Continuous Emissions Monitoring Systems Monitoring Plan

40 CFR Part 75

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Cape Canaveral Energy Center
Cape Canaveral, Florida
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Table of Contents

CHAPTER 1.0 INTRODUCTION 1

CHAPTER 2.0 CEM SYSTEM 2

2.1 DESCRIPTION OF THE CEM SYSTEM 2
2.1.1 Analyzers Included in CEMS 3
2.2 NO_x ANALYZER 4
2.3 O_2 ANALYZER 5
2.4 SAMPLE PROBE 5
2.5 FUEL FLOWMETERS 5
2.6 DATA ACQUISITION AND REDUCTION 5

CHAPTER 3.0 DATA CALCULATIONS AND REPORTING PROCEDURES 7

3.1 SO_2 REPORTING PROCEDURES AND CALCULATIONS 7
3.2 FUEL GAS SAMPLING AND REPORTING 9
3.3 CO_2 REPORTING PROCEDURES AND CALCULATIONS 9
3.4 NO_X EMISSION RATE REPORTING AND CALCULATIONS 10
3.5 HEAT INPUT REPORTING PROCEDURES AND CALCULATIONS 12
3.6 DATA CAPTURE REQUIREMENTS AND DATA SUBSTITUTION 13
3.7 RANGE OF OPERATION 14

CHAPTER 4.0 NO_X ANALYZER RANGES 15

4.1 NO_X RANGE DETERMINATION 15
4.1.1 MPC/MEC Calculations 15
4.2 O_2 ANALYZER SPAN AND RANGE 15

CHAPTER 5.0 CALIBRATION GAS CYLINDER REQUIREMENTS 16

CHAPTER 6.0 CERTIFICATION TESTING 17

6.1 CALIBRATION ERROR TEST 17
6.2 CYCLE RESPONSE TIME TEST 18
6.3 LINEARITY CHECK 18
6.4 RELATIVE ACCURACY TEST AUDIT 19
6.5 BIAS TEST 19
6.6 PERIODIC QUALITY ASSURANCE TESTING 20

CHAPTER 7.0 DAHS VERIFICATION TEST RESULTS 21

ATTACHMENT A - ECMPS GENERATED MONITORING PLAN REPORT .... A

ATTACHMENT B - XML FILE FORMAT MONITORING PLAN .... B

ATTACHMENT C - LIST OF ANTICIPATED RECORD TYPES C

ATTACHMENT D - STACK DRAWINGS .... D

ATTACHMENT E - FUEL FLOWMETER DOCUMENTATION .... E

ATTACHMENT F- FUEL ANALYSIS SHEETS .... F

REVISION NOTES

Revision No.	Revision Date	Revised Sections	Notes
00	November 2012	NA	Original Document
01	February 2013	Chapter 5.0	Updated the tables to reflect the proper NO_X high range and removed references to linearity testing for the NO_X low range.
02	March 2013	Multiple	Incorporated comments and corrections from FPL.

Chapter 1.0 Introduction

The Cape Canaveral Energy Center (CCEC) is owned and operated by Florida Power and Light Company (FPL) and is located at 6000 North U.S. Highway 1, Brevard County Florida. Florida is within the jurisdiction of USEPA Region 4. Two existing residual fuel and natural gas units (Unit 1 and Unit 2) have been shut down and dismantled and a new 1250 MW natural gas fired combined cycle unit has been constructed at the CCEC. The new unit is designated Unit 3 and is comprised of three 250 megawatt Siemens Model 8000H gas turbine-electrical generator sets with evaporative inlet cooling systems, three supplementary-fired heat recovery steam generators (HRSG's) with SCR reactors, one nominal 460 MMBtu/hr (LHV) gas fired duct burner located with-in each of the three HRSG's, three 149-foot exhaust stacks and a common 500-MW steam electrical generator. This "3-on-1" combined cycle technology yields a total generating capacity of approximately 1,250 MW.

Dry-low NO_X combustion technology for gas firing and water injection during oil firing are utilized to reduce NO_X emissions and selective catalytic reduction is employed to further reduce NO_X emissions. The Florida Department of Environmental Protection issued permit allows each of the combustion turbines to operate 8,760 hours per year. The permit does limit the total heat input fired by the duct burners to provide additional steam-generated electrical power to 3,697,920 MMBtu divided between the three HRSG's during any consecutive 12-month period while combusting natural gas. Each CT will primarily combust pipeline natural gas with ultralow sulfur distillate (ULSD) fuel oil as a back-up fuel.

The nominal maximum heat input rating for each combustion turbine is 2,586 MMBtu/hr. With the duct burners, this number increases to 3,046 MMBtu/hr. According to the facility's air permit each CT is limited to a maximum heat input of 2,586 MMBtu/hr while firing natural gas and 2,440 MMBtu/hr while firing ultralow sulfur distillate (ULSD) fuel oil.

Unit 3 is an affected unit under the Federal Acid Rain Program, and is required to monitor and report nitrogen oxides (NOx), and report sulfur dioxide (SO_2) and carbon dioxide (CO_2) emissions. Because the unit is classified as a gas-fired unit under 40 CFR Part 72, this unit is exempt from the opacity monitoring requirements of 40 CFR Part 75. Flue gas from each combustion turbine unit is discharged to a dedicated stack. The stack extends 149 feet above grade and has a diameter at the testing ports of 22'-0". All flue gas sampling will be performed utilizing test ports located at an elevation of 138'-0" above grade.

This document is intended to satisfy the requirements of 40 CFR 75.53. The FPL CCEC Unit 3 is also subject to NO_X monitoring and reporting requirements under 40 CFR Part 60 Subpart KKKK. All emissions units at CCEC are also subject to monitoring and reporting requirements under the Clean Air Interstate Rule (CAIR). The Air Permit also requires the facility to monitor and report carbon monoxide (CO) emissions from the turbine stacks

Chapter 2.0 CEM System

2.1 Description of the CEM System

All flue gas pollutant and diluent measurements are made on a dry basis. Effluent gas from the sampling location is filtered and transported through heated sample lines to the sample conditioning system in the main analyzer cabinet. The sample conditioning system again filters the effluent gas. A chilled condenser removes moisture. The dry, particulate-free effluent gas sample is supplied to the analyzer located within the cabinet. The analog outputs of the analyzer and certain plant inputs are transmitted to a system controller located in the monitoring cabinet.

A B&W iNET CEMS Controller (iNET) controls the CEMS. The iNET provides timing and control of the sampling system and provides corrected and calculated analog outputs. The iNET also provides ten (10) second updates to the Data Acquisition and Handling System (DAHS).

The CEM operates on one-minute averages, from which 15-minute values are calculated, and all data is then reduced to 1-hour averages to comply with 40 CFR 75.10 (d)(1).

Automatic zero and span calibration error checks are performed on the CEMS monitors every twenty-four (24) hours. Certified EPA Protocol 1 Calibration gases, obtained from a Protocol Gas Verification Program (PGVP) participating vendor, are injected at a valve box in back of the probe.

The CEMS is comprised of the following principal components:

1. Sample probe with filter. The probe enclosure is heated to prevent moisture condensation and contains valves to allow probe calibration.

2. Heat-traced sample line from each sample probe terminates at its Main Analysis Enclosure. The heated sample line contains wiring and a bundle of tubes to transport sample and calibration gases between each sample probe enclosure and the Main Analysis Enclosure.

3. The Main Analysis Enclosure houses the sample conditioning system and gas analyzers.

4. A Data Acquisition and Handling System (DAHS) consisting of an IBM-compatible computer with a hard drive, monitor, modem, printer, mouse, and keyboard is usually located in the control room.

5. Calibration gas bottles that are located near the CEMS enclosure.

The following tables list the analyzers that are included in the CEMS for each emissions unit.

2.1.1 Analyzers Included in CEMS

Unit CCCT3A

Analyzer	Manufacturer/Model	Serial Number	Span/Range
NO_x - Stack	TECO Model 42i-LS	1205851855	0-10 ppm / 0-200 ppm
O_2 - Stack	Servomex Model 1440D	01440D1V02/4601	0 - 25.0%
Probe	Cisco Model EP-750	10009430-1	NA
GFFM -Turbine	Gas Turbine Efficiency Model 305AC9	3025186	NA
GFFM – HRSG/DB	Triad Model 6500	1001619	NA
OFFM – Turbine	Sitrans Model FUH 1010	34424	NA
Data Acquisition System	B&W KVB-Enertec NetDAHS	NA	NA
CO*	TECO Model 48i	JC1134200175	0-20 ppm / 0-1500 ppm
NO_X – SCR Inlet*	TECO Model 42i-LS	1205851857	0-200 ppm
O2 – SCR Inlet*	Servomex Model 1440D	01440D1V02/4600	0 - 25.0%

* These analyzers are included for reference and will not be discussed in the remainder of this document

Unit CCCT3B

Analyzer	Manufacturer/Model	Serial Number	Span/Range
NO_x - Stack	TECO Model 42i-LS	1205851859	0-10 ppm / 0-200 ppm
O_2 - Stack	Servomex 1440D	01440D1V02/4608	0 - 25.0%
Probe	Cisco Model EP-750	10009430-2	NA
GFFM -Turbine	Gas Turbine Efficiency Model 305AC9	3025185	NA
GFFM – HRSG/DB	Triad Model 6500	1001620	NA
OFFM – Turbine	Sitrans Model FUH 1010	34243	NA
Data Acquisition System	B&W KVB-Enertec NetDAHS	NA	NA
CO*	TECO Model 48i	JC1134100174	0-20 ppm / 0-1500 ppm
NO_X – SCR Inlet*	TECO Model 42i-LS	1205851858	0-200 ppm
O2 – SCR Inlet*	Servomex Model 1440D	01440D1V02/4609	0 - 25.0%

* These analyzers are included for reference and will not be discussed in the remainder of this document

Unit CCCT3C

Analyzer	Manufacturer/Model	Serial Number	Span/Range
NO_x - Stack	TECO Model 42i-LS	1205851860	0-10 ppm / 0-200 ppm
O_2 - Stack	Servomex 1440D	01440D1V02/4606	0 - 25.0%
Probe	Cisco Model EP-750	10009430-3	NA
GFFM -Turbine	Gas Turbine Efficiency Model 305AC9	3025184	NA
GFFM – HRSG/DB	Triad Model 6500	1001621	NA
OFFM – Turbine	Sitrans Model FUH 1010	34731	NA
Data Acquisition System	B&W KVB-Enertec NetDAHS	NA	NA
CO*	TECO Model 48i	JC1201300190	0-20 ppm / 0-1500 ppm
NO_X – SCR Inlet*	TECO Model 42i-LS	1205851856	0-200 ppm
O2 – SCR Inlet*	Servomex Model 1440D	01440D1V02/4607	0 - 25.0%

* These analyzers are included for reference and will not be discussed in the remainder of this document

2.2 NO_x Analyzer

The TECO Model 42i-LS NO_X analyzer operates on the principle that nitric oxide (NO) and ozone (O_3) react to produce a characteristic luminescence with an intensity linearly proportional to the NO concentration. Infrared light emission results when electronically excited NO_2 molecules decay to lower energy states.

Nitrogen dioxide (NO_2) must first be transformed into NO before it can be measured using the chemiluminescent reaction. NO_2 is converted to NO by a stainless steel NO_2 -to-NO converter heated to approximately 625°C. (The optional molybdenum converter is heated to 325°C).

The ambient air sample is drawn into the Model 42i through the sample bulkhead. The sample flows through a capillary, and then to the mode solenoid valve. The solenoid valve routes the sample either straight to the reaction chamber (NO mode) or through the NO_2-to-NO converter and then to the reaction chamber (NO_x mode). A flow sensor prior to the reaction chamber measures the sample flow.

Dry air enters the Model 42i through the dry air bulkhead, passes through a flow switch and then through a silent discharge ozonator. The ozonator generates the ozone needed for the chemiluminescent reaction. At the reaction chamber, the ozone reacts with the NO in the sample to produce excited NO_2 molecules. A photomultiplier tube (PMT) housed in a thermoelectric cooler detects the luminescence generated during this reaction. From the reaction chamber, the exhaust travels through the ozone (O_3) converter to the pump, and is released through the vent.

The NO and NO_x concentrations calculated in the NO and NO_x modes are stored in memory. The difference between the concentrations is used to calculate the NO_2 concentration. The Model 42i-HL outputs NO, NO_2 and NO_x concentrations to the front panel display, the analog outputs and also makes data available over serial or ethernet connection.

2.3 O_2 Analyzer

The Servomex Model 1440 oxygen analyzer measures the paramagnetic susceptibility of the sample gas by means of a magneto-dynamic measuring cell. Oxygen is virtually unique in being a paramagnetic gas; this means that it is attracted into a magnetic field.

In the Servomex measuring cell the oxygen concentration is detected by means of a dumb-bell mounted on a torque suspension in a strong, non-linear magnetic field. The higher the concentration of oxygen the greater this dumb-bell is deflected from its rest position. Around the dumb-bell is a coil of wire. A current is passed through this coil to return the dumb-bell to its original position. The current is measured and is proportional to the oxygen concentration.

2.4 Sample Probe

A representative sample of gas from the stack is acquired with a CiSCO Model EP-750 sample probe and is transported to the shelters via heated sample lines. The sample probes are designed to mount on a four-inch (4"), 150 pound ANSI flange. The probe assembly includes a 316L SS filter chamber located outside the flange in a NEMA 4 enclosure. This allows the filter to be periodically maintained safely without removing the probe from the gas stream. It also eliminates pluggage of the filter by direct impact of particulate or water droplets on the filter. The filter is rated at 15 microns and can be easily replaced or cleaned.

2.5 Fuel Flowmeters

Each unit has its own dedicated Gas Fuel Flowmeter system. Each gas fuel flowmeter system on Units CCCT3A, CCCT3B, and CCCT3C consists of a two separate orifice-type flow meters: one dedicated to the Gas Turbine and one fuel flowmeter to the supplemental fuel fired duct burner to the HRSG. The fuel flow measured by each meter is added together in the DAHS to provide the total fuel value for each combined cycle unit.

The orifice-type fuel flowmeters in place at CCEC are comprised of an orifice plate that produces a differential pressure proportional to the square root of fuel flow, a differential-pressure transmitter, a line-pressure transmitter, and a temperature transmitter. Each unit's combustion turbine fuel flow metering system uses a Gas Turbine Efficiency orifice plate meter while the duct burner fuel flow is measured using an orifice plate style flowmeter manufactured by Triad Measurement and Equipment.

Each combustion turbine, at CCEC, is also permitted to combust ultra low sulfur distillate as a backup fuel. The ULSD flow is measured by a Sitrans turbine type fuel flowmeter.

Each fuel flowmeter in service at CCEC was originally certified as part of the manufacturing process, prior to the CEMS test program, in accordance with the EPA's 2% accuracy requirement using one of the methods outlined under 40 CFR 75, Appendix D. CCEC certifies the fuel flowmeters annually and does a primary element inspection at least every three years.

Fuel flow signals are sent from the fuel flowmeter transmitters to the iNET and then to the Data Acquisition and Handling System (DAHS) system. The gas flow is corrected to standard conditions in the iNET and the DAHS calculates the total fuel flow.

2.6 Data Acquisition and Reduction

The CEMS Data Acquisition and Reporting is controlled by B&W KVB-Enertec Products NetDAHS software. The NetDAHS is a PC-based, multi-user, multi-tasking system, which provides automated data monitoring and management capabilities to the CEMS. The NetDAHS is utilized for operator interface, data storage, report generation, and data display.

The NetDAHS polls the iNet every ten (10) seconds for data to generate and store one (1) minute averages. The NetDAHS will indicate any occurrence of specification limit exceedances or CEM operational problems. In the NetDAHS, necessary reports are generated in the required format for submittal to the applicable regulatory agencies. These reports may be produced in either hard copy or electronic format and can be made available for telemetry transmission to state and local agencies.

Chapter 3.0 Data Calculations and Reporting Procedures

All required parameters follow the equations in 40 CFR Part 75 Appendices D, F, and G, as applicable. The formulae are listed in the monitoring plan forms under the Emissions Formulas data.

3.1 SO_2 Reporting Procedures and Calculations

All units at CCEC are affected units under the federal Acid Rain Program and therefore required to report SO_2 emissions. Each unit is also an affected unit under the SO_2 mass reporting requirements under the Clean Air Interstate Rule (CAIR). The CAIR requirements follow 40 CFR Part 75 for data capture, reporting procedures, and calculations.

