GRU
The Utility of Choice

GAINESVILLE REGIONAL UTILITIES
Strategic Planning

December 2, 1996

Mr. Hamilton S. (Buck) Oven, Jr., Coordinator
Office of Siting Coordination
Department of Environmental Protection
2600 Blair Stone Rd., MS 48
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities (GRU)
Deerhaven Generating Station, Unit 2
Site Certification (PA 74-04)

Dear Mr. Hamilton:

In followup to GRU's June 28, 1995 correspondence and Title V permit application, enclosed are particulate emission calculations for the coal handling facilities at the above-referenced site. The emission estimates are based on the following assumptions:

(1) Weekly and annual maximum potential coal throughput rates of 12,700 and 660,400 tons, respectively, for all emission points;

(2) No controls for railcar unloading (CH-001), belt conveyor 2 to belt conveyor 3A transfer point (CH-002), belt conveyor 2 to belt conveyor 3B transfer point (CH-003), belt conveyor 3A to storage pile transfer point (CH-004), and belt conveyor 3B to storage pile transfer point (CH-005);

(3) Enclosure control efficiency of 70% for transfer points located within the crusher building (CH-010A - CH-010D) and coal bunker building (CH-011A, CH-011B); and

(4) Insignificant emissions from covered conveyor belts.

(352) 334-3400 ext. 1261 P. O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (352) 334-3151

These calculations show that emissions from these sources are well below those estimated and modeled in the Site Certification application (Section 5.6, pg. 5-51). Furthermore, visual emission observations conducted by GRU and the Department demonstrated that the 20% opacity standard can be met under the conditions presented above.

Please call me at (352) 334-3400 Ext. 1284 if you have any questions.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Sr. Environmental Engineer

xc: R. Casserleigh
F. Hancock
A. Morrison, HGSS
A2.2

dhcoal.y19

Deerhaven Station – Summary of Coal Handling Sources

Source Description	Emission Point ID	Emission Type[1]	PM/PM_{10} Emission Rates (lb/wk)	PM/PM_{10} Emission Rates (ton/yr)
Coal Handling – Railcar Unloading; Bottom Discharge	CH–001	F	11.840	0.310
Coal Handling – Belt Conveyor 2 to Belt Conveyor 3A	CH–002	F	11.840	0.310
Coal Handling – Belt Conveyor 2 to Belt Conveyor 3B	CH–003	F	11.840	0.310
Coal Handling – Belt Conveyor 3A to Storage Pile	CH–004	F	11.840	0.310
Coal Handling – Belt Conveyor 3B to Storage Pile	CH–005	F	11.840	0.310
Coal Storage – Conveyor 3A to Ready Storage Pile	CH–006	F	10.147	0.025
Coal Storage – Conveyor 3B to Episodic Storage Pile	CH–007	F	10.147	0.025
Coal Storage – Main Storage Pile	CH–008	F	178.080	0.447
Coal Handling – Dozer Operations on Storage Pile	CH–009	F	137.933	3.301
Coal Handling – Crusher Building; Belt Conveyor 4A to Surge Bin	CH–010A	F	3.550	0.090
Coal Handling – Crusher Building; Surge Bin to Crusher Feeder	CH–010B	F	3.550	0.090
Coal Handling – Crusher Building; Crusher Feeder to Crusher	CH–010C	F	3.550	0.090
Coal Handling – Crusher Building; Crusher to Belt Conveyor 5A	CH–010D	F	3.550	0.090
Coal Handling – Coal Bunker Building; Belt Conveyor 5A to Belt Conveyor 6A	CH–011A	F	3.550	0.090
Coal Handling – Coal Bunker Building; Belt Conveyor 6A to Bunkers	CH–011B	F	3.550	0.090
		Totals	**416.807**	**5.888**

[1] F = Fugitive

al - for file

GAINESVILLE REGIONAL UTILITIES

Strategic Planning

January 18, 1996

Mr. Clair Fancy, Chief
Bureau of Air Regulation
Florida Dept. of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities
Deerhaven Generating Station, Combustion Turbine No. 3
PSD-FL-212, PA 74-04D
Ambient Effects Curves - Clarification

Dear Mr. Fancy:

By letter dated November 27, 1995 GRU submitted ambient effects curves for the above-referenced unit. Please note that certain curves, specifically the Estimated Performance curve and the Temperature Effects curve, upon which the text (and the example calculations) were based had been updated; the corresponding text had not. Therefore, there was an inconsistency between the text (e.g., ISO Output) and the curves that may have caused some confusion. Provided herein is the revised text which conforms to the curves applicable to this unit.

