stewardship. Education includes new hire orientation and training sessions. During orientation, new hires are educated about the various permits, permit conditions and monitoring requirements.

Training sessions will teach supervisory personnel and operators about air permit requirements and other environmental topics.

## Facility Monitoring

This section establishes the use of parameters to monitor Standby Generation Facility. PCC conducts reasonable monitoring to assure continued compliance with the terms and conditions of their permit. The monitoring will be carried out in the manner prescribed in this procedure.

The performance parameters include such physical, chemical or electrical characteristics as are applicable to the particular emissions unit and which are indicators of the condition, operating rates and efficiencies. Such parameters generally include the following indicators:

Standby Generation (EUE 005- Engines 9 & 10 & EU003 – Engine 11)

Exhaust gas oxygen levels

Fuel (natural gas) consumption

Visible emissions

Standby Generation (EU 009 – Engines 1-8)

Exhaust gas oxygen levels

Fuel (natural gas) consumption

Visible emissions

Density charge factor

# Compliance Method

## **EU 009, Standby Generation – (engines #1-#8)**

Tests conducted after initial startup measuring CO and NOX together with accompanying VE tests (conducted during CO and NOX tests) indicated that each engine is capable of operating at maximum capacity specified in construction permit without exceeding maximum allowable emissions for NOX and CO. To prove that each engine operated at near maximum capacity during compliance testing, heat inputs were measured by recording natural gas flows and calculating correspondent heat inputs (please note that engine manufacturer's data concerning heat content of natural gas when used in internally combusted engines is 925 CTU/CF). Natural gas flows were recorded two ways, one by recording Energy Services of Pensacola (gas supplier) gas meter at the beginning and at the end of each one-hour test (total of 3) for each engine and by taking instantaneous natural gas flows indicated by engine electronic controller/indicator. Instantaneous gas flows (CF/min) were taken several times during each hour of testing, averaged and multiplied by running time (minutes) to obtain flow in CF/given time. These two readings were close enough so that proposed future heat input readings will be accomplished using engine electronic controllers/indicators. These controllers/indicators also record and display, among other data, charge density factor indicating fuel to air ratio, rpms, temperatures, etc. These data can be recorded using computer software. Density charge information(s) recorded during compliance testing are attached. Also during compliance testing PCC operator measured oxygen content of exhaust gases using Bacharach combustion analyzer. This was done to compare his readings to readings recorded by compliance tester. Both readings were basically the same for each engine. Recording for density charge, O<sub>2</sub> readings and engine heat inputs (measuring gas flows) are attached.

Recorded values during compliance testing were as follows:

	<u>Charge Density</u>	<u>Exhaust Air O<sub>2</sub></u>	<u>Av Gas Flow CFM</u>
Engine #1	0.75	9.4	214
Engine #2	0.75	9.4	212
Engine #3	0.76	9.4	216
Engine #4	0.77	9.4	216
Engine #5	0.77	9.4	218
Engine #6	0.76	9.4	222
Engine #7	0.76	9.4	220
Engine #8	0.75	9.4	215
Av	0.76	9.4	217

Since Standby Generation is intended to be used as backup power generation, such as during power (Gulf Power) outages, PCC proposes to conduct following Compliance Plan to insure engine(s) optimal operation in lieu of yearly NOX and CO testing.

1. Have all 8 engines maintained yearly by competent contractor.
2. PCC operator will use PCC instrument to read O<sub>2</sub> after maintenance is completed
3. To assure engines stay in compliance PCC operator will conduct testing on each engine as follows

When engine(s) is used to generate power and runs continuously for more than two weeks

Or

When engine(s) is not used to generate power, test will be conducted twice a year

Tests will consist of the following:

Run "Charge Density " test using computer and software furnished by manufacturer (Caterpillar) for 30 minutes and record readings.

(Allowable Charge Density is 0.72 – 0.80)

Check O<sub>2</sub> content in exhaust gas using Bacharach Model PCA2, or equivalent instrument. (Allowable O<sub>2</sub> range is 9.0 – 10.0%)

Check visible emissions

Record gas consumption in CFMs using computer program.



Record engine running time

Compute engine gas consumption as follows: (test will run at least 30 minutes)

Total CF used during test time = CF/min x test time in minutes.