SO_2 mass emission rate while combusting pipeline natural gas will be calculated by utilizing the pipeline natural gas flow rate as reported by the pipeline natural gas fuel flowmeter system, using the following equation (40 CFR 75, Appendix D, Equation D-5):

$$M_{SO_{2}g} = ER \ x \ HI_g \qquad (Eq. D-5)$$

Where:

M_{SO2g}	=	Hourly mass of SO_2 emitted due to combustion of natural gas, lb/hr
ER	=	0.0006 lb/mmBtu for pipeline natural gas.
HI_g	=	Hourly heat input of natural gas, calculated using procedures found in 40 CFR 75, Appendix F, in mmBtu/hr

SO_2 mass emission rate while combusting ULSD will be calculated by utilizing the flow rate as reported by the ULSD fuel flowmeter system, using the following equation (40 CFR 75, Appendix D, Equation D-2):

$$SO2_{rate-oil} = 2.0 \ x \ Oil_{rate} \times \frac{\%S_{oil}}{100.0} \qquad (Eq. D-2)$$

Where:

$SO_{2rate\text{-}oil}$	=	Hourly mass emission rate of SO_2 emitted from combustion of oil, lb/hr
Oil_{rate}	=	Mass rate of oil consumed per hr during combustion, lb/hr
$\%S_{oil}$	=	Percentage of sulfur by weight in the oil
2.0	=	Ratio of lb SO_2/lb S

Total SO_2 mass emissions must be calculated and reported during hours when both PNG and ULSD fuel are combusted. Per 40 CFR 75, Appendix D, 3.5, equation D-12 will be used:

$$M_{SO_2-hr} = \sum_{all\ fuels} SO_{2\,rate-1}\ x\ t_i \quad (Eq.\ D-12)$$

Where:

$M_{SO2\text{-}hr}$	=	Total mass of SO_2 emissions from all fuels combusted during the hour, lb.
$SO_{2rate-l}$	=	SO_2 mass emission rate for each type of gas or oil fuel combusted during the hour, lb/hr.
t_i	=	Time each gas or oil fuel was combusted for the hour (fuel usage time), fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).

Total quarterly and year to date annual SO_2 mass emissions must also be calculated and reported in each quarters electronic emissions report (EDR) to the USEPA. The NetDAHS software is configured to use equations F-3 and F-4 from Appendix F of 40 CFR Part 75.

$$E_q = \frac{\sum_{h=1}^{n} E_h * t_h}{2000} \qquad (Eq.F-3)$$

Where:

E_q	=	Quarterly total SO_2 mass emissions, tons.
E_h	=	Hourly SO_2 mass emission rate, lb/hr.
T_h	=	Unit operating time, hour or fraction of an hour.
n	=	Number of hourly SO_2 emissions values during calendar quarter.
2000	=	Conversion of 2000 lb per ton.

$$E_a = \sum_{q=1}^{n} E_q \qquad (Eq.\ F-4)$$

Where:

E_a	=	Annual total SO_2 mass emissions, tons.
E_q	=	Quarterly SO_2 mass emissions, tons.
q	=	Quarters for which E_q are available during calendar year.

3.2 Fuel Gas Sampling and Reporting

PNG samples will be taken by the gas supplier as outlined in 40 CFR 75, Appendix D. Sampling procedures will be in accordance with ASTM methods. To meet the definition of Pipeline Quality Natural Gas found in 40 Part 72 the fuel must not contain more than 0.5 grains sulfur per 100 scf of fuel and it must be composed of at least 70% methane by volume or have a gross calorific value between 950 and 1100 BTU per scf. The fuel supplier for the CCEC will follow the method for determining the fuel total sulfur content as found in 40 CFR 75 Appendix D 2.3.3.1.2. A fuel analysis sheet is contained in Attachment E.

ULSD samples are taken in accordance with 40 CFR 75, Appendix D, 2.2.5, using approved method: ASTM D2622–98, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence. Per 40 CFR 75, Appendix D, 2.2.6, oil density is determined following ASTM D4052–96 (Reapproved 2002), Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter. The most recent samples were taken and analyzed on 11/01/2012. Analysis reveals that the sulfur content is 6.1mg/kg. The analysis report is included in Attachment E.

Each unit is required to report the total fuel flow data from the meter that feeds the Gas Turbine and the meter that feeds the Duct Burner at the HRSG. This is done by following the Gas summary equation marked in the NetDAHS as N-Gas.

3.3 CO_2 Reporting Procedures and Calculations

40 CFR 75, Appendix G, equation G-4 will be utilized to estimate the unit's CO_2 emission rate.

$$W_{CO2} = \frac{F_c \; x H \; x U_f \; x MW_{CO2}}{2000} \qquad (Eq. G-4)$$

Where:

W_{CO2}	=	CO_2 emitted from combustion, tons/hour
F_c	=	Carbon based F-factor 1040 scf/MMBtu or 1420 scf/MMBtu for PNG and ULSD respectively.
H	=	Hourly heat input in mmBtu
U_f	=	1/385 scf CO_2/lb-mole at 14.7 psia and 69°F
MW_{CO2}	=	Molecular weight of carbon dioxide (44.0)

The total CO_2 mass emissions must be calculated and reported during hours when both PNG and ULSD fuel are combusted. Per 40 CFR 75, Appendix G, equation G-4A will be used:

$$M_{CO_2-hr} = \sum_{all\ fuels} CO_{2\,rate-1} \; x \; t_i \qquad (Eq. G-4A)$$

Where:

$M_{CO2\text{-}hr}$	=	Total mass of CO_2 emissions from all fuels combusted during the hour, tons.
$CO_{2rate-I}$	=	CO_2 mass emission rate for each type of gas or oil fuel combusted during the hour, ton/hr.
t_i	=	Time each gas or oil fuel was combusted for the hour (fuel usage time), fraction of an hour (in equal increments that can range from one hundredth to one quarter of an hour, at the option of the owner or operator).

Total quarterly and calendar year-to-date CO_2 mass emissions must also be calculated and reported in each quarters electronic emissions report (EDR) to the USEPA. The NetDAHS software is configured to use equations F-12 and F-13 from Appendix F of 40 CFR Part 75.

$$E_{CO2q} = \sum_{h=1}^{H_R} E_h t_h \qquad (Eq.F-12)$$

Where:

E_{CO2q}	=	Quarterly average NO_X emission rate, lb/mmBtu.
E_h	=	Hourly average NO_X emission rate during unit operation, lb/mmBtu.
t_h	=	Unit operating time, in hours or fraction of an hour.
H_R	=	Number of hourly rates during calendar quarter.

$$E_{CO2a} = \sum_{q=1}^{4} E_{CO2q} \qquad (Eq.\ F-13)$$

Where:

E_{CO2a}	=	Annual total CO_2 mass emissions, tons.
E_{CO2q}	=	Quarterly total CO_2 mass emissions, tons.
q	=	Quarters for which E_{CO2q} are available during calendar year.

3.4 NO_X Emission Rate Reporting and Calculations

40 CFR 75, Appendix F, Equation F-5 will be utilized to calculate NO_X emission rate. Data collected by the NO_X and O_2 analyzers will be used in the calculations. Note that equation F-5 from Part 75 is identical to equation 19-1 from 40 CFR Part 60, Appendix A, Method 19. The USEPA's reporting tools reflect 19-1 as the equation in use.

$$E = K\ x\ C_h\ x\ F_d \times \left(\frac{20.9}{(20.9 - \%O_2)} \right) \qquad (Eq.\ F-5)$$

Where:

E	=	Pollutant emissions, lb/MMBtu
K	=	1.194 x 10^{-7} (lb/dscf)/ppm NO_X
C_h	=	Hourly average pollutant concentration, ppm dry
$\%O_2$	=	Oxygen concentration, % volume
F_d	=	A factor representing a ratio of the volume of dry flue gases generated to the calorific value of the fuel combusted. The F_d for PNG is 8710 dscf/MMBtu and for ULSD it is 9190 dscf/MMBtu.

A diluent cap value of 19% O_2 will be used whenever the actual O_2 hourly value exceeds 19%.

The units are also required to report NO_X mass values per state regulations and also the federal CAIR[1] program. Equation F-24A will be used for this reporting.

$$E_{(NOx)_h} = ER_{(NOx)_h} \times HI_h \qquad (Eq.\ F-24)$$

Where:

$E_{(NOx)h}$	=	NO_X mass emissions rate in lbs/hr for the hour
$ER_{(NOx)h}$	=	Hourly average NO_X emission rate for hour h, lb/mmBtu, from Method 19 in appendix A–7 to part 60. (Adjusted for bias if, the bias-test procedure in appendix A to part 75 shows a bias-adjustment factor is necessary.)
HI_h	=	Hourly average heat input rate for hour h, MMBtu/hr.

[1] – The Clean Air Interstate Rule (CAIR), is found in 40 CFR Part 96 and is still in effect due to the US District Courts vacature of the Cross State Air Pollution Rule (CSAPR). If CSAPR is ever re-instated, it is expected that it will replace the CAIR reporting requirements, although there is no expected change in the NO_X mass reporting methodology if CSAPR if this does occur.

Average quarterly and calendar year-to-date NO_x emissions rate must also be calculated and reported in each quarters electronic emissions report (EDR) to the USEPA. The NetDAHS software is configured to use equations F-9 and F-10 from Appendix F of 40 CFR Part 75.

$$E_q = \sum_{t=1}^{n} \frac{E_i}{n} \qquad (Eq.\ F-9)$$

Where:

E_q	=	Quarterly average NO_X emission rate, lb/mmBtu.
E_i	=	Hourly average NO_X emission rate during unit operation, lb/mmBtu.
n	=	Number of hourly rates during calendar quarter.

$$E_a = \sum_{t=1}^{m} \frac{E_i}{m} \qquad (Eq.\ F-10)$$

Where:

E_a	=	Average NO_X emission rate for the calendar year, lb/mmBtu.
E_i	=	Hourly average NO_X emission rate during unit operation, lb/mmBtu.
m	=	Number of hourly rates for which E_i is available in the calendar year.

3.5 Heat Input Reporting Procedures and Calculations

Heat Input will be calculated and reported utilizing data from fuel flowmeters and heating values of the fuel combusted as described in 40 CFR 75, Appendix D, Section 3.4.1.

When the units at CCEC unit are combusting gaseous fuel, the following equation will be used to determine the hourly heat input rate (40 CFR 75, Appendix D, Equation D-6). Note that this equation is identical as equation F-20 found in Appendix F of 40 CFR 75:

$$HI_{rate-gas} = \frac{Gas_{rate} \times GCV_{gas}}{10^6} \qquad (Eq. D-6)$$

Where:

$HI_{rate-gas}$	=	Hourly heat input from gaseous fuel, mmBtu/hr.
Gas_{rate}	=	Average volumetric flow rate of fuel, for the portion of the hour in which the unit operated, 100 scf/hr.
GCV_{gas}	=	Gross calorific value of gaseous fuel, Btu/100 scf.
10^6	=	Conversion of Btu to MMBtu.

When any unit is combusting ULSD fuel, the following equation will be used (40 CFR 75, Appendix D, Equation D-8):

$$HI_{rate-oil} = \frac{Oil_{rate}\ \ x\ GCV_{oil}}{10^6} \qquad (Eq. D-8)$$

Where:

$HI_{Rate-oil}$	=	Hourly heat input from combustion of oil, MMBtu/hr.
Oil_{Rate}	=	Mass rate of oil consumed per hour, , in lb/hr.
GCV_{oil}	=	Gross calorific value of oil, Btu/lb.
10^6	=	Conversion factor, (Btu-100 scf/MMBtu-scf).

Since Units CCCT3A, CCCT3B, and CCCT3C, at the Cape Canaveral Energy Center, can combust multiple fuels, Equation D-15A is also utilized to calculate the total HI rate from the combustion of PNG and ULSD.

$$HI_{rate-hr} = \frac{\sum_{all-fuels} HI_{ratei} t_i}{t_u} \qquad (Eq.\, D-15A)$$

Where:

$HI_{rate-hr}$ = Total heat input rate from all fuels combusted during the hour, MMBtu/hr.
HI_{rate-i} = Heat input for each type of gas combusted during the hour, MMBtu/hr.
t_i = Time each gas was combusted for the hour or fraction of an hour
t_u = Unit operating time

Total quarterly and calendar year-to-date Heat Input values must also be calculated and reported in each quarters electronic emissions report (EDR) to the USEPA. The NetDAHS software is configured to use equations D-16 and D-17 from Appendix D of 40 CFR Part 75.

$$HI_{qtr} = \sum_{all\ hours\ \ in\ qtr} HI_{hr} \qquad (Eq.D-16)$$

Where:

HI_{qtr} = Total heat input from fuel combustion during quarter, mmBtu.
HI_{hr} = Hourly heat input determined from Equation F-20/D-6, mmBtu.

$$HI_{YTD} = \sum_{q=1}^{current-quarter} HI_{qtr} \qquad (Eq.\ D-17)$$

Where:

HI_{YTD} = Annual total CO_2 mass emissions, tons.
HI_{qtr} = Quarterly total CO_2 mass emissions, tons.

3.6 Data Capture Requirements and Data Substitution

The CEMS must be capable of completing a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute interval (40 CFR 75, §75.10(d)(1)). Emissions concentrations collected by the monitors will be reduced to hourly averages. Hourly averages will consist of at least one data point in each fifteen-minute quadrant of an hour, where the unit combusted fuel during that quadrant of an hour.

An hourly average may be computed from a valid data point in two quadrants (where the unit operates for more than one quadrant of an hour) if data are unavailable due to performance of a calibration, quality assurance, or preventive maintenance activities. All valid measurements or data points collected during an hour will be used to calculate hourly averages. All data points collected during an hour will be, to the extent practicable, evenly spaced over the hour.

Failure to acquire the minimum number of data points for calculation of an hourly average will result in the failure to obtain a valid hour of data and the loss of such component data for the entire hour.

An hourly average NO_X emission rate in lb/MMBtu is valid only if both the pollutant and diluent monitors acquire the minimum number of data points.

If a valid hour of data is not obtained, the owner/operator will estimate and record emissions for the missing hour by means of the DAHS in accordance with the missing data substitution procedures outlined in 40 CFR 75, Subpart D.

3.7 Range of Operation

CCEC Units CCCT3A, CCCT3B, and CCCT3C each have a maximum output of 450 MW, with a lower stable operating boundary of 55 MW. Each unit also has a total nominal maximum heat input value of 3046.0 MMBtu/hr (2586.0 MMBtu/hr for each CT and 460.0 for each duct burner/HRSG).

Chapter 4.0 NO_X Analyzer Ranges

4.1 NO_X Range Determination

The NO_X analyzers are dual range analyzers. The low range of the NO_X analyzer (0-10 ppm) is based on using an MEC value of 10.0 ppm. The MEC is based on air pollution control device *manufacturer's guaranteed removal efficiencies*. The high range of the NO_X analyzer (0-200 ppm) is based on using an MPC value of 200 ppm from the default tables in 40 CFR 75.

4.1.1 MPC/MEC Calculations

The NO_X analyzers are set as dual range analyzers. The high span has been set to 200 ppm to ensure that high concentrations, during periods of control equipment malfunction, will not exceed the full scale range of the analyzer. The span for the low range is set to 10 ppm. The 10-ppm span was chosen through an expected control efficiency of the SCR and the water injection control devices. The Maximum NO_X Potential Concentration and the Maximum Expected Concentration (MEC) values were chosen based on air permit levels and EPA default values ("Monitoring Span Data" in the electronic monitoring plan). The NO_X analyzer ranges were calculated based on the following:

MPC = 200.0 ppm
MEC = 10.0 ppm

Low range: MEC x (1.0 up to 1.25), rounded up to nearest 10 = 10 ppm

High range: MPC x (1.0 up to 1.25), rounded up to nearest 100 = 200 ppm

The Maximum NOx Emission Rate (MER), for each fuel, was calculated in the following manner.

PNG: $E = K \times C_h \times F_d \times (20.9 / (20.9 - \%O_2)) = 2.288$ lb/MMBtu
ULSD: $E = K \times C_h \times F_d \times (20.9 / (20.9 - \%O_2)) = 2.414$ lb/MMBtu

Where:

E	=	Pollutant emissions, lb/mmBtu
K	=	1.194×10^{-7} (lb/dscf)/ppm NO_X
C_h	=	Hourly average pollutant concentration, ppm dry. The NOx MPC value of 200 ppm was utilized as the C_h in the calculation.
$\%O_2$	=	Oxygen concentration, % volume. The allowed maximum O_2 default value of 19% O_2 for turbines was utilized in the calculation.
F_d	=	A factor representing a ratio of the volume of dry flue gases generated to the caloric value of the fuel combusted (F). Default factor of 8710 for PNG and 9190 for ULSD were utilized in the applicable calculation.

4.2 O_2 Analyzer Span and Range

Per 40 CFR 75 Appendix A. 2.1.3 required specifications of setting the O_2 analyzer span between 15% and 25% O_2, the span of the O_2 analyzers was set at 25% O_2. In compliance with section 2.1 of Appendix A, the full-scale range of each of the installed O_2 analyzers is 0 - 25% O_2. A diluent cap of 19% O_2 is set in the DAHS to be used in hourly calculations in which the hourly average O2 value is greater than 19% O_2.

Chapter 5.0 Calibration Gas Cylinder Requirements

The following specialty gases are required for calibration of the analyzers and for all audit testing. All calibration gases must be EPA Protocol and purchased from a Protocol Gas Verification Program (PGVP) participating vendor.

The table(s) below represents the calibration gas concentration ranges as allowed under 40 CFR 75, Appendix A. The ordered concentration of gases for each analyzer must fall within the listed ranges. In applications where more than one regulatory requirement must be meet, a single set of calibration gases will be purchased. This calibration gas concentration will be purchased in the “overlap” area of the allowed concentration ranges of the two regulations.