Please call me at (904) 334-3400 Ext. 1284 if you have any questions.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Sr. Environmental Engineer

cc: EPA
NPS

xc: D. Beck
R. Casserleigh
C. Kirts, FDEP-Jax.
B. Oven, FDEP- Tall.
DHGT3

CT3curv2.y17

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

PERFORMANCE ESTIMATING

A. General

The performance data presented in this section is in the form of curves which may be utilized in estimating and evaluating the affects of compressor inlet temperature on turbine output, heat rate, and air flow. The curves are for the base load operation mode of the gas turbine using natural gas and distillate fuel. Since the curves are based on ISO conditions [compressor inlet temperature of 59°F (15°C) and a barometric pressure of 14.7 psia (101 kPa)], operational performance data can be derived after determining the correction factor for the particular site conditions.

B. Performance Derivation

To derive the site output of a typical MS–7001 gas turbine operating under full load in the base mode using natural gas, it is necessary to convert from ISO conditions to site conditions. This is accomplished by determining the altitude factor for the specific site location from drawing 416HA662 and determining the temperature percent factor from drawing 522HA283 Rev–1.

For example, to determine the full load output and heat rate under base mode conditions at a site altitude of 400 feet (122 m) and a compressor inlet temperature of 100°F (38°C), convert ISO conditions to actual site conditions.

Full Load Site Output = Output (ISO) × Altitude Correction Factor (ACF) × Temperature Correction Factor (TCF)

Full Load Site Heat Rate = Heat Rate (ISO) × Temperature Correction Factor (TCF)

Where: for natural gas firing

ISO Output = 84.96 megawatts

ISO Heat Rate = 10,440 Btu/kwhr

ACF = 0.986 [from drawing 416HA662 for 400 feet (122 m) altitude]

TCF (Output) = 0.86 [from drawing 522HA283 for 100°F (38°C)]

TCF (Heat Rate) = 1.03 [from drawing 522HA283 for 100°F (38°C)]

Therefore:

Full Load Site Output = 84.96 x 0.986 x 0.86 = 72.04 megawatts

Full Load Site Heat Rate = 10,440 x 1.03 = 10,753 Btu/kwhr

To determine part load heat rate under base mode conditions at the same altitude and temperature, calculate as follows:

Percent Full Load Output (at the site conditions) = Part Load Output/Full Load Output × 100 Percent

General Electric Model PG7121(EA) Gas Turbine

Estimated Performance - Configuration: DLN Combustor

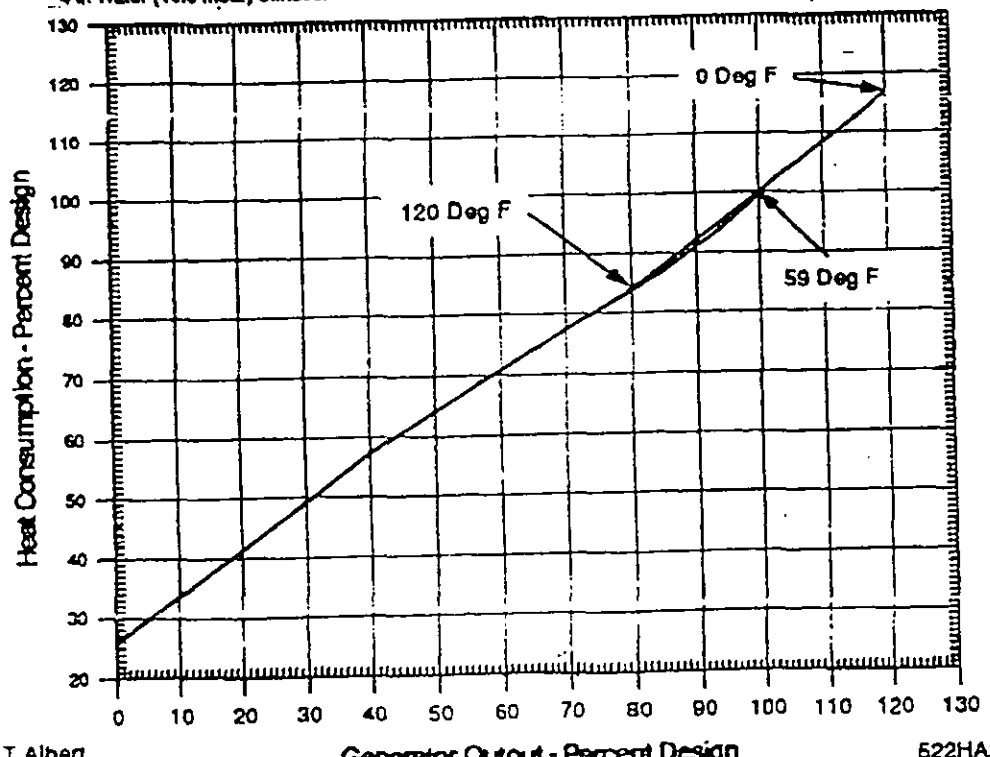
Compressor Inlet Conditions 59F (15 C), 60% Relative Humidity
Atmospheric Pressure 14.7 psia (1.013 bar)