Compute engine heat input

MM BTUH = (60 min / minutes tested) (CF used during test)(925 BTU/CF).

Maximum allowable heat input is 6,863 BTU/BHP/hr

6,863 x 1,818 BHP = 12.5 MM BTUH

Compute operating capacity

Operating Capacity % = (Test MM BTUH / 12.5 MM BTUH) x

100 = % of load

**Testing:**

Once a year visible emissions testing will be conducted on all 8 engines by certified VE tester according to EPA Method 9.

Records will be kept for a period of 5 years.

# Compliance Method

## **E.U 003 & EU 005, Standby Generation - (engines #9, #10 & #11)**

All three engines are tuned for equal NOX-CO emissions. Factory literature recommends that in order to achieve this, excess oxygen (O<sub>2</sub>) in exhaust of each engines needs to be 0.3%

Tests conducted after initial startup measuring CO and NOX together with accompanying VE tests (conducted during CO and NOX tests) indicated that each engine is capable of operating at maximum capacity specified in construction permit without exceeding maximum allowable emissions for NOX and CO. To prove that each engine operated at near maximum capacity during compliance testing, heat inputs were measured by recording natural gas flows and calculating correspondent heat inputs (please note that engine manufacturer's data concerning heat content of natural gas when used in internally combusted engines is 925 BTU/CF). Natural gas flows were measured by recording Energy Services of Pensacola (gas supplier) gas meter at the beginning and at the end of each one-hour test (total of 3) for each engine.

Since Standby Generation is intended to be used as backup power generation, such as during power (Gulf Power) outages, PCC proposes to conduct following Compliance Plan to insure engine(s) optimal operation in lieu of yearly NOX and CO testing.

1. Have all 3 engines tuned yearly by competent contractor. Yearly tune-up reports on each engine will indicate O<sub>2</sub> readings.
2. PCC operator will use PCC instrument to read O<sub>2</sub> after tune up.
3. To assure engines stay in compliance PCC operator will conduct testing on each engine as follows

When engine(s) is used to generate power and runs continuously for more than two weeks

Or

When engine(s) is not used to generate power, test will be conducted twice a year

Tests will consist of the following

Check O<sub>2</sub> content in exhaust gas using Teledyne Oxygen analyzer or equivalent instrument (Allowable O<sub>2</sub> is 0.3%)

Check visible emissions

Record gas consumption in CFMs taking readings from gas meter.

Record engine running time

Compute engine gas consumption as follows: (test will run at least 30 minutes)

Total CF used during test time = CF/min x test time in minutes.

Compute engine heat input

MM BTUH = (60 min / minutes tested) (CF used during test) (925 BTU/CF).

Maximum allowable heat input is 14.9 MM BTUH

Compute operating capacity

Operating Capacity % = (Test MM BTUH / 14.9 MM BTUH) x 100 = % of load

**Testing:**

Once a year visible emissions testing on 3 engines will be conducted by certified VE reader and according to EPA Method 9.

Records will be kept for a period of 5 years

## **Operation and Maintenance Plan**

This section establishes a plant specific Operations and Maintenance (O & M) Plan. This element provides reasonable assurance that this facility can be effectively operated and maintained, through reasonable provisions for the operation and maintenance of the facility. Routine maintenance of equipment will be performed as needed to assure optimal operation.

The Plan contains inspection and maintenance schedules including periodic assessments of the condition of equipment and schedule for recording of performance parameter data.

### **Startup (typical for all engines)**

Check cooling system

Check oil level

Push start button.

After engine is at full speed and at operating temperature, generators are loaded.