40 CFR 75 Specifications:

Units CCCT3A, CCCT3B, and CCCT3C:

NO_x Low Range: 0-10 ppm Span	Range of Concentrations	Notes
Zero (0-20% of span)[1]	0 - 2 ppm	Calibration Error and Response Time Tests
Mid (50-60% of span)[2]	5- 6 ppm	Calibration Error[2]
High (80-100% of span)	8 - 10 ppm	Calibration Error[2] and Response Time Tests

NOx High Range: 0-200 ppm Span	Range of Concentrations	Notes
Zero (0-20% of span)1	0 - 40 ppm	Calibration Error and Response Time Tests
Low (20-30% of span)	40 – 60 ppm	Linearity Test
Mid (50-60% of span) 2	100- 120 ppm	Linearity Test, Calibration Error[2]
High (80-100% of span)	160 - 200 ppm	Calibration Error[2], Response Time, and Linearity Tests

O_2 Span 0-25%	Range of Concentrations	Notes
Zero (0-20% of span)[1]	0 – 5 %	Calibration Error and Response Time Tests
Low (20-30% of span)	5.0 – 7.5 %	Linearity Test
Mid (50-60% of span)[2]	12.5 – 15 %	Linearity Test
High (80-100% of span)	20 – 25 %	Calibration Error[2], Response Time, and Linearity Tests

[1] – Note: Zero air material is typically used for daily calibration.
[2] - Note: a mid-level calibration gas (50-60% of span) may be used in place of the high-level gas if the mid-level gas is more representative of actual stack gas concentrations.

Chapter 6.0 Certification Testing

Initial certification testing will conducted on all three new units at the Cape Canaveral Energy Center according to the certification test protocol, which will be developed and submitted to the Florida Department of Environmental Protection (FDEP) and US EPA authorities for pre-approval prior to the start of any CEMS certification testing. The overall testing program will follow the procedures described below. On-going Quality Assurance testing or any necessary re-certification testing of the CEMS will continue to be performed in accordance with 40 CFR 75, Appendix A.

After certification, facility representatives will maintain and operate the CEMS in accordance with manufacturer's recommendations as outlined in the Operation and Maintenance Manual and Quality Assurance Plan (both under separate cover).

Initial Certification testing includes:

- Calibration Error (7-day drift test)
- Cycle Response Time
- Linearity Check
- Relative Accuracy Test Audit (RATA) and Bias Test
- DAHS Verification

6.1 Calibration Error Test

An on-site calibration error test (7-day drift test) will be performed for each NO_X and O_2 analyzer in accordance with 40 CFR 75, Appendix A, Section 6.3. The low range of the dual-range NOx analyzer is exempted from the 7-Day Calibration Error Test because its range, 0-10 ppm is lower than the minimum required range per 40 CFR 75 Appendix A, Section 6.3.1. However, since the units are also subject to 40 CFR 60 requirements, the low range may need to be tested to satisfy 40 CFR 60, Appendix B, Performance Specification 2. The test will be performed while the unit is combusting fuel at typical stack temperature and pressure conditions. It is not necessary for the unit to be generating electricity during the test.

The calibration error test consists of measuring the calibration error of each monitor scale once each day for seven (7) consecutive operating (on line) days. In the event that extended unit outages occur after the commencement of the test, the 7 consecutive days need not be 7 consecutive calendar days. For pollutant analyzers, the calibration error tests will be conducted at two EPA Protocol calibration gas concentrations: zero-level (0-20% of span) and high-level (80-100% of span) as specified in 40 CFR 75, Appendix A, Section 6.3.1. Alternately, a mid-level calibration gas (50-60% of span) may be used in place of the high-level gas if the mid-level gas is more representative of actual stack gas concentrations.

In accordance with 40 CFR 75, Appendix A, Section 3.1, results of the 7-day calibration error test are acceptable if the daily calibration error does not exceed: 2.5% for NO_x and 0.5% for O_2, Alternatively, if the pollutant monitor's span value is equal to or less than 200 ppm, then calibration error shall not exceed 5.0 ppm difference.

Calibration checks will be performed automatically at approximately 24-hour intervals by the iNET during the drift test period. The readings for each analyzer will be taken from the DAHS at the completion of the calibration routine. Copies of the DAHS reports will be contained in the final certification test report. Manual or automatic adjustments will not be made to the monitors until after the zero and high drift responses have been taken for that day during the 7-day test. If any automatic or manual adjustments are made to the instruments during the 7-day calibration error test, it will be in such a way that the magnitude of the adjustments will be recorded and reported.

6.2 Cycle Response Time Test

The cycle time test measures the monitor's reaction time to a change in gas concentration. The daily zero and span calibration gases will be utilized for response time testing. The test will be done on both ranges of the NO_X analyzer and the O_2 analyzer. For each range of the NO_X and O_2 analyzers, certified EPA Protocol gases will be used. These procedures are given in 40 CFR 75 Appendix A, Section 6.4.

To conduct the downscale portion of the Cycle Time test, a stable flue gas emission level will be determined. The stable value will be recorded and then a zero-level concentration gas will be injected into the system. The time of the zero gas injection using the DAHS will be recorded. The monitor will be allowed to measure the zero-level gas concentration until the response stabilizes. The stabilized ending gas calibration value and time are then recorded. The response time is the time interval from the stable cal gas value reading to 95% of the stable flue gas reading.

The procedure is then repeated for the upscale portion of the Cycle Time test by returning the system to read stack flue gases. After the stack flue gas readings have stabilized, a high-level calibration gas will be injected until the monitor measures a stable high-level gas concentration. The stabilized start and end values and times will be recorded. The time for the system to record 95% of the stable ending value will then be determined.

The upscale and the downscale cycle times will be compared for both NO_X ranges and the O_2 times. The longer (slowest) of these three times will be recorded as the cycle time for the analyzer. For monitors with dual ranges, report the test results from the range giving the longer cycle time. The Cycle Time is considered acceptable if the cycle time does not exceed 15 minutes.

The following criteria will be used to assess when a stable reading of stack emissions or calibration gas concentration has been attained. A stable value is defined as a reading with a change of less than 2.0 percent of the span value for 2 minutes, or a reading with a change of less than 6.0 percent from the measured average concentration over 6 minutes. Alternatively, for NO_X and O_2 systems, the reading can also be considered stable if it changes by no more than 0.5 ppm, or 0.2% for O_2 for two minutes. For monitors or monitoring systems that perform a series of operations (such as purge, sample, and analyze), timing of the injections of the calibration gases will be done so that they will produce the longest possible cycle times.

The daily zero and span calibration gases can be utilized for response time testing. Note that if the daily span calibration gas is between 50%-60% of the analyzer span value, then you cannot use that calibration gas for this test. The gas concentration must be between 80%-100% of the span value of the analyzer.

6.3 Linearity Check

An on-site linearity test will be conducted in accordance with the 40 CFR 75, Appendix A, for the NO_X and O_2 monitoring systems. The test will be performed while the unit is combusting primary fuel at typical stack temperature and pressure conditions. It is not necessary for the unit to be generating electricity during the test.

40 CFR 75, Appendix A, Section 6.2 requires that a linearity to be performed on all ranges of each analyzer. This does not apply to ranges where the span is $\leq$30 ppm. Therefore in this application, the low-range is exempt from the Linearity requirements.

EPA Protocol gases will be used to conduct the linearity checks of the analyzers. Three concentrations of calibration gases, low (20-30% of analyzer span), mid (50-60% of analyzer span) and high (80-100% of analyzer span) will be introduced at the probe (40 CFR 75, Appendix A, Section 5.2).

Each monitor will be challenged three times with the appropriate EPA Protocol reference gas, without using the same gas twice in succession. The monitors' response for each concentration will be recorded. The average of the three responses will be used to calculate the linearity error (40 CFR 75, Appendix A, Section 6.2).

6.4 Relative Accuracy Test Audit

NO_x RATA will be conducted simultaneously with the O_2 RATA. Each sample run will be no less than 21 minutes in duration with approximately 15 minutes between sampling runs for calibration of the Reference Method analyzers.

For each Reference Method 7E/3A determination, the flue gas will be sampled at a number of traverse points that will be determined prior to testing using EPA Method 1 procedures. The difference between the Reference Method sample and the NO_X monitor's reading will be evaluated from a minimum of nine sets of paired monitor and Reference Method test data (40 CFR 75, Appendix A, Section 6.5.9). From these differences, the 95% confidence coefficient is calculated, and the relative accuracy determined (40 CFR 75, Appendix A, Section 7.3). The diluent gas tests will be conducted concurrently with the pollutant gas tests. Any tests not included in the calculations for the determination of relative accuracy (maximum of three) will be included in the final test report.

The NO_x relative accuracy will be established on-site. In accordance with 40 CFR 75, Appendix A, Section 3.3.2, the NO_x RATA results are acceptable if the NO_x relative accuracy does not exceed 10.0% (semiannual). Under the incentive program if the RATA results are ≤7.5% then the next RATA can be performed on an annual basis rather than semiannual.

For affected units where the average of the reference method measurements of NO_x emission rate during the relative accuracy test audit is ≤0.200 lb/mmBtu, the difference between the mean value of the CEMS measurements and the reference method mean value shall not exceed ±0.015 lb/mmBtu, wherever the relative accuracy specification of 10.0 percent is not achieved.

The alternative criteria will only be utilized if the 10% relative accuracy requirement is not achieved. Under the incentive program if the RATA results are ≤7.5% or ±0.015 lb/mmBtu difference from the reference method, then the next RATA can be performed on an annual basis rather than semiannual.

6.5 Bias Test

A bias test will be performed on the NO_x monitoring system in accordance with 40 CFR 75, Appendix A, Section 6.5 and 7.6. The bias test will be performed using the same data sets as those used to calculate the relative accuracy at the normal operating level.

If the mean difference is greater than the absolute value of the confidence coefficient, the monitor fails the bias test requirements of 40 CFR 75, Appendix A, Section 7.6.4, and the values shall be adjusted for bias from the time of the test failure until the next relative accuracy test shows no bias (40 CFR 75, Appendix A, Sections 3.4.1 and 3.4.2).

6.6 Periodic Quality Assurance Testing

The following test will be performed periodically or if any maintenance triggers a recertification event to ensure that the data are quality assured:

- Calibration Drift (daily)
- Linearity Check (every QA operating quarter)
- Relative Accuracy Test Audit (RATA) and Bias Test (minimum every 4 QA operating quarters)
- Fuel Flowmeter Calibration (every 4 QA operating quarters unless CCEC chooses to use the optional Fuel Flow-to-Load testing in which case the Fuel Flowmeter calibration test can be extended up to 20 calendar operating quarters)
- Orifice Plate Inspection (minimum every 36 months)

Chapter 7.0 DAHS Verification Test Results

The facility will retest the DAHS formulae listed in the Monitoring Plan Formula Data records anytime that there is a change to the monitoring plan that may have an effect on the DAHS ability to reduce the data to the hourly reportable values as required in 40 CFR Part 75.10(d). A hard copy of the results will be kept on site. The DAHS verification test was also be conducted following the EPA guidelines for validating that the DAHS correctly applies the 40 CFR 75 Subpart D data substitution criteria. A copy of this report was included with the initial CEMS certification report.

Attachment A - ECMPS Generated Monitoring Plan Report

The attached monitoring plan file was configured using the EPA's Emissions Collection and Monitoring Plan System (ECMPS) software tools.

NOTE: *All EDR files will be submitted in XML file format and will be validated using the current version of the EPA's Emissions Collection and Monitoring Plan System (ECMPS) software tools.*

Unit CCCT3A ECMPS Monitoring Plan Report Print Out

ECMPS Client Tool

Version 1.0 2012 Q4

Monitoring Plan Printout Report

March 7, 2013 03:20 PM

Facility Name: Cape Canaveral

Facility Details

Facility ID (ORISPL): 609
Monitoring Plan Location IDs: CCCT3A
State: FL
County: Brevard
Latitude: 28.4694
Longitude: -80.7642

Reporting Frequency

Monitoring Plan Location IDs	Reporting Frequency	Begin Quarter	End Quarter
CCCT3A	Q - Quarterly	2013 QTR 2	

Monitoring Location Attributes

Unit/Stack/Pipe Identifier	Duct Indicator	Ground Elevation	Stack Height	Cross Area Exit	Cross Area Flow	Material Code	Shape Code	Begin Date	End Date
CCCT3A		0	149	380				05/30/2013	

Unit Operation Information

Unit Identifier	Non-Load Based Ind	Commence Commercial Operation Date	Commence Operation Date	Boiler/Turbine Type			Max Heat Input		
				Code	Begin Date	End Date	Value (mmBtu)	Begin Date	End Date
CCCT3A		06/01/2013	06/01/2013	CC	06/01/2013		3046.0	05/30/2013	

Unit Type Codes: CC - Combined cycle

Unit Program Information

Unit Identifier	Program Code	Unit Class	Unit Monitor Certification Begin Date	Unit Monitor Certification Deadline
CCCT3A	ARP	P2	06/01/2013	
	CAIRNOX	A	06/01/2013	
	CAIROS	A	06/01/2013	
	CAIRSO2	A	06/01/2013	
	TRNOXOS	A	06/01/2013	

Unit Fuel

Unit Identifier	Fuel Type	Fuel Indicator	Demonstration Method for GCV	Demonstration Method for Daily Sulfur	Ozone Season Indicator	Begin Date	End Date
CCCT3A	DSL	S	GHS	SHS		05/30/2013	
	PNG	P	GHS	SHS		05/30/2013	

Fuel Type Codes: PNG - Pipeline Natural Gas

DSL - Diesel Oil

Fuel Indicator Codes: S - Secondary

P - Primary

Demonstration Method Codes for GCV: GHS - 720 Hours of Data Using Hourly Sampling

Demonstration Method Codes for SO2: SHS - 720 Hours of Data Using Manual Hourly Sampling

Unit Controls

Unit Identifier	Parameter	Control Equipment	Original Ind	Seasonal Ind	Installation Date	Optimization Date	Retirement Date
CCCT3A	NOX	DLNB	Y				
	NOX	H2O	Y				
	NOX	SCR	Y				

Control Equipment Descriptions: SCR - Selective Catalytic Reduction

H2O - Water Injection

DLNB - Dry Low NOx Burners

Monitoring Method

Unit/Stack/Pipe Identifier	Parameter	Methodology	Substitute Data Approach	Bypass Approach Code	Begin Date/Hour	End Date/Hour
CCCT3A	CO2	AD	SPTS		05/30/2013 00	
	HI	AD	SPTS		05/30/2013 00	
	NOX	NOXR			05/30/2013 00	
	NOXR	CEM	SPTS		05/30/2013 00	
	OP	EXP			05/30/2013 00	

Parameter Codes:
OP - Opacity
NOXR - NOx Emission Rate (lb/mmBtu)
NOX - NOx Hourly Mass Rate (lb/hr)
HI - Heat Input Rate (mmBtu/hr)
CO2 - CO2 Hourly Mass Rate (ton/hr)

Methodology Codes:
NOXR - NOx Mass Calculated from NOx Emission Rate
EXP - Exempt
CEM - Continuous Emission Monitor
AD - Appendix D

Substitute Data Codes:
SPTS - Standard Part 75 for Missing Data

Facility Name: Cape Canaveral

Facility ID (ORISPL): 609

Monitoring Plan Printout Report

March 7, 2013 03:20 PM

Monitoring System / Analytical Components

Unit/Stack /Pipe Identifier	System					Component								
	ID	Type	Des	Begin Date/Hour	End Date/Hour	ID	Type	SAM	BAS	Manufacturer	Model or Version	Serial Number	Begin Date/Hour	End Date/Hour
CCCT3A	A01	NOX	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						A01	NOX	EXT	D	TECO	42I	1205851855	05/30/2013 00	
						A02	O2	EXT	D	SERVOMEX	1440D	01440D1V02/4601	05/30/2013 00	
						A03	PRB	EXT		CISCO	EP750	TBD	05/30/2013 00	
	A02	GAS	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						A04	GFFM	ORF		TRIAD MEASUREMENT & EQUIP	6500	1001619	05/30/2013 00	
						A05	GFFM	ORF		GAS TURBINE EFFICIENCY	305AC9	3025186	05/30/2013 00	
	A03	OILM	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						A06	OFFM	TUR		SITRANS	FUH 1010	34424	05/30/2013 00	

System Types Descriptions:
NOX - NOx Emission Rate
GAS - Gas Fuel Flow
OILM - Mass of Oil Fuel Flow

System Designations Descriptions:
P - Primary

Sample Acquisition Method (SAM):
TUR - Turbine
ORF - Orifice
EXT - Dry Extractive

Component Types Descriptions:
DAHS - Data Acquisition and Handling System
NOX - NOx Concentration
O2 - O2 Concentration
PRB - Probe
GFFM - Gas Fuel Flowmeter
OFFM - Oil Fuel Flowmeter