Fuel			Natural Gas	Distillate Oil
Design Output	kW		84960	83500
Design Heat Rate (LHV)	Btu/kWh	(kJ/kWh)	10440 (11010)	10520 (11100)
Design Heat Cons (LHV)	Btu/h	(kJ/h) x10^6	887.0 (935.6)	878.4 (926.0)
Design Exhaust Flow	lb/h	(kg/h) x10^3	2359 (1070)	2365 (1073)
Exhaust Temperature	deg. F	(deg.C)	999 (537)	999 (537)
Load			Base	Base

Notes:

1. Altitude correction on curve 416HA662 Rev A.
2. Ambient temperature correction on curve 522HA283 Rev 1.
3. Effect of modulating IGV's on exhaust temperature and flow on curve 522HA284 Rev 1.
4. Humidity effects on curve 496HA697 Rev B - all performance calculated with a constant specific humidity of .0064 or less so as not to exceed 100% relative humidity.
5. Plant Performance is measured at the generator terminals and includes allowances for exitation power, shaft driven auxiliaries, and 4.0 in H2O (10.0 mbar) inlet and 5.5 in H2O (13.7 mbar) exhaust pressure drops, a DLN Combustor, and the effects of inlet bleed heating.
6. Additional inlet and exhaust pressure loss effects:

	% Effect on Output	% Effect on Heat Rate	Effect on Exhaust Temp.
4 in Water (10.0 mbar) Inlet	-1.40	0.42	1.9F (1.0C)
4 in Water (10.0 mbar) exhaust	-0.40	0.40	1.8F (1.0C)