Check visible emissions

### **Shutdown (typical for all engines)**

Unload generator

Stop the engine

**Pensacola Christian College  
Standby Generation Facility  
EU 005 & EU 003**

**Scheduled Maintenance Procedures**

Performed by PCC

1. Oil and filter change every 700 hours

Every Three months

2. Check plugs
3. Check gas regulator water column
4. Check compression

Routine test and adjustment as necessary for proper operation

Performed by Outside Contractor

Annual

1. Check 2301 Woodward governor
2. Change plugs
3. Set timing
4. Adjust air fuel ratio
5. Compression test
6. Check and replace carburetor diaphragms (if necessary)
7. Adjust valves, check push rods
8. Oil samples taken
9. Check magneto
10. O2 analyzer test

**Pensacola Christian College  
Standby Generation Facility  
EU 009**

**Scheduled Maintenance Procedures**

**Weekly**

- Check air inlet filter
- Verify automatic mode enabled
- Check battery charger operation and electrolyte level
- Check cooling system coolant level
- Inspect visible electrical connections
- Inspect electrohydraulic system
- Inspect air cleaner service indicator
- Check engine oil level
- Check fuel filter differential pressure
- Check jacket water heater
- Conduct walk-around inspection

**Monthly**

- Conduct operational engine testing
- Record engine charge density versus engine speed
- Record fuel consumption

**Annually (conducted by Caterpillar authorized service technician)**

- Drain after cooler condensation
- Inspect alternator
- Lubricate generator ball bearings
- Inspect/adjust/replace belts
- Obtain coolant sample for laboratory analysis
- Test/add supplemental coolant additive (SCA)
- Measure record crankcase blowby
- Inspect crankshaft vibration damper
- Measure/record cylinder pressure
- Change electrohydraulic system oil
- Inspect/replace engine air cleaner element
- Clean engine crankcase breather
- Check engine mounts

- Obtain engine oil sample for laboratory analysis
- Change engine oil filter
- Conduct engine performance test
- Check engine protective devices
- Clean/inspect engine speed/timing sensor
- Adjust engine valve lash and bridge (at 250 hours)
- Inspect exhaust bypass
- Inspect exhaust piping
- Check fuel metering valve screen
- Drain gas pressure regulator condensation
- Test generator set
- Inspect generator set vibration
- Inspect/replace hoses and clamps
- Check/adjust ignition system timing
- Inspect inlet air system
- Test insulation
- Clean radiator
- Inspect starting motor
- Check stator lead
- Measure/record valve stem projection
- Inspect water pump

**Every Three Years**

- Check rotating rectifier
- Inspect turbocharger

## **Records**

Records of inspections, maintenance, operating parameters and operating hours for each unit shall be retained for a minimum of two years and shall be made available to DEP upon request. These records are kept in Standby Generation Facility office.

### **Records requirements shall include:**

- Records of engine(s) operating parameters
  - Scheduled O<sub>2</sub> readings
  - Scheduled Charge Density factors
  - Scheduled heat intake (gas consumption) recordings

- Records of time(s) each engine operated
  - Operating hours shall not exceed the following:
    - EU 005 - engines #9 & #10 – 8,760 hr/yr/engine
    - EU 003 - engine #11 – 8,500 hr/yr
    - EU 009 - engines 1 through 8 – 2,300 hr/yr/engine

- Records of engine(s) malfunctions or failures and corrective actions taken

- Records of scheduled maintenance by PCC and/or outside contractor

- Results of compliance tests



## **Periodic Plan Review**

This plan will be reviewed at least annually from date of approval. This review will evaluate the effectiveness of the Plan and will make any changes necessary for the Plan to be continuously administered.

The Environmental Compliance Plan shall be updated as operations change, but no less frequently than upon renewal of permit. DEP shall be notified of changes to the this plan other than those required for routine maintenance. The Environmental Compliance Plan shall be revised when operational procedures change, to reflect any facility alterations performed or to reflect experience resulting from facility operation. PCC will periodically review and revise the operating protocol, as appropriate, to ensure satisfactory system performance.

## Abnormal Events

In the event PCC is temporarily unable to comply with any of the conditions of DEP permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind or other cause, PCC will notify DEP. Notification shall be made in person, by telephone, or other means within 24 hours of breakdown or malfunction. The telephone number to call to notify DEP is **850 595-8364 ext. 1220**. For emergencies involving a significant threat to human health or the environment, **the number is 850 320-0519**.

A written report of any noncompliance referenced above shall be submitted to the Florida **Department of Environmental Protection, 160 Governmental Center, Pensacola, FL 32502-5794**, within 30 days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem and time when the facility will again be operating in accordance with permit conditions.