Monitoring System Fuel Flow

Unit/Stack/Pipe Identifier	System ID	Fuel Code	Max Fuel Flow Rate	Units of Measure	Source Code	Begin Date/Hour	End Date/Hour
CCCT3A	A02	PNG	30667.0	HSCF	URV	05/30/2013 00	
	A03	DSL	126880.0	LBHR	UMX	05/30/2013 00	

System Fuel Codes Descriptions: PNG - Pipeline Natural Gas
DSL - Diesel Oil

Units of Measure Descriptions: LBHR - Pounds / Hour
HSCF - Hundred Standard Cubic Feet / Hour

Source Codes Descriptions: URV - Upper Range Value
UMX - Unit Maximum Rate

Analyzer Range Data

Unit/Stack/Pipe Identifier	Component Type	Component ID	Range Code	Dual Range Indicator	Begin Date/Hour	End Date/Hour
CCCT3A	NOX	A01	Auto Ranging	Y	05/30/2013 00	
	O2	A02	High Range		05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Facility Name: Cape Canaveral

Facility ID (ORISPL): **609**

Emissions Formulas

Unit/Stack/Pipe Identifier	Parameter	Formula ID	Formula Code	Formula	Begin Date/Hour	End Date/Hour
CCCT3A	CO2	A01	G-4	CO2_gas=(1040*F#(A04)*(1/385)*44.0)/2000	05/30/2013 00	
	NOXR	A02	F-5	E=1.194*10**-7*S#(A01-A01)*F#(A12)*(20.9/(20.9-S#(A02-A01)))	05/30/2013 00	
	NOX	A03	F-24A	NOX_mass = F#(A02)*F#(A06)	05/30/2013 00	
	HI	A04	D-6	HI_gas = (F#(A13) * GCV_gas) / 10 ** 6	05/30/2013 00	
	HI	A05	D-8	HI_oil = S#(A06-A03) * GCV_oil / 10 ** 6	05/30/2013 00	
	HI	A06	D-15A	HI_hr = (F#(A04) * T_gas + F#(A05) * T_oil)/ T_unit	05/30/2013 00	
	SO2	A07	D-5	SO2_glb/hr = 0.0006*F#(A04)	05/30/2013 00	
	SO2	A08	D-2	SO2_rate-oil = 2.0 * S#(A06-A03) * %S_oil / 100.0	05/30/2013 00	
	SO2	A09	D-12	SO2_TOTAL= ((F#(A08) * T_OIL) + (F#(A07) * T_GAS))	05/30/2013 00	
	CO2	A10	G-4	W_CO2 = 1420 * F#(A05) * 1 / 385 * 44.0 / 2000	05/30/2013 00	
	CO2	A11	G-4A	CO2_unit =((F#(A01) * T_gas) + (F#(A10) * T_oil)) / T_unit	05/30/2013 00	
	FD	A12	F-8	F_c = X_oil * 1420 + X_gas * 1040	05/30/2013 00	
	FGAS	A13	N-GAS	Gas_total = S#(A14-A02) + S#(A05-A02)	05/30/2013 00	

Parameter Codes Descriptions:

CO2 - CO2 Hourly Mass Rate (ton/hr)
NOXR - NOx Emission Rate (lb/mmBtu)
NOX - NOx Hourly Mass Rate (lb/hr)
HI - Heat Input Rate (mmBtu/hr)
SO2 - SO2 Hourly Mass Rate (lb/hr)
FD - F-Factor Dry-basis
FGAS - Gas Hourly Flow Rate (hscf)

Formula Codes Descriptions:

N-GAS - FGAS (net gas flow rate)
G-4A - CO2 (from CO2 rate for multiple fuels)
G-4 - CO2 (from HI, Fc)
F-8 - FD/FC/FW (from multiple fuels)
F-5 - NOXR/SO2R (from NOX or SO2 dry, O2 dry, Fd)
F-24A - NOX (from NOX rate, HI)
D-8 - HI (from oil flow rate, GCV)
D-6 - HI (from gas flow rate, GCV)
D-5 - SO2 (from gas SO2 emission rate, HI)
D-2 - SO2 (from OILM, oil sulfur content)
D-15A - HI (from HI rate for multiple fuels)
D-12 - SO2 (from SO2 rate for multiple fuels)

Span Values

Unit/Stack /Pipe Identifier	Comp Type	Scale	Method	MPC/ MPF	MEC	Span Value	Full-Scale Range	Units of Measure	Scale Transition Point	Def. High Range Value	Flow Full Range (SCFH)	Flow Span Value (SCFH)	Begin Date/Hour	End Date/Hour
CCCT3A	NOX	H	TB	200.0	10.0	200.000	200.000	PPM	9.5				05/30/2013 00	
	NOX	L	F		10.0	10.000	10.000	PPM	9.5				05/30/2013 00	
	O2	H				25.000	25.000	PCT					05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Span Method Codes Descriptions: TB - Table Defaults from Part 75
F - Formula

Units of Measure Descriptions: PPM - Parts per Million
PCT - Percentage

Unit/Stack/Pipe Load or Operating Level Information

Unit/Stack/Pipe Identifier	Maximum Hourly Load	Units of Measure	Upper Bound of Range of Operation	Lower Bound of Range of Operation	Designated Normal Op. Level	Second Most Frequently Used Op. Level	Second Normal Indicator	Load Analysis Date	Begin Date/Hour	End Date/Hour
CCCT3A	450	MW	450	55	High	Mid	Yes	05/30/2013	05/30/2013 00	

Units of Measure Descriptions: MW - Megawatt

Monitoring Defaults

Unit/Stack/Pipe Identifier	Parameter	Value	Units of Measure	Purpose Code	Fuel Type	Operating Condition	Source of Value	Begin Date/Hour	End Date/Hour
CCCT3A	NORX	2.4140	LBMMBTU	MD	NFS	A	TEST	05/30/2013 00	
	O2X	19.0000	PCT	DC	NFS	A	DEF	05/30/2013 00	

Parameter Codes Descriptions: O2X - Maximum O2 Concentration (pct)
NORX - Maximum NOx Emission Rate (lb/mmBtu)

Units of Measure Descriptions: PCT - Percentage
LBMMBTU - Pounds / mmBtu

Purpose Codes Descriptions: MD - Missing Data (or Unmonitored Bypass Stack or Emergency Fuel) Default
DC - Diluent Cap

Fuel Type Codes Descriptions: NFS - Non-Fuel Specific

Operating Conditions Descriptions: A - Any Hour

Source Codes Descriptions: TEST - Unit or Stack Testing
DEF - Default Value from Part 75

Qualifications

Unit/Stack/Pipe Identifier	Qualification Type	Begin Date	End Date
CCCT3A	GF	01/01/2013	

Qualification Percentages for Qualification Type Code GF Begin Date 01/01/2013

Qualification Year	Average Percent Value	Year 1			Year 2			Year 3		
		Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value
2013	100.0	2013	P	100.0	2014	P	100.0	2015	P	100.0

Qualification Types Descriptions: GF - Gas-Fired Unit

Data Type Codes Descriptions: A - Actual
D - Demonstration
P - Projected

Unit CCCT3B ECMPS Monitoring Plan Report Print Out

Facility Name: Cape Canaveral

Facility Details

Facility ID (ORISPL): 609
Monitoring Plan Location IDs: CCCT3B
State: FL
County: Brevard
Latitude: 28.4694
Longitude: -80.7642

Reporting Frequency

Monitoring Plan Location IDs	Reporting Frequency	Begin Quarter	End Quarter
CCCT3B	Q - Quarterly	2013 QTR 2	

Monitoring Location Attributes

Unit/Stack/Pipe Identifier	Duct Indicator	Ground Elevation	Stack Height	Cross Area Exit	Cross Area Flow	Material Code	Shape Code	Begin Date	End Date
CCCT3B		0	149	380				05/30/2013	

Unit Operation Information

Unit Identifier	Non-Load Based Ind	Commence Commercial Operation Date	Commence Operation Date	Boiler/Turbine Type			Max Heat Input		
				Code	Begin Date	End Date	Value (mmBtu)	Begin Date	End Date
CCCT3B		06/01/2013	06/01/2013	CC	06/01/2013		3046.0	05/30/2013	

Unit Type Codes: CC - Combined cycle

Unit Program Information

Unit Identifier	Program Code	Unit Class	Unit Monitor Certification Begin Date	Unit Monitor Certification Deadline
CCCT3B	ARP	P2	06/01/2013	
	CAIRNOX	A	06/01/2013	
	CAIROS	A	06/01/2013	
	CAIRSO2	A	06/01/2013	
	TRNOXOS	A	06/01/2013	

Unit Fuel

Unit Identifier	Fuel Type	Fuel Indicator	Demonstration Method for GCV	Demonstration Method for Daily Sulfur	Ozone Season Indicator	Begin Date	End Date
CCCT3B	DSL	S	GHS	SHS		05/30/2013	
	PNG	P	GHS	SHS		05/30/2013	

Fuel Type Codes: PNG - Pipeline Natural Gas
DSL - Diesel Oil

Fuel Indicator Codes: S - Secondary
P - Primary

Demonstration Method Codes for GCV: GHS - 720 Hours of Data Using Hourly Sampling

Demonstration Method Codes for SO2: SHS - 720 Hours of Data Using Manual Hourly Sampling

Unit Controls

Unit Identifier	Parameter	Control Equipment	Original Ind	Seasonal Ind	Installation Date	Optimization Date	Retirement Date
CCCT3B	NOX	DLNB	Y				
	NOX	H2O	Y				
	NOX	SCR	Y				

Control Equipment Descriptions: SCR - Selective Catalytic Reduction
H2O - Water Injection
DLNB - Dry Low NOx Burners

Monitoring Method

Unit/Stack/Pipe Identifier	Parameter	Methodology	Substitute Data Approach	Bypass Approach Code	Begin Date/Hour	End Date/Hour
CCCT3B	CO2	AD	SPTS		05/30/2013 00	
	HI	AD	SPTS		05/30/2013 00	
	NOX	NOXR			05/30/2013 00	
	NOXR	CEM	SPTS		05/30/2013 00	
	OP	EXP			05/30/2013 00	
	SO2	AD	SPTS		05/30/2013 00	

Parameter Codes:
SO2 - SO2 Hourly Mass Rate (lb/hr)
OP - Opacity
NOXR - NOx Emission Rate (lb/mmBtu)
NOX - NOx Hourly Mass Rate (lb/hr)
HI - Heat Input Rate (mmBtu/hr)
CO2 - CO2 Hourly Mass Rate (ton/hr)

Methodology Codes:
NOXR - NOx Mass Calculated from NOx Emission Rate
EXP - Exempt
CEM - Continuous Emission Monitor
AD - Appendix D

Substitute Data Codes:
SPTS - Standard Part 75 for Missing Data

Facility Name: Cape Canaveral

Facility ID (ORISPL): 609

Monitoring Plan Printout Report

March 7, 2013 03:23 PM

Monitoring System / Analytical Components

Unit/Stack /Pipe Identifier	System					Component								
	ID	Type	Des	Begin Date/Hour	End Date/Hour	ID	Type	SAM	BAS	Manufacturer	Model or Version	Serial Number	Begin Date/Hour	End Date/Hour
CCCT3B	B01	NOX	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						B01	NOX	EXT	D	TECO	42I	1205851859	05/30/2013 00	
						B02	O2	EXT	D	SERVOMEX	1440D	01440D1V02/4608	05/30/2013 00	
						B03	PRB	EXT		CISCO	EP750	TBD	05/30/2013 00	
	B02	GAS	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						B04	GFFM	ORF		TRIAD MEASUREMENT & EQUIP	6500	1001620	05/30/2013 00	
						B05	GFFM	ORF		GAS TURBINE EFFICIENCY	305AC9	3025185	05/30/2013 00	
	B03	OILM	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						B06	OFFM	TUR		SITRANS	FUH 1010	34243	05/30/2013 00	

System Types Descriptions:
NOX - NOx Emission Rate
GAS - Gas Fuel Flow
OILM - Mass of Oil Fuel Flow

System Designations Descriptions:
P - Primary

Sample Acquisition Method (SAM):
TUR - Turbine
ORF - Orifice
EXT - Dry Extractive

Component Types Descriptions:
DAHS - Data Acquisition and Handling System
NOX - NOx Concentration
O2 - O2 Concentration
PRB - Probe
GFFM - Gas Fuel Flowmeter
OFFM - Oil Fuel Flowmeter

Monitoring System Fuel Flow

Unit/Stack/Pipe Identifier	System ID	Fuel Code	Max Fuel Flow Rate	Units of Measure	Source Code	Begin Date/Hour	End Date/Hour
CCCT3B	B02	PNG	30667.0	HSCF	URV	05/30/2013 00	
	B03	DSL	126880.0	LBHR	UMX	05/30/2013 00	

System Fuel Codes Descriptions: PNG - Pipeline Natural Gas
DSL - Diesel Oil

Units of Measure Descriptions: LBHR - Pounds / Hour
HSCF - Hundred Standard Cubic Feet / Hour

Source Codes Descriptions: URV - Upper Range Value
UMX - Unit Maximum Rate

Analyzer Range Data

Unit/Stack/Pipe Identifier	Component Type	Component ID	Range Code	Dual Range Indicator	Begin Date/Hour	End Date/Hour
CCCT3B	NOX	B01	Auto Ranging	Y	05/30/2013 00	
	O2	B02	High Range		05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Facility Name: **Cape Canaveral**

Facility ID (ORISPL): **609**

Monitoring Plan Printout Report

March 7, 2013 03:23 PM

Emissions Formulas

Unit/Stack/Pipe Identifier	Parameter	Formula ID	Formula Code	Formula	Begin Date/Hour	End Date/Hour
CCCT3B	CO2	B01	G-4	CO2-gas = (1040 * F#(B04) * (1 / 385) * 44.0) / 2000	05/30/2013 00	
	NOXR	B02	F-5	E = 1.194 * 10 ** - 7 * S#(B01-B01) * F#(B12) * (20.9/(20.9- S#(B02-B01)))	05/30/2013 00	
	NOX	B03	F-24A	NOX_mass = F#(B02)*F#(B06)	05/30/2013 00	
	HI	B04	D-6	HI_gas = (F#(B13) * GCV_gas) / 10 ** 6	05/30/2013 00	
	HI	B05	D-8	HI_oil = S#(B06-B03) * GCV_oil / 10 ** 6	05/30/2013 00	
	HI	B06	D-15A	HI_hr = (F#(B04) * T_gas + F#(B05) * T_oil)/ T_unit	05/30/2013 00	
	SO2	B07	D-5	SO2_glb/hr = 0.0006*F#(B04)	05/30/2013 00	
	SO2	B08	D-2	SO2_rate-oil = 2.0 * S#(B06-B03) * %S_oil / 100.0	05/30/2013 00	
	SO2	B09	D-12	SO2_TOTAL= ((F#(B08) * T_OIL) + (F#(B07) * T_GAS))	05/30/2013 00	
	CO2	B10	G-4	W_CO2 = 1420 * F#(B05) * 1 / 385 * 44.0 / 2000	05/30/2013 00	
	CO2	B11	G-4A	CO2_unit =((F#(B01) * T_gas) + (F#(B10) * T_oil)) / T_unit	05/30/2013 00	
	FD	B12	F-8	F_c = X_oil * 1420 + X_gas * 1040	05/30/2013 00	
	FGAS	B13	N-GAS	GAS_TOTAL = S#(B14-B02) + S#(B05-B02)	05/30/2013 00	

Parameter Codes Descriptions:

CO2 - CO2 Hourly Mass Rate (ton/hr)
NOXR - NOx Emission Rate (lb/mmBtu)
NOX - NOx Hourly Mass Rate (lb/hr)
HI - Heat Input Rate (mmBtu/hr)
SO2 - SO2 Hourly Mass Rate (lb/hr)
FD - F-Factor Dry-basis
FGAS - Gas Hourly Flow Rate (hscf)

Formula Codes Descriptions:

N-GAS - FGAS (net gas flow rate)
G-4A - CO2 (from CO2 rate for multiple fuels)
G-4 - CO2 (from HI, Fc)
F-8 - FD/FC/FW (from multiple fuels)
F-5 - NOXR/SO2R (from NOX or SO2 dry, O2 dry, Fd)
F-24A - NOX (from NOX rate, HI)
D-8 - HI (from oil flow rate, GCV)
D-6 - HI (from gas flow rate, GCV)
D-5 - SO2 (from gas SO2 emission rate, HI)
D-2 - SO2 (from OILM, oil sulfur content)
D-15A - HI (from HI rate for multiple fuels)
D-12 - SO2 (from SO2 rate for multiple fuels)

Facility Name: **Cape Canaveral**

Facility ID (ORISPL): **609**

Span Values

Unit/Stack /Pipe Identifier	Comp Type	Scale	Method	MPC/ MPF	MEC	Span Value	Full-Scale Range	Units of Measure	Scale Transition Point	Def. High Range Value	Flow Full Range (SCFH)	Flow Span Value (SCFH)	Begin Date/Hour	End Date/Hour
CCCT3B	NOX	H	TB	200.0	10.0	200.000	200.000	PPM	9.5				05/30/2013 00	
	NOX	L	F		10.0	10.000	10.000	PPM	9.5				05/30/2013 00	
	O2	H				25.000	25.000	PCT					05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Span Method Codes Descriptions: TB - Table Defaults from Part 75
F - Formula