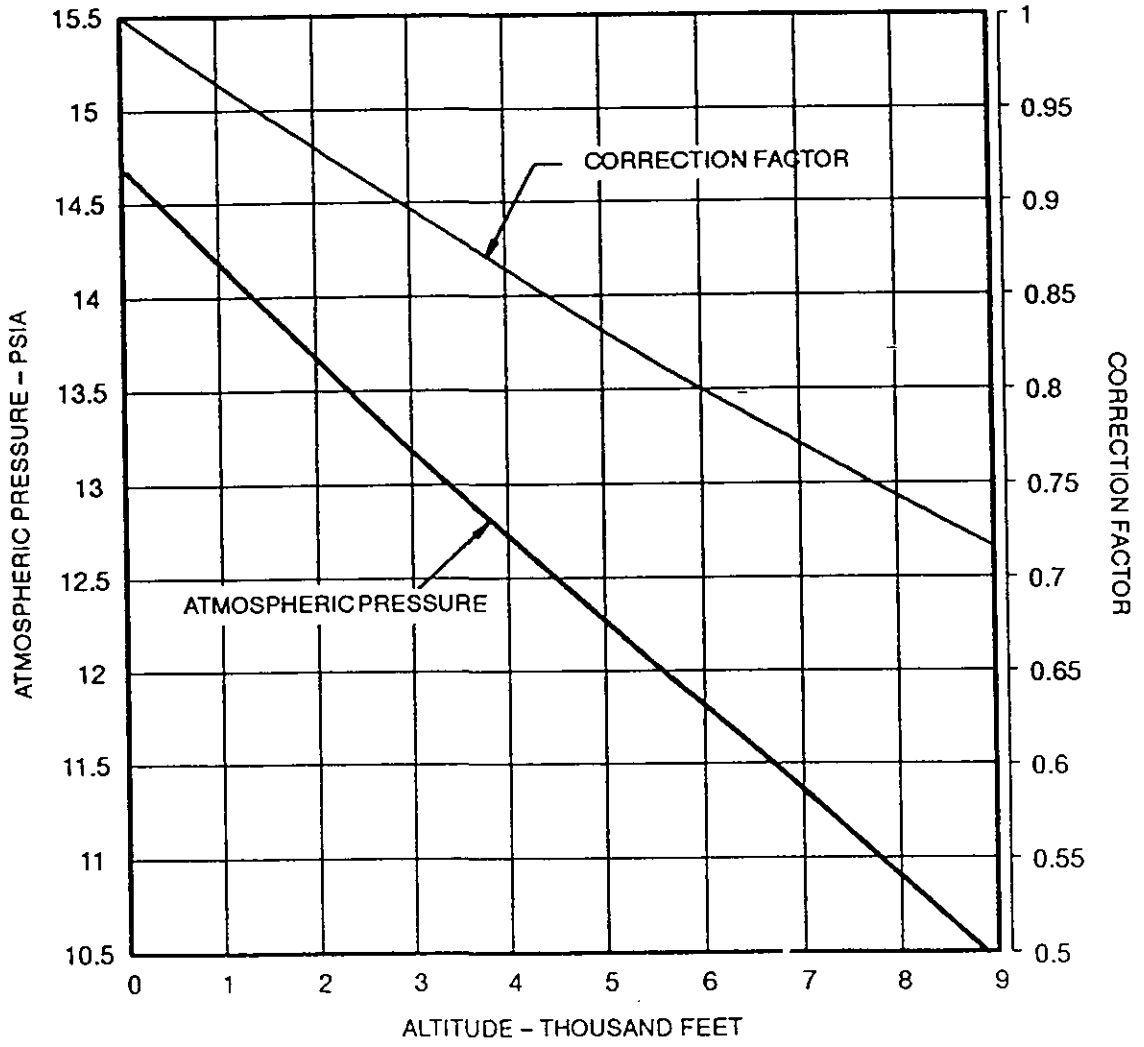
T Albert
7/12/95

522HA282
Rev - 1

General Electric Gas Turbine
Altitude Correction Factor

Altitude Vs Atmospheric Pressure
And
Altitude Vs Correction Factor
For Gas Turbine Output And Fuel Consumption

NOTES:
1. Heat Rate and Thermal Efficiency are not affected by altitude.
2. Correction Factor = P(atm)/14.7