If an emergency arises or there is any condition, which prevents the continued operation or results in non-compliance with applicable regulations, the operator will:

Stop operation immediately

Notify proper official(s), as soon as practically possible, of the time, date and nature of the occurrence and the corrective action(s) taken

Ensure that the engines are in good working order before resuming operation

## Forms

Pensacola Christian College  
Standby Generation – EU 005 & EU 003

**Tune Up Record**

**Year:** \_\_\_\_\_

	<b>Engine #9</b>	<b>Engine #10</b>	<b>Engine #11</b>
<b>Tune up Date</b>	_____	_____	_____
<b>Service Contractor</b>	_____	_____	_____
<b>02 Reading</b>	_____	_____	_____

**Pensacola Christian College  
Standby Generation – EU 005 & EU 003**

**Compliance Check - O2 Readings**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #9</b>												
<b>Engine #10</b>												
<b>Engine #11</b>												

\*Did not run entire month

**Pensacola Christian College  
Standby Generation – EU 005 & EU 003**

**Compliance Check – Visible Emissions ( yes or no)**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #9</b>												
<b>Engine #10</b>												
<b>Engine #11</b>												

\*Did not run entire month

**Pensacola Christian College  
Standby Generation – EU 005 & EU 003**

**Compliance Check – Gas Consumption**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #9</b>												
<b>Engine #10</b>												
<b>Engine #11</b>												

\*Did not run entire month

**Pensacola Christian College  
Standby Generation – EU 005 & EU 003**

**Compliance Check – Engine Running Time**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #9</b>												
<b>Engine #10</b>												
<b>Engine #11</b>												

\*Did not run entire month



**Pensacola Christian College  
Standby Generation - EU 009  
Maintenance Record**

**Year:** \_\_\_\_\_

	<b>Engine #1</b>	<b>Engine #2</b>	<b>Engine #3</b>	<b>Engine #4</b>
<b>Maintenance Date</b>	_____	_____	_____	_____
<b>Service Contractor</b>	_____	_____	_____	_____
<b>02 Reading</b>	_____	_____	_____	_____

	<b>Engine #5</b>	<b>Engine #6</b>	<b>Engine #7</b>	<b>Engine #8</b>
<b>Maintenance Date</b>	_____	_____	_____	_____
<b>Service Contractor</b>	_____	_____	_____	_____
<b>02 Reading</b>	_____	_____	_____	_____

**Pensacola Christian College  
Standby Generation - EU 009**

**Compliance Check - O2 Readings**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #1</b>												
<b>Engine #2</b>												
<b>Engine #3</b>												
<b>Engine #4</b>												
<b>Engine #5</b>												
<b>Engine #6</b>												
<b>Engine #7</b>												
<b>Engine #8</b>												

**Pensacola Christian College  
Standby Generation - EU 009**

**Compliance Check – Charge Density**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #1</b>												
<b>Engine #2</b>												
<b>Engine #3</b>												
<b>Engine #4</b>												
<b>Engine #5</b>												
<b>Engine #6</b>												
<b>Engine #7</b>												
<b>Engine #8</b>												

**Pensacola Christian College  
Standby Generation - EU 009**

**Compliance Check – Visible Emissions (yes or no)**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #1</b>												
<b>Engine #2</b>												
<b>Engine #3</b>												
<b>Engine #4</b>												
<b>Engine #5</b>												
<b>Engine #6</b>												
<b>Engine #7</b>												
<b>Engine #8</b>												

**Pensacola Christian College  
Standby Generation - EU 009**

**Compliance Check – Gas Consumption**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #1</b>												
<b>Engine #2</b>												
<b>Engine #3</b>												
<b>Engine #4</b>												
<b>Engine #5</b>												
<b>Engine #6</b>												
<b>Engine #7</b>												
<b>Engine #8</b>												

**Pensacola Christian College  
Standby Generation - EU 009**

**Compliance Check – Engine Running Time**

**Year** \_\_\_\_\_

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>Engine #1</b>												
<b>Engine #2</b>												
<b>Engine #3</b>												
<b>Engine #4</b>												
<b>Engine #5</b>												
<b>Engine #6</b>												
<b>Engine #7</b>												
<b>Engine #8</b>												