Units of Measure Descriptions: PPM - Parts per Million
PCT - Percentage

Unit/Stack/Pipe Load or Operating Level Information

Unit/Stack/Pipe Identifier	Maximum Hourly Load	Units of Measure	Upper Bound of Range of Operation	Lower Bound of Range of Operation	Designated Normal Op. Level	Second Most Frequently Used Op. Level	Second Normal Indicator	Load Analysis Date	Begin Date/Hour	End Date/Hour
CCCT3B	450	MW	450	55	High	Mid	Yes	05/30/2013	05/30/2013 00	

Units of Measure Descriptions: MW - Megawatt

Monitoring Defaults

Unit/Stack/Pipe Identifier	Parameter	Value	Units of Measure	Purpose Code	Fuel Type	Operating Condition	Source of Value	Begin Date/Hour	End Date/Hour
CCCT3B	NORX	2.4140	LBMMBTU	MD	NFS	A	TEST	05/30/2013 00	
	O2X	19.0000	PCT	DC	NFS	A	DEF	05/30/2013 00	

Parameter Codes Descriptions: O2X - Maximum O2 Concentration (pct)
NORX - Maximum NOx Emission Rate (lb/mmBtu)

Units of Measure Descriptions: PCT - Percentage
LBMMBTU - Pounds / mmBtu

Purpose Codes Descriptions: MD - Missing Data (or Unmonitored Bypass Stack or Emergency Fuel) Default
DC - Diluent Cap

Fuel Type Codes Descriptions: NFS - Non-Fuel Specific

Operating Conditions Descriptions: A - Any Hour

Source Codes Descriptions: TEST - Unit or Stack Testing
DEF - Default Value from Part 75

Qualifications

Unit/Stack/Pipe Identifier	Qualification Type	Begin Date	End Date
CCCT3B	GF	01/01/2013	

Qualification Percentages for Qualification Type Code GF Begin Date 01/01/2013

Qualification Year	Average Percent Value	Year 1			Year 2			Year 3		
		Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value
2013	100.0	2013	P	100.0	2014	P	100.0	2015	P	100.0

Qualification Types Descriptions: GF - Gas-Fired Unit

Data Type Codes Descriptions: A - Actual
D - Demonstration
P - Projected

Unit CCCT3C ECMPS Monitoring Plan Report Print Out

Monitoring Plan Printout Report

March 7, 2013 03:26 PM

Facility Name: Cape Canaveral

Facility Details

Facility ID (ORISPL): 609
Monitoring Plan Location IDs: CCCT3C
State: FL
County: Brevard
Latitude: 28.4694
Longitude: -80.7642

Reporting Frequency

Monitoring Plan Location IDs	Reporting Frequency	Begin Quarter	End Quarter
CCCT3C	Q - Quarterly	2013 QTR 2	

Monitoring Location Attributes

Unit/Stack/Pipe Identifier	Duct Indicator	Ground Elevation	Stack Height	Cross Area Exit	Cross Area Flow	Material Code	Shape Code	Begin Date	End Date
CCCT3C		0	149	380				05/30/2013	

Unit Operation Information

Unit Identifier	Non-Load Based Ind	Commence Commercial Operation Date	Commence Operation Date	Boiler/Turbine Type			Max Heat Input		
				Code	Begin Date	End Date	Value (mmBtu)	Begin Date	End Date
CCCT3C		06/01/2013	06/01/2013	CC	06/01/2013		3046.0	05/30/2013	

Unit Type Codes: CC - Combined cycle

Unit Program Information

Unit Identifier	Program Code	Unit Class	Unit Monitor Certification Begin Date	Unit Monitor Certification Deadline
CCCT3C	ARP	P2	06/01/2013	
	CAIRNOX	A	06/01/2013	
	CAIROS	A	06/01/2013	
	CAIRSO2	A	06/01/2013	
	TRNOXOS	A	06/01/2013	

Facility Name: Cape Canaveral

Facility ID (ORISPL): 609

Unit Fuel

Unit Identifier	Fuel Type	Fuel Indicator	Demonstration Method for GCV	Demonstration Method for Daily Sulfur	Ozone Season Indicator	Begin Date	End Date
CCCT3C	DSL	S	GHS	SHS		05/30/2013	
	PNG	P	GHS	SHS		05/30/2013	

Fuel Type Codes: PNG - Pipeline Natural Gas

DSL - Diesel Oil

Fuel Indicator Codes: S - Secondary

P - Primary

Demonstration Method Codes for GCV: GHS - 720 Hours of Data Using Hourly Sampling

Demonstration Method Codes for SO2: SHS - 720 Hours of Data Using Manual Hourly Sampling

Unit Controls

Unit Identifier	Parameter	Control Equipment	Original Ind	Seasonal Ind	Installation Date	Optimization Date	Retirement Date
CCCT3C	NOX	DLNB	Y				
	NOX	H2O	Y				
	NOX	SCR	Y				

Control Equipment Descriptions: SCR - Selective Catalytic Reduction

H2O - Water Injection

DLNB - Dry Low NOx Burners

Monitoring Method

Unit/Stack/Pipe Identifier	Parameter	Methodology	Substitute Data Approach	Bypass Approach Code	Begin Date/Hour	End Date/Hour
CCCT3C	CO2	AD	SPTS		05/30/2013 00	
	HI	AD	SPTS		05/30/2013 00	
	NOX	NOXR			05/30/2013 00	
	NOXR	CEM	SPTS		05/30/2013 00	
	OP	EXP			05/30/2013 00	
	SO2	AD	SPTS		05/30/2013 00	

Parameter Codes:
SO2 - SO2 Hourly Mass Rate (lb/hr)
OP - Opacity
NOXR - NOx Emission Rate (lb/mmBtu)
NOX - NOx Hourly Mass Rate (lb/hr)
HI - Heat Input Rate (mmBtu/hr)
CO2 - CO2 Hourly Mass Rate (ton/hr)

Methodology Codes:
NOXR - NOx Mass Calculated from NOx Emission Rate
EXP - Exempt
CEM - Continuous Emission Monitor
AD - Appendix D

Substitute Data Codes:
SPTS - Standard Part 75 for Missing Data

Facility Name: Cape Canaveral

Facility ID (ORISPL): 609

Monitoring Plan Printout Report

March 7, 2013 03:26 PM

Monitoring System / Analytical Components

Unit/Stack /Pipe Identifier	System					Component								
	ID	Type	Des	Begin Date/Hour	End Date/Hour	ID	Type	SAM	BAS	Manufacturer	Model or Version	Serial Number	Begin Date/Hour	End Date/Hour
CCCT3C	C01	NOX	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						C01	NOX	EXT	D	TECO	42I	1205851860	05/30/2013 00	
						C02	O2	EXT	D	SERVOMEX	1440D	01440D1V02/4606	05/30/2013 00	
						C03	PRB	EXT		CISCO	EP750	TBD	05/30/2013 00	
	C02	GAS	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						C04	GFFM	ORF		TRIAD MEASUREMENT & EQUIP	6500	1001621	05/30/2013 00	
						C05	GFFM	ORF		GAS TURBINE EFFICIENCY	305AC9	3025184	05/30/2013 00	
	C03	OILM	P	05/30/2013 00		900	DAHS			Babcock & Wilcox PGG	8.3.001		05/30/2013 00	
						C06	OFFM	TUR		SITRANS	FUH 1010	34731	05/30/2013 00	

System Types Descriptions:
NOX - NOx Emission Rate
GAS - Gas Fuel Flow
OILM - Mass of Oil Fuel Flow

System Designations Descriptions:
P - Primary

Sample Acquisition Method (SAM):
TUR - Turbine
ORF - Orifice
EXT - Dry Extractive

Component Types Descriptions:
DAHS - Data Acquisition and Handling System
NOX - NOx Concentration
O2 - O2 Concentration
PRB - Probe
GFFM - Gas Fuel Flowmeter
OFFM - Oil Fuel Flowmeter

Monitoring System Fuel Flow

Unit/Stack/Pipe Identifier	System ID	Fuel Code	Max Fuel Flow Rate	Units of Measure	Source Code	Begin Date/Hour	End Date/Hour
CCCT3C	C02	PNG	30667.0	HSCF	URV	05/30/2013 00	
	C03	DSL	126880.0	LBHR	UMX	05/30/2013 00	

System Fuel Codes Descriptions: PNG - Pipeline Natural Gas
DSL - Diesel Oil

Units of Measure Descriptions: LBHR - Pounds / Hour
HSCF - Hundred Standard Cubic Feet / Hour

Source Codes Descriptions: URV - Upper Range Value
UMX - Unit Maximum Rate

Analyzer Range Data

Unit/Stack/Pipe Identifier	Component Type	Component ID	Range Code	Dual Range Indicator	Begin Date/Hour	End Date/Hour
CCCT3C	NOX	C01	Auto Ranging	Y	05/30/2013 00	
	O2	C02	High Range		05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Facility Name: Cape Canaveral

Facility ID (ORISPL): **609**

Emissions Formulas

Unit/Stack/Pipe Identifier	Parameter	Formula ID	Formula Code	Formula	Begin Date/Hour	End Date/Hour
CCCT3C	CO2	C01	G-4	CO2-gas = (1040 * F#(C04) * (1 / 385) * 44.0) / 2000	05/30/2013 00	
	NOXR	C02	F-5	E = 1.194 * 10 ** - 7 * S#(C01-C01) * F#(C12) * (20.9/(20.9- S#(C02-C01)))	05/30/2013 00	
	NOX	C03	F-24A	NOX_mass = F#(C02)*F#(C06)	05/30/2013 00	
	HI	C04	D-6	HI_gas = (F#(C13) * GCV_gas) / 10 ** 6	05/30/2013 00	
	HI	C05	D-8	HI_oil = S#(C06-C03) * GCV_oil / 10 ** 6	05/30/2013 00	
	HI	C06	D-15A	HI_hr = (F#(C04) * T_gas + F#(C05) * T_oil)/ T_unit	05/30/2013 00	
	SO2	C07	D-5	SO2_glb/hr = 0.0006*F#(C04)	05/30/2013 00	
	SO2	C08	D-2	SO2_rate-oil = 2.0 * S#(C06-C03) * %S_oil / 100.0	05/30/2013 00	
	SO2	C09	D-12	SO2_TOTAL= ((F#(C08) * T_OIL) + (F#(C07) * T_GAS))	05/30/2013 00	
	CO2	C10	G-4	W_CO2 = 1420 * F#(C05) * 1 / 385 * 44.0 / 2000	05/30/2013 00	
	CO2	C11	G-4A	CO2_unit =((F#(C01) * T_gas) + (F#(C10) * T_oil)) / T_unit	05/30/2013 00	
	FD	C12	F-8	F_c = X_oil * 1420 + X_gas * 1040	05/30/2013 00	
	FGAS	C13	N-GAS	GAS_TOTAL = S#(C14-C02) + S#(C05-C02)	05/30/2013 00	

Parameter Codes Descriptions:

- CO2 - CO2 Hourly Mass Rate (ton/hr)
- NOXR - NOx Emission Rate (lb/mmBtu)
- NOX - NOx Hourly Mass Rate (lb/hr)
- HI - Heat Input Rate (mmBtu/hr)
- SO2 - SO2 Hourly Mass Rate (lb/hr)
- FD - F-Factor Dry-basis
- FGAS - Gas Hourly Flow Rate (hscf)

Formula Codes Descriptions:

- N-GAS - FGAS (net gas flow rate)
- G-4A - CO2 (from CO2 rate for multiple fuels)
- G-4 - CO2 (from HI, Fc)
- F-8 - FD/FC/FW (from multiple fuels)
- F-5 - NOXR/SO2R (from NOX or SO2 dry, O2 dry, Fd)
- F-24A - NOX (from NOX rate, HI)
- D-8 - HI (from oil flow rate, GCV)
- D-6 - HI (from gas flow rate, GCV)
- D-5 - SO2 (from gas SO2 emission rate, HI)
- D-2 - SO2 (from OILM, oil sulfur content)
- D-15A - HI (from HI rate for multiple fuels)
- D-12 - SO2 (from SO2 rate for multiple fuels)

Facility Name: Cape Canaveral

Facility ID (ORISPL): 609

Monitoring Plan Printout Report

March 7, 2013 03:26 PM

Span Values

Unit/Stack /Pipe Identifier	Comp Type	Scale	Method	MPC/ MPF	MEC	Span Value	Full-Scale Range	Units of Measure	Scale Transition Point	Def. High Range Value	Flow Full Range (SCFH)	Flow Span Value (SCFH)	Begin Date/Hour	End Date/Hour
CCCT3C	NOX	H	TB	200.0	10.0	200.000	200.000	PPM	9.5				05/30/2013 00	
	NOX	L	F		10.0	10.000	10.000	PPM	9.5				05/30/2013 00	
	O2	H				25.000	25.000	PCT					05/30/2013 00	

Component Types Descriptions: NOX - NOx Concentration
O2 - O2 Concentration

Span Method Codes Descriptions: TB - Table Defaults from Part 75
F - Formula

Units of Measure Descriptions: PPM - Parts per Million
PCT - Percentage

Unit/Stack/Pipe Load or Operating Level Information

Unit/Stack/Pipe Identifier	Maximum Hourly Load	Units of Measure	Upper Bound of Range of Operation	Lower Bound of Range of Operation	Designated Normal Op. Level	Second Most Frequently Used Op. Level	Second Normal Indicator	Load Analysis Date	Begin Date/Hour	End Date/Hour
CCCT3C	450	MW	450	55	High	Mid	Yes	05/30/2013	05/30/2013 00	

Units of Measure Descriptions: MW - Megawatt

Facility Name: **Cape Canaveral**

Facility ID (ORISPL): **609**

Monitoring Plan Printout Report

March 7, 2013 03:26 PM

Monitoring Defaults

Unit/Stack/Pipe Identifier	Parameter	Value	Units of Measure	Purpose Code	Fuel Type	Operating Condition	Source of Value	Begin Date/Hour	End Date/Hour
CCCT3C	NORX	2.4140	LBMMBTU	MD	NFS	A	TEST	05/30/2013 00	
	O2X	19.0000	PCT	DC	NFS	A	DEF	05/30/2013 00	

Parameter Codes Descriptions: O2X - Maximum O2 Concentration (pct)
NORX - Maximum NOx Emission Rate (lb/mmBtu)

Units of Measure Descriptions: PCT - Percentage
LBMMBTU - Pounds / mmBtu

Purpose Codes Descriptions: MD - Missing Data (or Unmonitored Bypass Stack or Emergency Fuel) Default
DC - Diluent Cap

Fuel Type Codes Descriptions: NFS - Non-Fuel Specific

Operating Conditions Descriptions: A - Any Hour

Source Codes Descriptions: TEST - Unit or Stack Testing
DEF - Default Value from Part 75

Qualifications

Unit/Stack/Pipe Identifier	Qualification Type	Begin Date	End Date
CCCT3C	GF	01/01/2013	

Qualification Percentages for Qualification Type Code GF Begin Date 01/01/2013

Qualification Year	Average Percent Value	Year 1			Year 2			Year 3		
		Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value	Data Year	Data Type Cd	Percent Value
2013	100.0	2013	P	100.0	2014	P	100.0	2015	P	100.0

Qualification Types Descriptions: GF - Gas-Fired Unit

Data Type Codes Descriptions: A - Actual
D - Demonstration
P - Projected

Attachment B - XML File Format Monitoring Plan

The attached monitoring plan EDR files were configured and generated on the NetDAHS, imported into, then validated, and exported from the EPA's Emissions Collection and Monitoring Plan System (ECMPS) software tools.