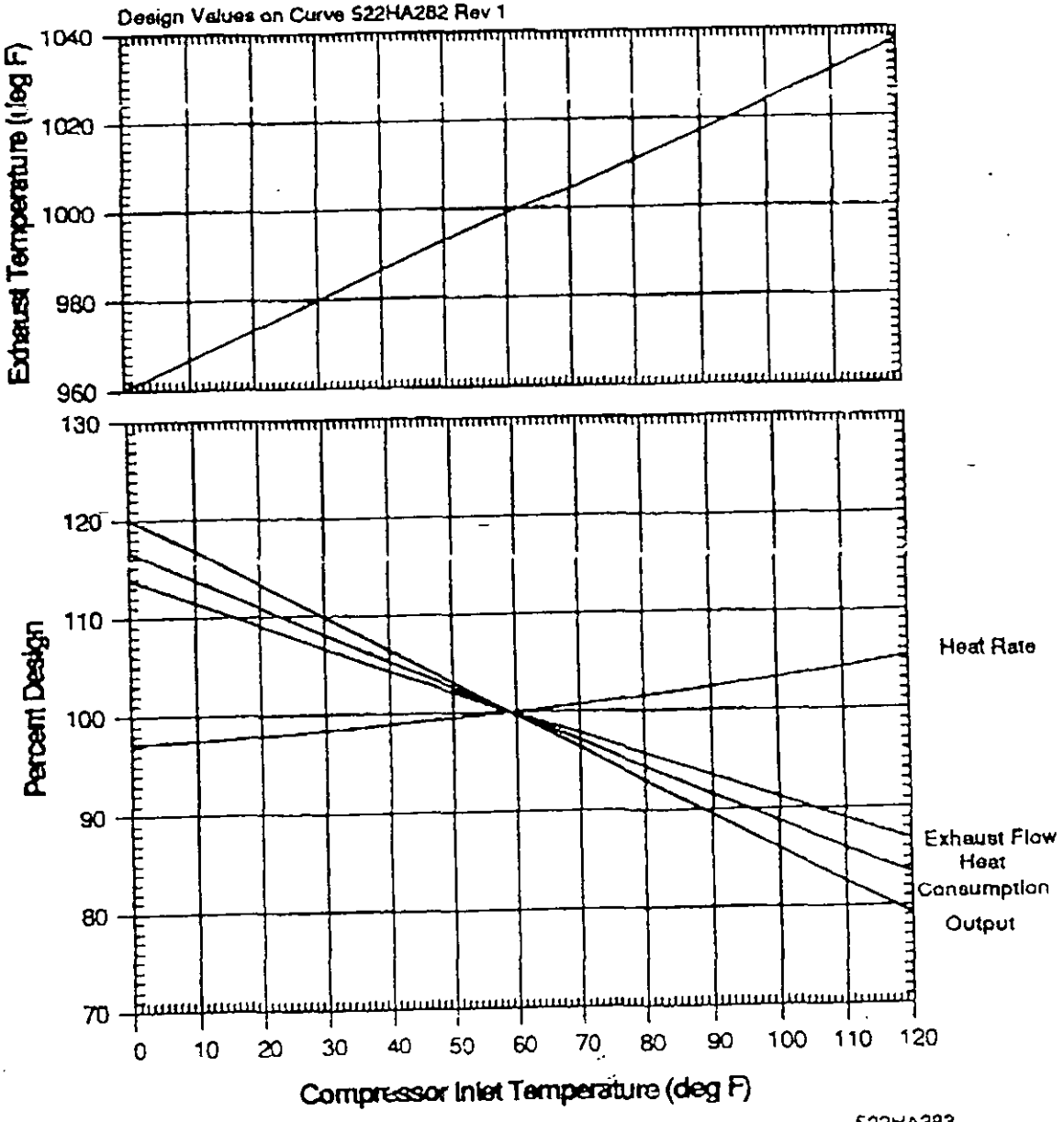
4/24/90
F.J. BROOKS

416HA662
REV A

GENERAL ELECTRIC MODEL PG7121(EA) GAS TURBINE

Effect of Compressor Inlet Temperature on Output, Heat Rate, Heat Consumption, Exhaust Flow And Exhaust Temperature at Base Load

Configuration: DLN Combustor
Fuel: Natural Gas, Distillate Oil
Design Values on Curve 522HA282 Rev 1



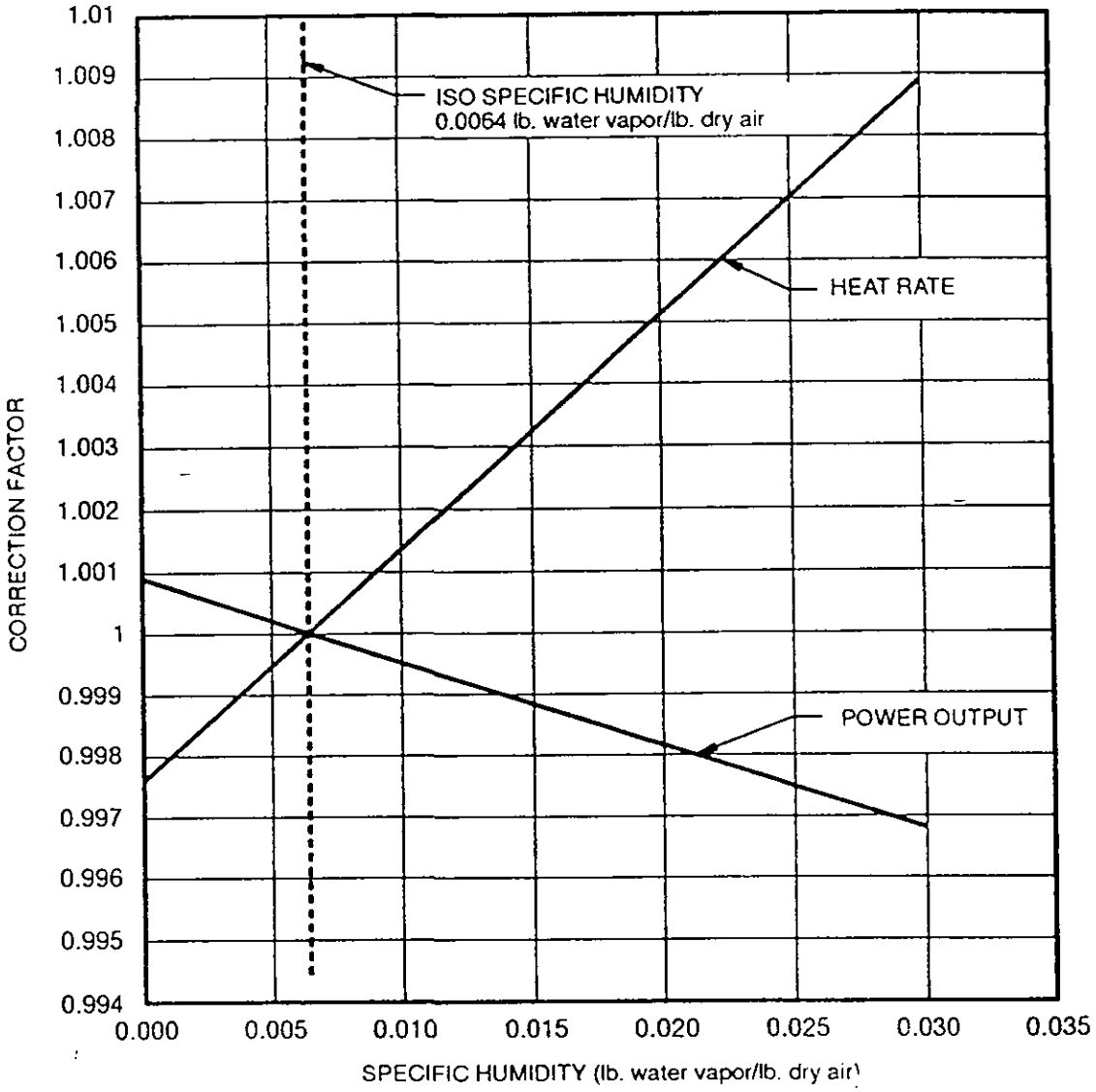
T Albert
7/13/95

522HA283
Rev - 1

General Electric MS6001, MS7001 And MS9001 Gas Turbines

Corrections To Output And Heat Rate
For Non–Iso Specific Humidity Conditions

For Operation At Base Load On Exhaust
Temperature Control Curve



10/10/89
DA JAQUEWAY

498HA697
REV B

GRU

GAINESVILLE REGIONAL UTILITIES

Strategic Planning

December 22, 1995

RECEIVED
JAN 02 1996
BUREAU OF
AIR REGULATION

Mr. Clair Fancy, Chief
Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities
Deerhaven Generating Station
Combustion Turbine No. 3 (PSD-FL-212, PA 74-04D)
Notice of Startup

Dear Mr. Fancy:

In accordance with 40 CFR 60.7(a)(3) notice is hereby provided that the startup date of the above-referenced unit was December 20, 1995.

Please call me at (352) 334-3400 Ext. 1284 if you have any questions.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Sr. Environmental Engineer

xc: D. Beck
R. Casserleigh
C. Kirts, FDEP-Jax.
B. Oven, FDEP-Tall.
DHGT3

ct3star.y17

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

GAINESVILLE REGIONAL UTILITIES
Strategic Planning

November 27, 1995

RECEIVED
DEC 4 1995
BUREAU OF
AIR REGULATION

Mr. Clair Fancy, Chief
Bureau of Air Regulation
Florida Dept. of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities
Deerhaven Generating Station, Combustion Turbine No. 3
PSD-FL-212, PA 74-04D
Ambient Effects Curves

Dear Mr. Fancy:

Pursuant to the above-referenced permits, enclosed are the ambient effects curves for Deerhaven Combustion Turbine No. 3. This unit is currently projected to startup in early December and to be performance-tested in January or February 1996.

Please call me at (904) 334-3400 Ext. 1284 if you have any questions.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Sr. Environmental Engineer

xc: D. Beck
R. Casserleigh
C. Kirts, FDEP-Jax.
B. Oven, FDEP- Tall.
DHGT3

CT3curve.y17

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

PERFORMANCE ESTIMATING

A. General

The performance data presented in this section is in the form of curves which may be utilized in estimating and evaluating the affects of compressor inlet temperature on turbine output, heat rate, and air flow. The curves are for the base load operation mode of the gas turbine using natural gas and distillate fuel. Since the curves are based on ISO conditions [compressor inlet temperature of 59°F (15°C) and a barometric pressure of 14.7 psia (101 kPa)], operational performance data can be derived after determining the correction factor for the particular site conditions.

B. Performance Derivation

To derive the site output of a typical MS–7001 gas turbine operating under full load in the base mode using natural gas, it is necessary to convert from ISO conditions to site conditions. This is accomplished by determining the altitude factor for the specific site location from drawing 416HA662 and determining the temperature percent factor from drawing 499HA734.

For example, to determine the full load output and heat rate under base mode conditions at a site altitude of 400 feet (122 m) and a compressor inlet temperature of 100°F (38°C), convert ISO conditions to actual site conditions.