NOTE: *All EDR files will be submitted in XML file format and will be validated using the current version of the EPA's Emissions Collection and Monitoring Plan System (ECMPS) software tools.*

Unit CCCT3A XML Monitoring Plan Print Out

```
<?xml version="1.0" encoding="utf-8"?>
<?xml-stylesheet type="text/xsl"
href="http://ecmps.camdsupport.com/documents/ECMPS_MonitoringPlan.xslt"?>

<MonitoringPlan xsi:noNamespaceSchemaLocation="C:\Program Files\ECMPS\XML\MonitoringPlan.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <ORISCode>609</ORISCode>
   <Version>1.1</Version>
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Unit CCCT3B XML Monitoring Plan Print Out

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Unit CCCT3C XML Monitoring Plan Print Out

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Attachment C - List of Anticipated Record Types

List of anticipated Data types for quarterly XML file Submission

Note that within thirty days of the conclusion of each calendar quarter, up to three separate data files must be submitted by the Designated Representative or one of his agents to the EPA. The three files include:

- Monitoring Plan Data
- Quarterly Quality Assurance Test Result Data
- Quarterly Emissions Data

In each file, there are certain common data types.

Common Data Types

- ORIS Code: 609
- Unit ID: Units CCCT3A, CCCT3B, CCCT3C
- Comments

Monitoring Plan

- Monitoring Plan Comment Data
- Unit Stack Configuration Data
- Monitoring Location Data:
    - Stack Pipe Data
    - Unit Data
- Monitoring Location Attribute Data
- Unit Capacity Data
- Unit Control Data
- Unit Fuel Data
- Monitoring Method Data
- Monitoring Formula Data
- Monitoring Default Data
- Monitoring Span Data
- Monitoring Load Data
- Component Data
- Analyzer Range Data
- Monitoring System Data
    - Monitoring System Component Data
    - Monitoring System Fuel Flow Data
- Monitoring Qualification Data
    - Monitoring Qualification Gas-Fired Unit Data
    - Monitoring Qualification Percent Data

Quality Assurance and Certification Data:

- Quality Assurance And Cert
- Test Summary Data
- Calibration Injection Data
- Linearity Summary Data
- Linearity Injection Data
- RATA Data
    - RATA Summary Data
    - RATA Run Data
- Cycle Time Summary Data
    - Cycle Time Injection Data
- Online Offline Calibration Data
- Fuel Flowmeter Accuracy Data
- Transmitter Transducer Data
- Fuel Flow To Load Baseline Data
- Fuel Flow To Load Test Data
- Test Qualification Data
- QA Certification Event Data
- Test Extension Exemption Data

Emissions

- Daily Emission Data
- Summary Value Data
- Daily Test Summary Data
    - Daily Calibration Data
- Hourly Operating Data
- Monitor Hourly Value Data
- Derived Hourly Value Data
- Hourly Fuel Flow Data
- Hourly Parameter Fuel Flow Data
    - Long Term Fuel Flow Data

Summary Value Data will include:

- SO_2 Quarterly and Year to date Summary
- CO_2 Quarterly and Year to date Summary
- HI Quarterly and Year to date Summary
- NO_x Mass Quarterly and Year to date Summary
- NOx Rate Quarterly and Year to date Summary
- Operating Hours Quarterly and Year to date Summary

Each file will identify the Year and Quarter and may contain Submission Comments.

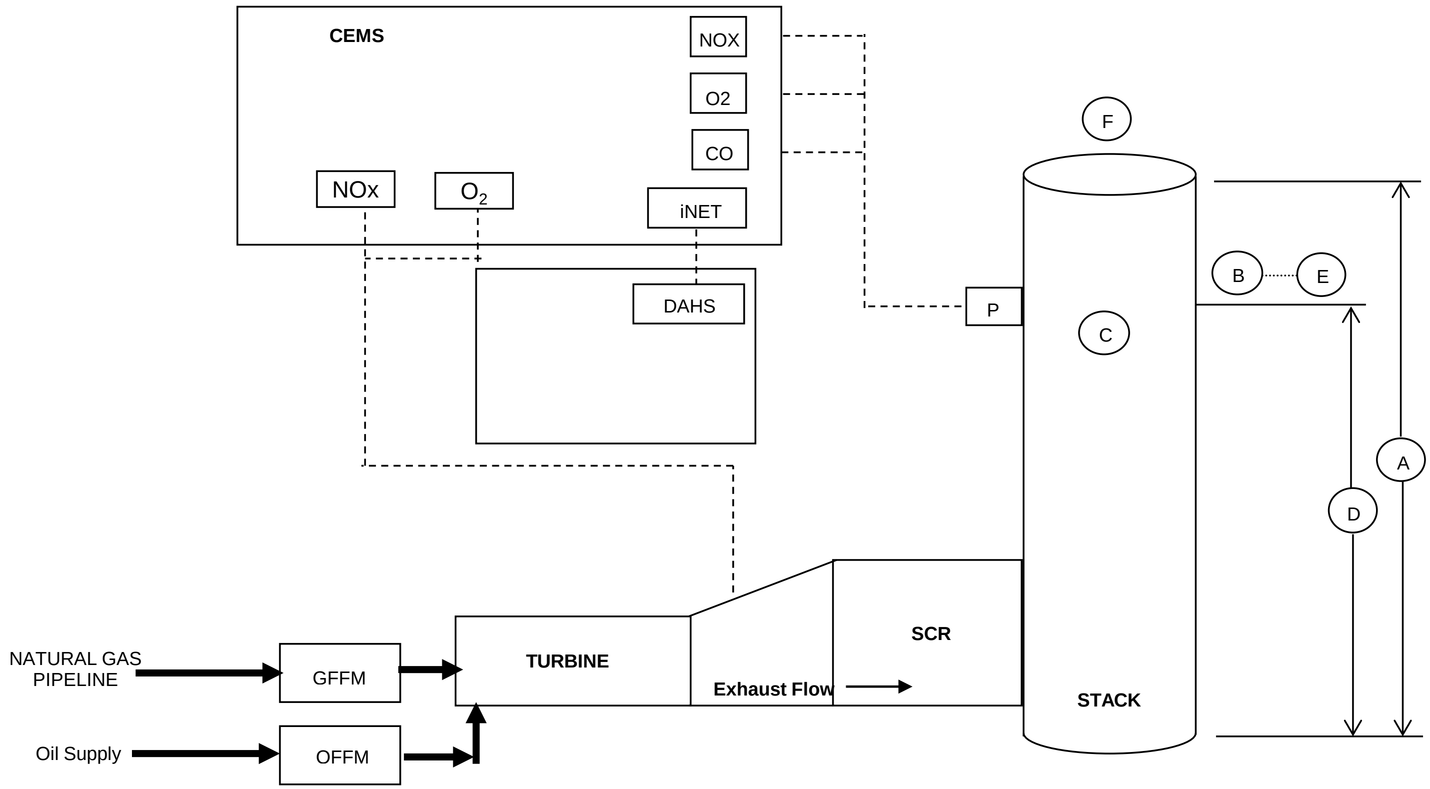
Attachment D - Stack Drawings

Stack Diagrams

Data Flow Diagrams

Plot Plan

Facility Name: Cape Canaveral Energy Center
Source: Turbines CCCT3A, CCCT3B, and CCCT3C
ORIS Code: 609



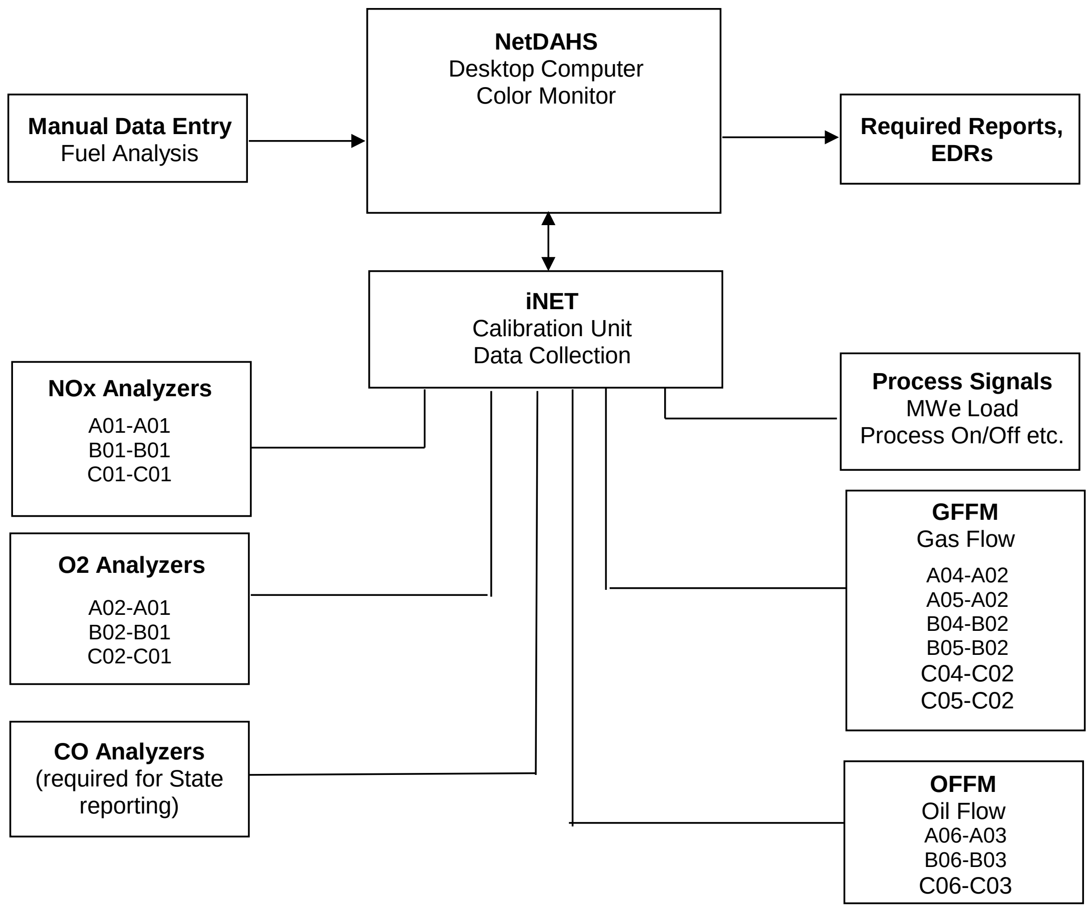
note: each unit has the same configuration

Monitor Location Information

A.	Stack height above grade	149 ft
B.	Stack diameter at test port (inside dim.)	21' 11.5"
C.	Inside cross-section area at test port	378.68 ft^2
D.	Test port elevation (4 ports 90 deg. apart)	
	1. Above grade	137' 0"
	2a. Above last disturbance	43' 2"
	2b. Stack diameters	0.55
	3a. Prior to next disturbance	12' 0"
	3b. Stack diameters	0.55
E.	Location of sample probe:	
	1. Above grade	138' 0"
	2a. Above last disturbance	44' 2"
	2b. Stack diameters	2.02
	3a. Prior to next disturbance	11' 0"
	3b. Stack diameters	0.5
F.	Inside cross sectional area at flue exit	378.68 ft^2
G.	Stack base elevation (at grade)	0' 6"

Facility Name: Cape Canaveral Energy Center
Source: Turbines CCCT3A, CCCT3B, and CCCT3C
ORIS Code: 609

General Information:
DAHS: Pentium-based, Dell compatible PC
Software: B&W KVB-Enertec NETDAHS
B&W iNET PLC for calibration control and short term data storage



DATA FLOW DIAGRAM

LEGEND

1. HEAT RECOVERY STEAM GENERATOR (HRSG)
2. HRSG ELECTRICAL EQUIPMENT ENCLOSURE (PDC)
3. SAMPLE PANEL
4. SECONDARY COOLING CHILLER FOR SAMPLE PANEL
5. CEMS ENCLOSURE
6. STACK
7. HRSG DUCT BURNER BLOWER SKID
8. HRSG DUCT BURNER GAS SKID
9. HRSG DCS EQUIPMENT
10. HRSG BLOWDOWN TANK
11. BOILER FEED PUMP LUBE OIL SKID
12. BOILER FEED PUMP
13. AMMONIA FLOW CONTROL UNIT
14. 19% AQUEOUS AMMONIA STORAGE TANKS
15. AMMONIA FORWARDING PUMPS
16. CO2 STORAGE
17. HYDROGEN STORAGE TRAILER
18. AMMONIA UNLOADING SKID
19. CT MAIN FUEL OIL PUMP STRAINER
20. CT MAIN FUEL OIL PUMP
21. CT WATER INJECTION PUMP
22. FUEL OIL INLET FILTER
23. NOT USED
24. COMBUSTION TURBINE
25. CT POWER CONTROL CENTERS
26. CT EXHAUST DIFFUSER
27. VT AND SURGE CUBICLE
28. CT NEUTRAL GROUNDING CUBICLE
29. CT ISO PHASE BUS DUCT
30. STATIC EXCITATION EQUIPMENT (SEE) TRANSFORMER
31. CT EXCITATION COMPARTMENT
32. UNIT AUXILIARY TRANSFORMER
33. CT GENERATOR STEP-UP TRANSFORMER
34. CT CO2 FIRE PROTECTION
35. SEE / SFC PACKAGE
36. CT CONTROL OIL SKID
37. CT LUBE OIL MODULE
38. CT INSTRUMENT AIR COMPRESSOR
39. LP ECONOMIZER HEAT EXCHANGER
40. CT WASH WATER DRAINS TANK
41. CT GENERATOR NEUTRAL CUBICLE
42. CT GENERATOR SEAL OIL EQUIPMENT
43. CT GENERATOR GAS SYSTEM EQUIPMENT
44. CT GENERATOR
45. CT PURGE AIR COMPRESSORS
46. CT GENERATOR BREAKER
47. STATIC FREQUENCY CONVERTER (SFC) TRANSFORMER
48. CT PURGE AIR RECEIVER
49. AIR INTAKE
50. CYCLE CHEMICAL FEED EQUIPMENT
51. CONTROL AIR RECEIVER TANK
52. STATION AIR RECEIVER TANK
53. DESICCANT AIR DRYERS
54. AIR RECEIVER TANKS
55. AIR COMPRESSORS
56. MISCELLANEOUS SERVICE BUILDING
57. SEWAGE LIFT STATION
58. HVAC EQUIPMENT ROOM
59. ELECTRIC EQUIPMENT ROOM
60. ADMINISTRATION OFFICES
61. WAREHOUSE
62. CONTROL / PROGRAMMING ROOM
63. MAINTENANCE / MACHINE SHOP
64. BUILDING CONDENSING UNITS
65. RETENTION POND
66. PIPE RACK
67. DRAINAGE TRENCH OR DRAINAGE PIPE
68. SERVICE WATER / FIRE WATER STORAGE TANK
69. SERVICE WATER PUMPS
70. FIRE PUMPS
71. DEMINERALIZED WATER STORAGE TANK
72. DEMINERALIZED WATER PUMPS
73. DEMINERALIZED WATER TRAILER AREA
74. VACUUM PRIMING PUMPS
75. STEAM JET AIR EJECTOR SKIDS
76. STEAM TURBINE
77. STEAM TURBINE CONDENSER
78. STEAM TURBINE GENERATOR
79. ST GENERATOR ELECTRICAL EQUIPMENT ENCLOSURE
80. ST ISO PHASE BUS DUCT
81. STEAM TURBINE BLOWDOWN TANK
82. ST EXCITATION COMPARTMENT (THY & FCB CUBICLES)
83. ST GENERATOR EXCITATION TRANSFORMER
84. ST GENERATOR STEP-UP TRANSFORMER
85. CONDENSATE PUMPS
86. ST GENERATOR VT AND SURGE COMPARTMENT
87. ST STATOR COOLING UNIT
88. ST EMERGENCY SEAL OIL PUMP
89. ST MAIN SEAL OIL PUMP
90. ST GENERATOR NEUTRAL GROUNDING CUBICLE XFMR
91. H2 GAS DRYER
92. ST LUBE OIL CONDITIONER
93. ST LUBE OIL RESERVOIR
94. ST LUBE OIL COOLER
95. FIRE PROTECTION STEAM TURBINE VALVE HOUSE
96. ST EHC OIL UNIT
97. WATER TREATMENT AREA PROCESS DRNS TRNSFR SUMP
98. FUEL OIL TRANSFER PUMPS
99. FUEL OIL TRUCK UNLOADING PUMPS
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114. FUEL GAS MAIN FILTER/SEPARATOR
115. FUEL GAS LEAK DETECTION SEPARATOR
116. FUEL GAS SEPARATOR / FLASH DRAINS TANK
117. SUS TRANSFORMER
118. COLLECTOR YARD
119. ELECTRICAL PULLBOX
120. ELECTRICAL MANHOLE
121. MV SWITCHGEAR ELECTRICAL EQUIPMENT ENCLOSURE
122. FPL TRANSMISSION TOWER LOC 27
123. COMMON AREA 480V SUS TRANSFORMER
124. COMMON AREA SUS MCC ENCLOSURE
125. OIL/WATER SEPARATOR
126. BLOWDOWN SUMP AND PUMPS
127. WASTEWATER TRANSFER SUMPS
128. AUXILIARY COOLING WATER PRIMING PUMP
129. WATER TREATMENT AREA
130. CIRCULATING WATER CHEMICAL FEED
131. CLOSED CYCLE COOLING WATER PMPS AND XCHNGRS
132. CLOSED CYCLE COOLING WATER EXPANSION AND HEAD TANK
133. CIRCULATING WATER PUMPS
134. CIRCULATING WATER LINES
135. AUXILIARY COOLING WATER PUMPS
136. HURRICANE SHELTER W/LPG TANKS AND GENERATORS