Full Load Site Output = Output (ISO) × Altitude Correction Factor (ACF)
× Temperature Correction Factor (TCF)

Full Load Site Heat Rate = Heat Rate (ISO) × Temperature Correction Factor (TCF)

Where:

ISO Output = 83.5 megawatts

ISO Heat Rate = 10,480 Btu/kwhr

ACF = 0.986 [from drawing 416HA662 for 400 feet (122 m) altitude]

TCF (Output) = 0.845 [from drawing 499HA734 for 100°F (38°C)]

TCF (Heat Rate) = 1.045 [from drawing 499HA734 for 100°F (38°C)]

Therefore:

Full Load Site Output = 83.5 × 0.986 × 0.845 = 69.57 megawatts

Full Load Site Heat Rate = 10,480 × 1.045 = 10,952 Btu/kwhr

To determine part load heat rate under base mode conditions at the same altitude and temperature, calculate as follows:

Percent Full Load Output (at the site conditions) =
Part Load Output/Full Load Output × 100 Percent

General Electric Model PG7121(EA) Gas Turbine

Estimated Performance - Configuration: DLN Combustor

Compressor Inlet Conditions 59F (15 C), 60% Relative Humidity
Atmospheric Pressure 14.7 psia (1.013 bar)

Fuel			Natural Gas	Distillate Oil
Design Output	kW		84960	83500
Design Heat Rate (LHV)	Btu/kWh	(kJ/kWh)	10440 (11010)	10520 (11100)
Design Heat Cons (LHV)	Btu/h	(kJ/h) x10^6	887.0 (935.6)	878.4 (926.0)
Design Exhaust Flow	lb/h	(kg/h) x10^3	2359 (1070)	2365 (1073)
Exhaust Temperature	deg. F	(deg.C)	999 (537)	999 (537)
Load			Base	Base

Notes:
1. Altitude correction on curve 416HA662 Rev A.
2. Ambient temperature correction on curve 522HA283 Rev 1.
3. Effect of modulating IGV's on exhaust temperature and flow on curve 522HA284 Rev 1.
4. Humidity effects on curve 496HA667 Rev B - all performance calculated with a constant specific humidity of .0064 or less so as not to exceed 100% relative humidity.
5. Plant Performance is measured at the generator terminals and includes allowances for exitation power, shaft driven auxiliaries, and 4.0 in H2O (10.0 mbar) inlet and 5.5 in H2O (13.7 mbar) exhaust pressure drops, a DLN Combustor, and the effects of inlet bleed heating.
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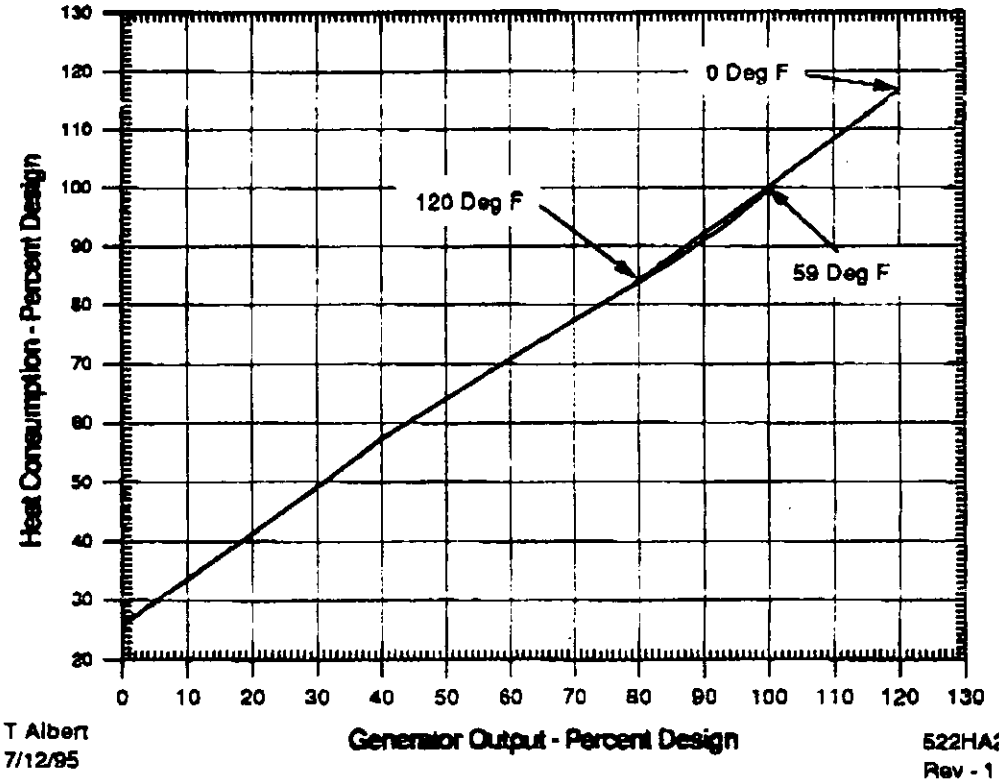
	% Effect on Output	% Effect on Heat Rate	Effect on Exhaust Temp.
4 in Water (10.0 mbar) Inlet	-1.40	0.42	1.9F (1.0C)
4 in Water (10.0 mbar) exhaust	-0.40	0.40	1.8F (1.0C)