137. EXISTING MANATEE WARM WATER DISCHARGE STRUCTURE
138. EXISTING MANATEE WARM WATER INTAKE STRUCTURE
139. EXISTING MANATEE WARM WATER PUMPS
140. EXISTING MANATEE WARM WATER HEAT EXCHANGER
141. EXISTING MANATEE WARM WATER TRV / SWITCHGEAR
142. EXISTING MANATEE WARM WATER CIRC. WATER HEATERS
143. EXISTING MANATEE WARM WATER UNDERGROUND PIPE
144. SOLAR PANEL ELECTRICAL EQUIPMENT
145. WATER PUMP AREA DRAINS SUMP
146. COMBINED WATER WASH SKID
147. FUEL OIL TANK AREA DRAINS SUMP
148. EVAPORATIVE COOLER PROCESS DRAINS TANK AND PUMPS
149. MISC. SERVICES BUILDING AREA PROCESS DRAINS SUMP
150. CT FIRE WATER DELUGE HOUSE
151. CT MAINTENANCE CRANE APRONS
152. ST MAINTENANCE APRON
153. SFC CROSSOVER SWITCH (BAB40)
154. HYDROGEN BULK STORAGE
155. COMMON BLOWDOWN TANK
156. WAREHOUSE DRAINS SUMP
157. POTABLE WATER PUMPS AND TANK
158. CIRCULATING WATER PUMP SEAL WATER PUMPS
159. INTAKE SCREEN SPRAY WATER EQUIPMENT
160. INTAKE TRASH ROLL-OFF AREA
161. AMMONIA UNLOADING SUMPS
162. FUEL OIL STORAGE TANK
163. FISH RETURN FLUSH PUMPS
164. FUEL GAS RELIEF SILENCERS

NO.	REVISION	DATE	DRWN	DSND	CHKD	CHKD
5	REVISED RETENTION POND ITEM 65, FUEL GAS YARD GRAPHICS ITEM 110; UPDATED GRAPHICS AT INTAKE STRUCTURES FOR ITEMS 158, 159, 160; ADDED ITEM 163 & 164.	042512	JJB	JBJ	AG	NO
4	RELOCATED HYDROGEN STORAGE TRAILER ITEM 17; REARRANGED CT AIR COMPRESSOR ITEMS 38 & 45.	031312	BC	JBJ	RGS	DD
3	CHANGED CALL OUT FOR ITEMS 68 AND 69 FROM RAW WATER TO SERVICE WATER; RELOCATED HURRICANE SHELTER W/LPG TANK AND GENERATORS; REMOVED ITEM 101 AND 105. ADDED ITEMS 158, 159, 160, 161 AND 162, INTAKE TRASH ROLL-OFF, INTAKE SCREEN SPRAY WATER EQUIPMENT, CIRCULATING WATER PUMP SEAL WATER PUMPS AND AMMONIA UNLOADING SUMPS.	11/15/11	RET	JBJ	MHS	DD
2	REMOVED FIREWALLS AT SUS XFMRS, ITEM 117 & 123. ADJUSTED FUEL GAS YARD, MISC. SERVICE BLDG., PUMPS AT WATER TANKS AND PARKING AREA. REVISED CONDENSING UNITS ARRANGEMENT, ITEM 64. ADDED CONTAINMENT AT 'SEE' XFMR, ITEM 30, SFC CROSSOVER SWITCH TO TRAIN 'B' CT, ITEM 153, HYDROGEN STORAGE TRAILER, ITEM 154, COMMON BLOWNDOWN TANKS, ITEM 155, AND WAREHOUSE DRAINS SUMP, ITEM 156, POTABLE WATER PUMPS AND TANK, ITEM 157.	061611	RET	JBJ	MHS	SC
1	SFC TRANSFORMER AT TRAIN "B" REMOVED, ID'S 47 AND 30 EXCHANGED. REMOVED ITEMS 103 FUEL OIL RECIRC PUMP, 104 FUEL OIL RECIRC SURGE TK, 57 SEWAGE LIFT STATION AT SWITCHYARD. RENAMED 97 TO WATER TREATMENT AREA PROCESS DRAINS TRANSFER SUMP 118 TO COLLECTOR YARD. ADDED WASTE WATER TRANSFER SUMPS AT C-5 & E-3 ITEMS 148 THRU 152. ADDED GRID LINES & BENCHMARK. CHANGED TAGS ON 2 TRANSFER SUMPS FROM 127 TO 148 & 149.	121110	RET	JBJ	MHS	SC
0	ISSUE FOR CONSTRUCTION					

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ZACHRY

ZACHRY ENGINEERING CORPORATION - 1515 ARAPAHOE STREET, TOWER 1, SUITE 900, DENVER, CO 80202-4256
FLORIDA BOARD OF PROFESSIONAL ENGINEERS CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

HEIDI BLASINGAME LICENSE No. 70073 STATE OF FLORIDA PROFESSIONAL ENGINEER 6/13/12

CAPE CANAVERAL ENERGY CENTER UNIT 3
SITE RELATED WORK
3x1 COMBINED CYCLE
GENERAL ARRANGEMENT - PLAN

DRAWN	DESIGNED 093010	CHECKED 093010	CHECKED
R. THOMPSON	B. JOHNSON	M. SELLMYER	N. NGUYEN

APPROVED	DRAWING NUMBER	SHEET	REV
APPROVED	D008710-STWL00001	01	5

richardt 2:36:41 PM 6/12/2012
P:\FPL\008710\techserv\dgn\Layout\Ortho\STWL00001s1.dgn

NAT'L.BD.NO.

CERTIFIED BY

NOOTER/ERIKSEN

M.A.W.P. **
HTG. SURFACE ***
STEAM CAP ****
SERIAL NO.
YEAR BUILT SEE NOTE BELOW

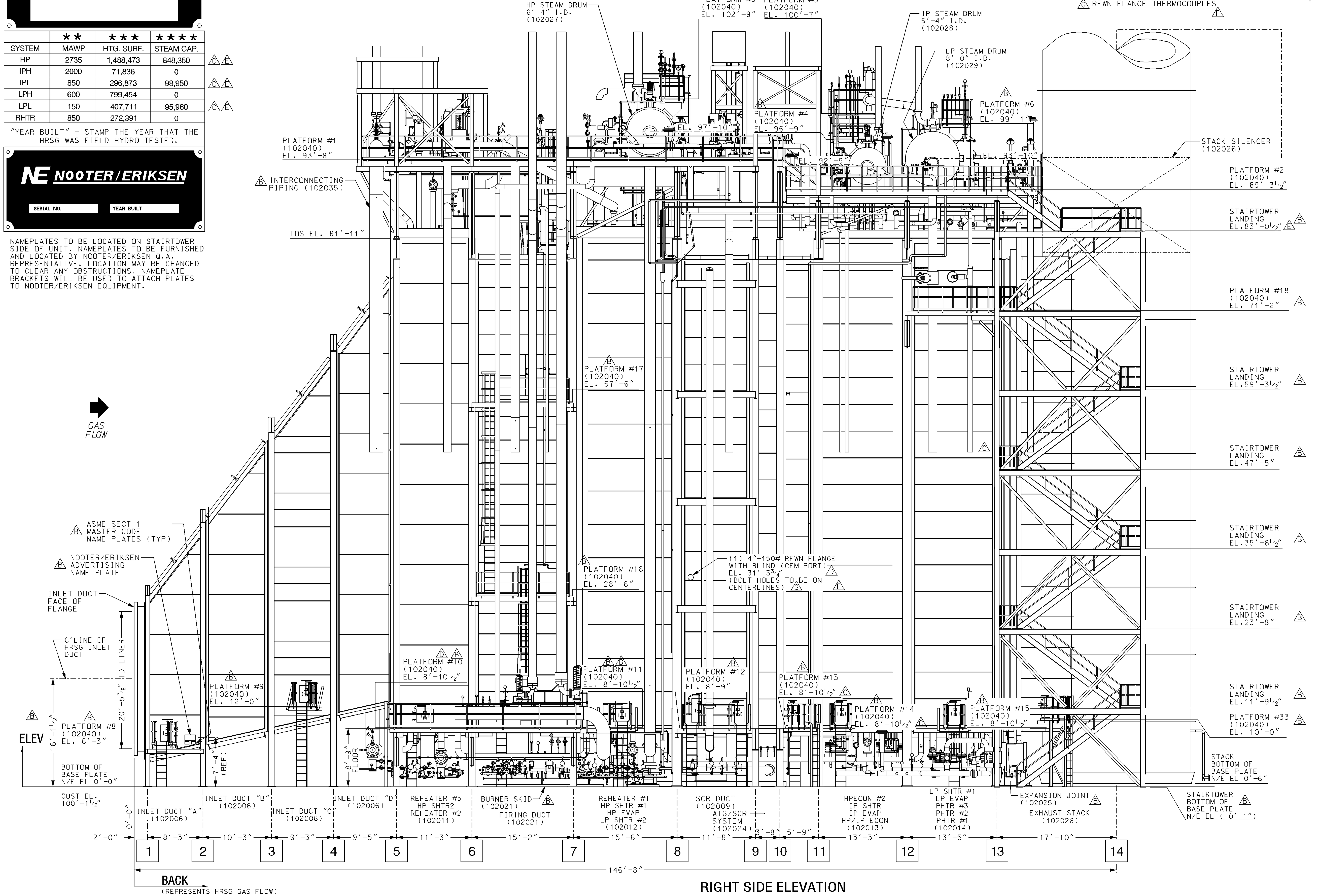
	**	***	****
SYSTEM	MAWP	HTG. SURF.	STEAM CAP.
HP	2735	1,488,473	848,350
IPH	2000	71,836	0
IPL	850	296,873	98,950
LPH	600	799,454	0
LPL	150	407,711	95,960
RHTR	850	272,391	0

"YEAR BUILT" - STAMP THE YEAR THAT THE HRSG WAS FIELD HYDRO TESTED.

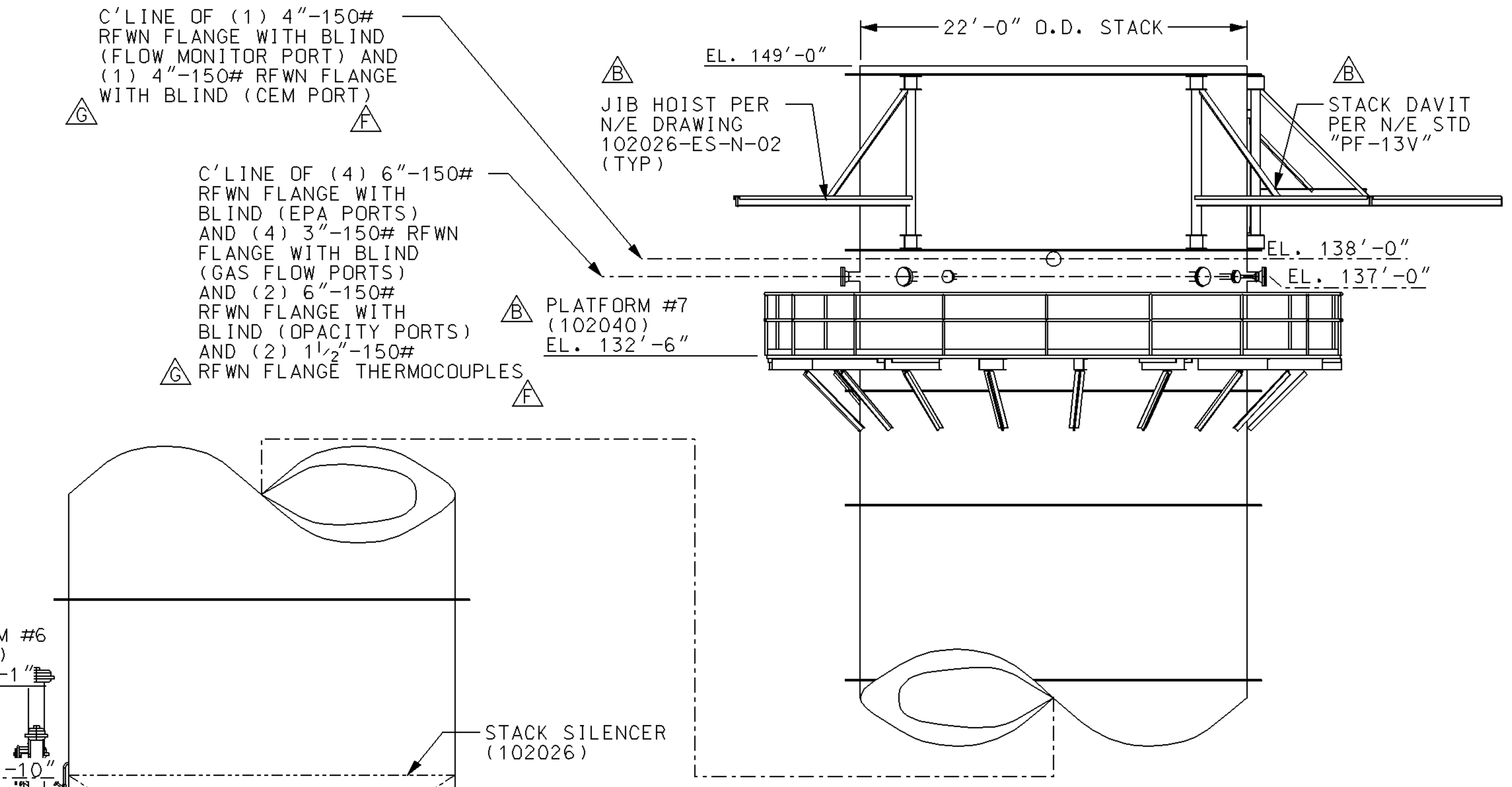
NOOTER/ERIKSEN

SERIAL NO. YEAR BUILT

NAMEPLATES TO BE LOCATED ON STAIRTOWER SIDE OF UNIT. NAMEPLATES TO BE FURNISHED AND LOCATED BY NOOTER/ERIKSEN Q.A. REPRESENTATIVE. LOCATION MAY BE CHANGED TO CLEAR ANY OBSTRUCTIONS. NAMEPLATE BRACKETS WILL BE USED TO ATTACH PLATES TO NOOTER/ERIKSEN EQUIPMENT.



RIGHT SIDE ELEVATION



NOTES:
1. ALL ELEVATIONS ARE TAKEN FROM N/E 0'-0" (BOTTOM OF HRSG BASE PLATES)
2. N/E ELEVATION 0'-0" IS PLANT ELEVATION 100'-1 1/2".
3. GRATING, STAIR TREADS, LADDERS AND HANDRAILS TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.
4. STRUCTURAL STEEL MEMBERS TO BE COMMERCIAL BLAST CLEANED PER SSPC-SP-6 AND PRIMER COAT 3 TO 5 MILS (75 TO 125 MICRONS) DFT CARBOLINE CARBOZINC 11 (GRAY). HOLD BACK 3" (75mm) FROM WELDS.

TOTAL OF (6) HRSG'S REQUIRED
(3) FOR CCEC - UNIT 3
(3) FOR RBEC - UNIT 5

REV	DATE	REVISION	BY	CHK
G	23-MAY	REVISED NOTE PER EWO 11-052	GJM	JDF
F	20-MAY	REVISED NOTES PER EWO 11-052	GJM	JDF
E	05-APR	UPDATED VIEW AND REVISED MASTER NAMEPLATE INFO	MJR	DVC
D	19-JAN	UPDATED VIEW	MJR	JDF
C	25-OCT	REMOVED LP-20 PER EWO-10-170, REVISED ELEVATIONS & MASTER NAMEPLATE INFO	DVC	JDF
B	13-OCT	UPDATED TO 3D	GJM	DVC

WELD SYMBOLS ARE PER AWS A2.4 LATEST EDITION

NOOTER/ERIKSEN

DWN	BDL	GENERAL ARRANGEMENT RIGHT SIDE ELEVATION
CHK	JAH	
PM	LDG	PURCHASER: FLORIDA POWER & LIGHT
PE	CLM	PROJECTS: CAPE CANAVERAL ENERGY CENTER - UNIT 3
SE	DDB	RIVIERA BEACH ENERGY CENTER - UNIT 5
TE	SPH	PLANT SITES: COCOA, FL/RIVIERA BEACH, FL

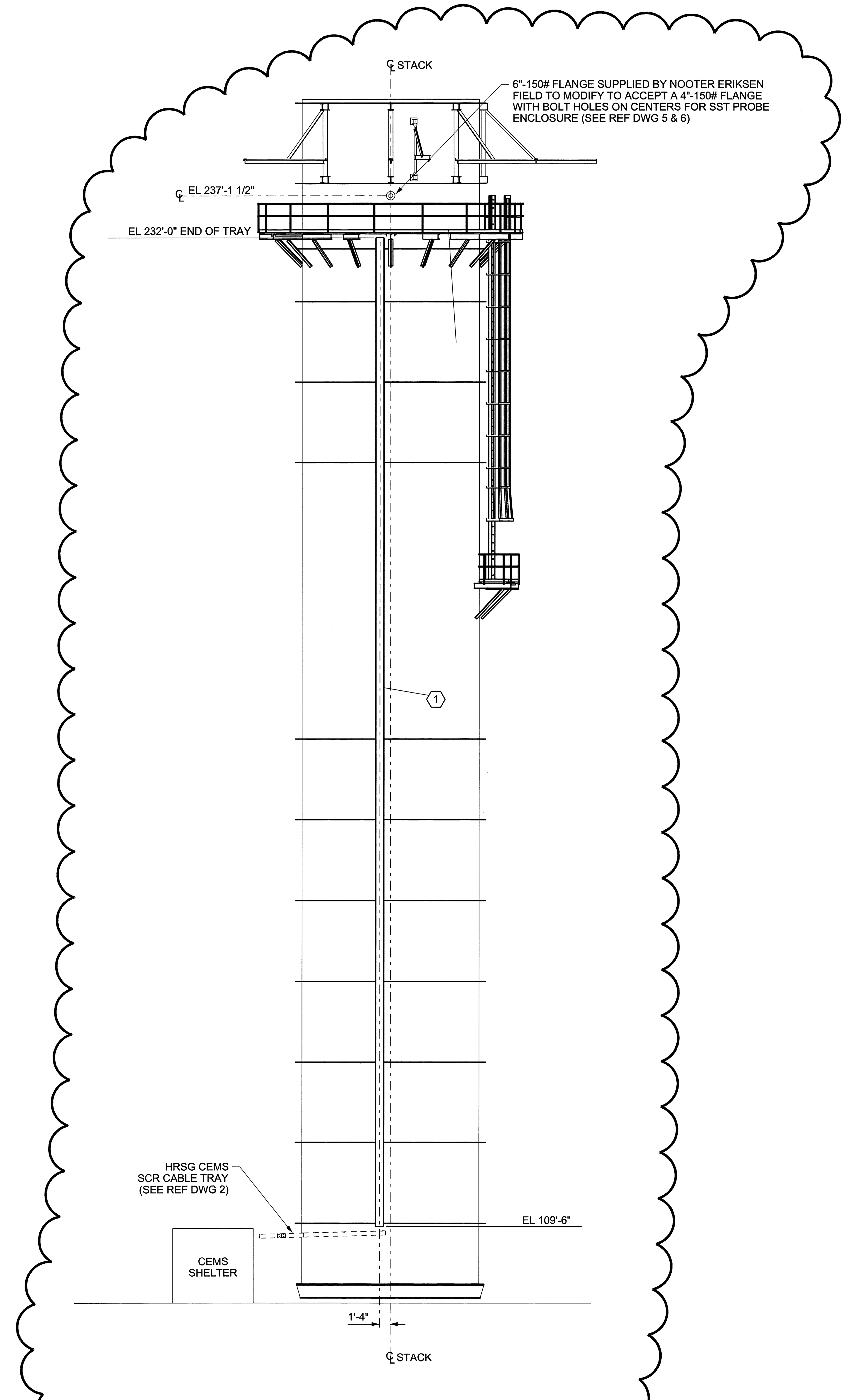
PROJECT: **CCEC/RBEC**
RELEASE DATE: 23-MAY-2011

	JOB NO CODE SHT	REV	FE
DRAWING NUMBER	102000-GA-001	G	X

M008710-5GAA001 S01 RG

NO EXCEPTIONS NOTED | Release for manufacture

PLOT DATE:5/23/2011 /TIME:8:59:24 AM



ELEVATION LOOKING SOUTH

HRSG EXHAUST STACK
CEMS SAMPLE LINE
CABLE TRAY
(TYP FOR ALL THREE TRAINS)

EQUIPMENT LIST THIS DRAWING		
ID NUMBER	TRAY TYPE	TOTAL LINEAR FOOT (PER UNIT)
1	12"W x 6"D, LADDER	122.50

SCALE
IN FEET
10 0 5 10 15 20

GENERAL NOTES

1. FOR TRAY INSTALLATION DETAILS AND NOTES SEE REF DWG 1.
2. FOR ALL OTHER INFORMATION SEE SPECIFICATION NUMBER 480902.
3. ALL ELEVATIONS REFER TO BOTTOM OF TRAY.

REFERENCE DRAWINGS

1. RACEWAY
   CABLE TRAY
   TYPICAL NOTES AND DETAILS
   D008710-EECE00001 SH01
2. CONTINUOUS EMISSIONS MONITORING
   HRSG SCR INLET HEATER SAMPLE LINE TRAY
   TRAINS A, B & C
   D008710-SAAE00001 SH01
3. GENERAL ARRANGEMENT
   RIGHT SIDE ELEVATION
   NOOTER DWG NO. 102000-GA-001
   M008710-SGAA001 S01
4. UNIT 3 CONTINUOUS EMISSION
   MONITORING SYSTEM INSTALLATION DETAILS
   CISCO DWG NO. 10009430-1,2,3
   M008710-SAACCIS001 S01
5. UNIT 3 CONTINUOUS EMISSION
   MONITORING SYSTEM INSTALLATION DETAILS
   CISCO DWG NO. 10009430-1,2,3
   M008710-SAAACIS002 S02
6. GENERAL ARRANGEMENT
   PLAN VIEW
   NOOTER DWG NO. 102000-GA-003
   M008710-SGAA002 S03

NO.	REVISION	DATE	DRWN	DSND	CHKD	CHKD
1	RELOCATE TRAY TO NORTH SIDE OF STACK ; ADDED REV DWG 6.	3-5-12	GM	[illegible]	RB	NSC
0	ISSUED FOR CONSTRUCTION.					

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ZACHRY ENGINEERING CORPORATION - 1515 ARAPAHOE STREET, TOWER 1, SUITE 900, DENVER, CO 80202-4256
FLORIDA BOARD OF PROFESSIONAL ENGINEERS CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

YAW OPOKU LICENSE No. 72072 STATE OF FLORIDA PROFESSIONAL ENGINEER
03-06-12

CAPE CANAVERAL ENERGY CENTER UNIT 3
CONTINUOUS EMISSIONS MONITORING
HRSG EXHAUST STACK SAMPLE LINE TRAY
TRAINS A, B & C

DRAWN 092311	DESIGNED 092911	CHECKED 092311	CHECKED 092911
J. MERCER	J. YOUNG	BARNETT	C. REEVES

APPROVED	DRAWING NUMBER	SHEET	REV
3-06-12 P. Kennedy; APPROVED S. Becker	D008710-SAAE00001	02	1

garym 10:56:48 AM 3/5/2012
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Attachment E - Fuel Flowmeter Documentation

To be inserted by facility owners/operators prior to submission to Florida DEP and USEPA Region 4 offices.

GTE™ GAS TURBINE EFFICIENCY *Power Made Efficient.*

CERTIFICATE OF CONFORMANCE

To: Siemens Energy, Inc.
Quality Assurance Department
4400 Alafaya Trail, MC 510
Orlando, FL 32826
Telephone: (407) 736-2000 / 407 736-5657
Fax: (407) 736-2872
Email: Quality.Assurance@siemens.com

Date Prepared: 10/29/11

Provide applicable Siemens Energy, Inc. information:

Item Name: Fuel Gas Flow Meter

Project Name: Siemens Energy

Purchase Agreement No. 4500617730 Line Item: 00001

Part Drawing No. ZDX569-XF00-MBP-000002 Rev 01

Specification No's: DS22T-002150 Rev D

List all applicable V-Sheet No.'s/ ECMI No.'s:
MDR'S:
ECMI: N/A

Provide applicable Vendor Information:

Shop Order/Job No.:3025186 Part No/s: N/A

Serial No.: 3025186 Quantity: 1

We hereby certify that the item described above was manufactured in strict accordance with the specifications and recommendations of the latest edition. All dimensional requirements were inspected, verified and recorded, and were found to be in compliance with ASME PTC19.5 and all customer specifications.

We hereby certify that the item described above also conforms to the Code of Federal Regulations 40 CFR-75 Appendix D paragraph 2.1.5.1. concerning emissions compliance accuracy. All instruments provided with the item above were initially calibrated in accordance with 40CFR-75 Appendix D paragraph 2.1.5.2 transmitter accuracy requirements.

Name (Please print or type): Jeff Cokeroft - Quality Assurance Specialist Date: 10-29-11

Telephone: 407-304-5200 X287 Fax: 407-304-5201 Email: Jeff.Cokeroft@gtefficiency.com

Signature: Jeff C 11-8-11

GAS TURBINE EFFICIENCY

Power Made Efficient.

C E R T I F I C A T E O F C O N F O R M A N C E

To: Siemens Energy, Inc.
Quality Assurance Department
4400 Alafaya Trail, MC 510
Orlando, FL 32826
Telephone: (407) 736-2000 / 407 736-5657
Fax: (407) 736-2872
Email: Quality.Assurance@siemens.com

Date Prepared: 10/29/11

Provide applicable Siemens Energy, Inc. information:

Item Name: Fuel Gas Flow Meter

Project Name: Siemens Energy

Purchase Agreement No. 4500617729 Line Item: 00001

Part Drawing No. ZDX569-XF00-MBP-000002 Rev 01

Specification No's: DS22T-002150 Rev D

List all applicable V-Sheet No.'s/ ECMI No.'s:
MDR'S:
ECMI: N/A

Provide applicable Vendor Information:

Shop Order/Job No.:3025185 Part No/s: N/A

Serial No.: 3025185 Quantity: 1

We hereby certify that the item described above was manufactured in strict accordance with the specifications and recommendations of the latest edition. All dimensional requirements were inspected, verified and recorded, and were found to be in compliance with ASME PTC19.5 and all customer specifications.

We hereby certify that the item described above also conforms to the Code of Federal Regulations 40 CFR-75 Appendix D paragraph 2.1.5.1. concerning emissions compliance accuracy. All instruments provided with the item above were initially calibrated in accordance with 40CFR-75 Appendix D paragraph 2.1.5.2 transmitter accuracy requirements.

Name (Please print or type): Jeff Cokeroft - Quality Assurance Specialist Date: 10-29-11

Telephone: 407-304-5200 X287 Fax: 407-304-5201 Email: Jeff.Cokeroft@gtefficiency.com

Signature: [signature] 11-8-11

GTE™ GAS TURBINE EFFICIENCY *Power Made Efficient.*

CERTIFICATE OF CONFORMANCE

To: Siemens Energy, Inc.
Quality Assurance Department
4400 Alafaya Trail, MC 510
Orlando, FL 32826
Telephone: (407) 736-2000 / 407 736-5657
Fax: (407) 736-2872
Email: Quality.Assurance@siemens.com

Date Prepared: 10/29/11

Provide applicable Siemens Energy, Inc. information:

Item Name: Fuel Gas Flow Meter

Project Name: Siemens Energy

Purchase Agreement No. 4500617728 Line Item: 00001

Part Drawing No. ZDX569-XF00-MBP-000002 Rev 01

Specification No's: DS22T-002150 Rev D

List all applicable V-Sheet No.'s/ ECMI No.'s:
MDR'S:
ECMI: N/A

Provide applicable Vendor Information:

Shop Order/Job No.:3025184 Part No/s: N/A

Serial No.: 3025184 Quantity: 1

We hereby certify that the item described above was manufactured in strict accordance with the specifications and recommendations of the latest edition. All dimensional requirements were inspected, verified and recorded, and were found to be in compliance with ASME PTC19.5 and all customer specifications.

We hereby certify that the item described above also conforms to the Code of Federal Regulations 40 CFR-75 Appendix D paragraph 2.1.5.1. concerning emissions compliance accuracy. All instruments provided with the item above were initially calibrated in accordance with 40CFR-75 Appendix D paragraph 2.1.5.2 transmitter accuracy requirements.

Name (Please print or type): Jeff Cokeroft - Quality Assurance Specialist Date: 10-29-11

Telephone: 407-304-5200 X287 Fax: 407-304-5201 Email: Jeff.Cokeroft@gtefficiency.com

Signature: [signature] 11-8-11

Attachment F- Fuel Analysis Sheets

DATE: 11/02/2012

SGS Oil, Gas and Chemicals
SGS Port Canaveral
8985 Columbia Road
Cape Canaveral, FL, 32920
U.S.A.
Tel: (321)-784-1941
Fax: (321)-784-1943

FLORIDA POWER & LIGHT CO
EMT/JB FUELS MANAGEMENT DEPT
PO BOX 14000
JUNO BEACH
UNITED STATES
33408

Certificate of Analysis: PC12-00394.001

CLIENT ORDER NO :	Job# 292468	SGS ORDER NO.:	--
CLIENT ID :	Ref# 121101	PRODUCT DESCRIPTION :	Diesel - ULSD
LOCATION :	TPSI-Canaveral		
SAMPLE SOURCE :	Shore Tank	SOURCE ID :	8
SAMPLE TYPE :	Inventory	SAMPLE BY :	SGS
SAMPLED :	11/01/2012	RECEIVED :	11/01/2012
ANALYSED :	11/01/2012 - 11/02/2012	COMPLETED :	11/02/2012

The laboratory analysis for the Sub-Contract Laboratory tests are provided by:

S15 - Subcontracted to another SGS Laboratory - New Orleans

PROPERTY	METHOD	RESULT	UNITS	MIN	MAX
Sulfur Content	ASTM D5453	6.1	mg/kg	--	15
Pour Point	ASTM D97	-11	°F	--	15
Flash Point by PMCC - Proc. A / Automatic Tester	ASTM D93	151	°F	140	--
Water Content	ASTM D95	0.0	% (v/v)	--	--
Sediment By Extraction Content	ASTM D473	0	% (v/v)	--	--
Ash Content	ASTM D482	<0.001	% (m/m)	--	0.01
Kinematic Viscosity at 100°F	ASTM D445	3.206	cSt	--	--
Saybolt Universal Viscosity at 100°F	ASTM D2161	36.6	SUS	32.6	40
API at 60°F	ASTM D4052	34.0	°API	30	40
Trace Metals in Gas Turbine Fuels by AAS - Flame Emission Spectroscopy	ASTM D3605				
Sodium content		<0.1	ppm	--	--
Potassium content §		<0.1	ppm	--	--
Summation of Sodium and Potasium §		<0.2	ppm	--	0.5
Calcium content		<0.1	ppm	--	0.5
Lead content		0.1	ppm	--	0.5
Vanadium content		<0.1	ppm	--	0.5
Ramsbottom Carbon Residue 10% Bottoms	ASTM D524	0.08	% (m/m)	--	0.35/0.15
Distillation of Petroleum Products at Atmospheric Pressure	ASTM D86				
Initial boiling point (IBP)		344.5	°F	--	--
10% Recovered at		424.9	°F	--	--
50% Recovered at		517.3	°F	--	--
90% Recovered at		623.8	°F	540	640
Final boiling point (FBP)		676.0	°F	--	690

§ - Analyte not in published method scope

AUTHORISED SIGNATORY

Jason Hobbs-Laboratory Supervisor

DATE: 11/02/2012

SGS Oil, Gas and Chemicals
SGS Port Canaveral
8985 Columbia Road
Cape Canaveral, FL, 32920
U.S.A.
Tel: (321)-784-1941
Fax: (321)-784-1943

FLORIDA POWER & LIGHT CO
EMT/JB FUELS MANAGEMENT DEPT
PO BOX 14000
JUNO BEACH
UNITED STATES
33408

Certificate of Analysis: PC12-00394.001

CLIENT ORDER NO :	Job# 292468	SGS ORDER NO.:	--
CLIENT ID :	Ref# 121101	PRODUCT DESCRIPTION :	Diesel - ULSD
LOCATION :	TPSI-Canaveral		
SAMPLE SOURCE :	Shore Tank	SOURCE ID :	8
SAMPLE TYPE :	Inventory	SAMPLE BY :	SGS
SAMPLED :	11/01/2012	RECEIVED :	11/01/2012
ANALYSED :	11/01/2012 - 11/02/2012	COMPLETED :	11/02/2012

The laboratory analysis for the Sub-Contract Laboratory tests are provided by:

S15 - Subcontracted to another SGS Laboratory - New Orleans

PROPERTY	METHOD	RESULT	UNITS	MIN	MAX	
% Recovery		98.0	% (v/v)	--	--	
% Residue		1.2	% (v/v)	--	--	
% Loss		0.8	% (v/v)	--	--	
Visual Colour	Visual Colour	Undyed	---	--	Dyed Red	
Copper Strip corrosion (3h / 50°C)	ASTM D130	1a	Rating	--	1	
Acid Number (Buffer end-point)	ASTM D664 (Method A)	<0.05	mg KOH/g	--	--	#
S15 - Cetane Number	ASTM D613	42.4	Rating	--	--	
Gross Calorific Value	ASTM D240	5851	MBtu/bbl	--	--	
Particulate Contamination In Aviation Fuels	ASTM D5452					
Volume of Sample Filtered		1.000	L	--	--	
Particulate Contamination		0.60	mg/L	--	--	
Particulate Contamination		0.70	mg/kg	--	10	
150 °C Accelerated Fuel Oil Stability Test	Octel Method F21-61					
Product Colour ASTM D1500 - before Ageing		L. 1.0	---	--	--	
Product Colour ASTM D1500 - after Ageing		L. 1.0	---	--	--	
Aging Time		90	min	--	--	
Pad Reflectance after ageing		91	%	--	--	
Reference Blotter Number		1	---	--	7.0	
S15 - Carbon, Hydrogen and Nitrogen in Petroleum Products and Lubricants	ASTM D5291					
Carbon		86.6	% (m/m)	--	--	
Hydrogen		13.3	% (m/m)	--	--	
Nitrogen		<0.8	% (m/m)	--	--	

**** End of Analytical Results ****

- Result is outside of test method limits and/or analytical range used in method precision study

AUTHORISED SIGNATORY

Jason Hobbs

Jason Hobbs-Laboratory Supervisor