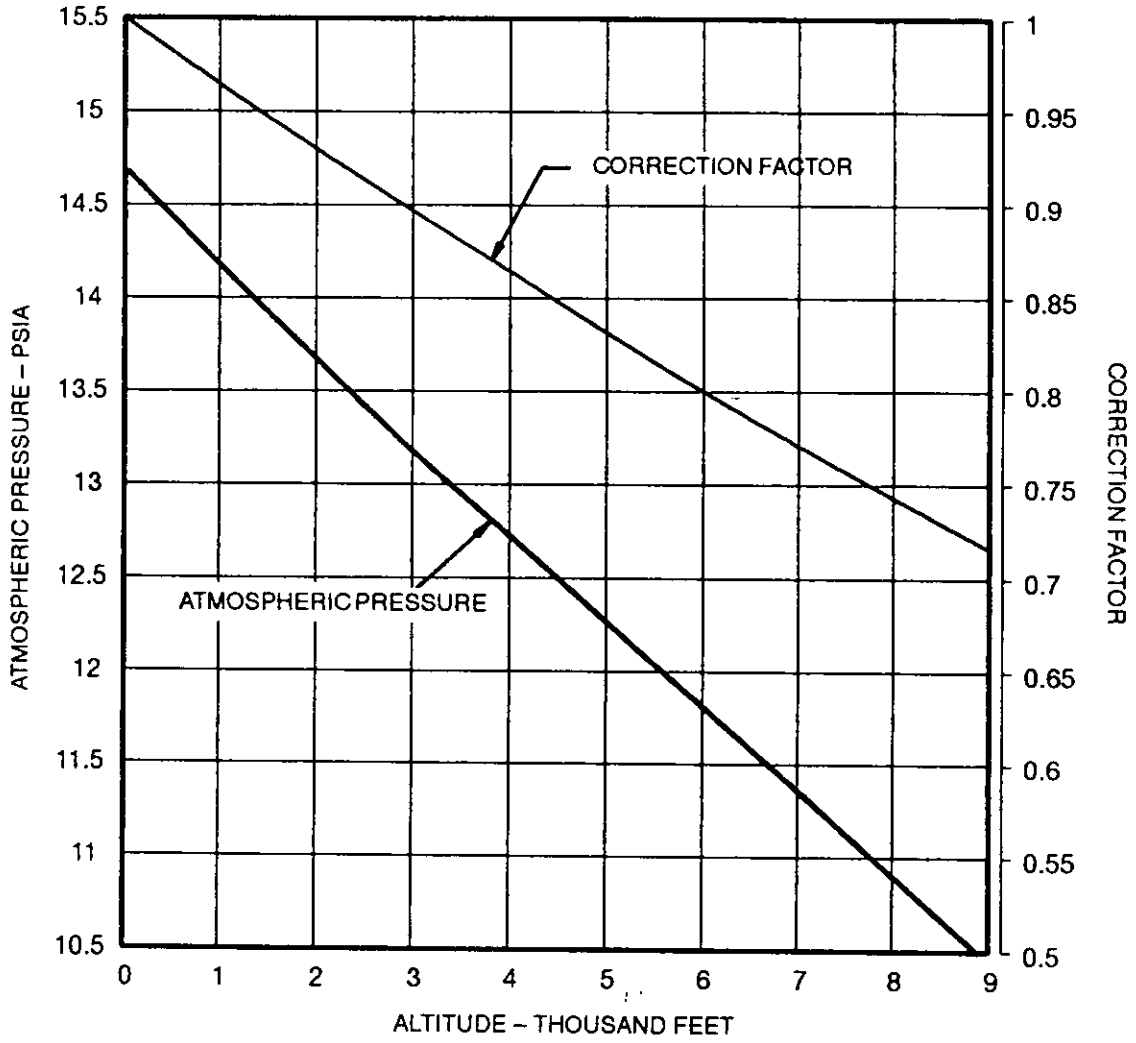
T Albert
7/12/95

522HA282
Rev - 1

General Electric Gas Turbine
Altitude Correction Factor

Altitude Vs Atmospheric Pressure
And
Altitude Vs Correction Factor
For Gas Turbine Output And Fuel Consumption

NOTES:
1. Heat Rate and Thermal Efficiency are not affected by altitude.
2. Correction Factor = P(atm)/14.7



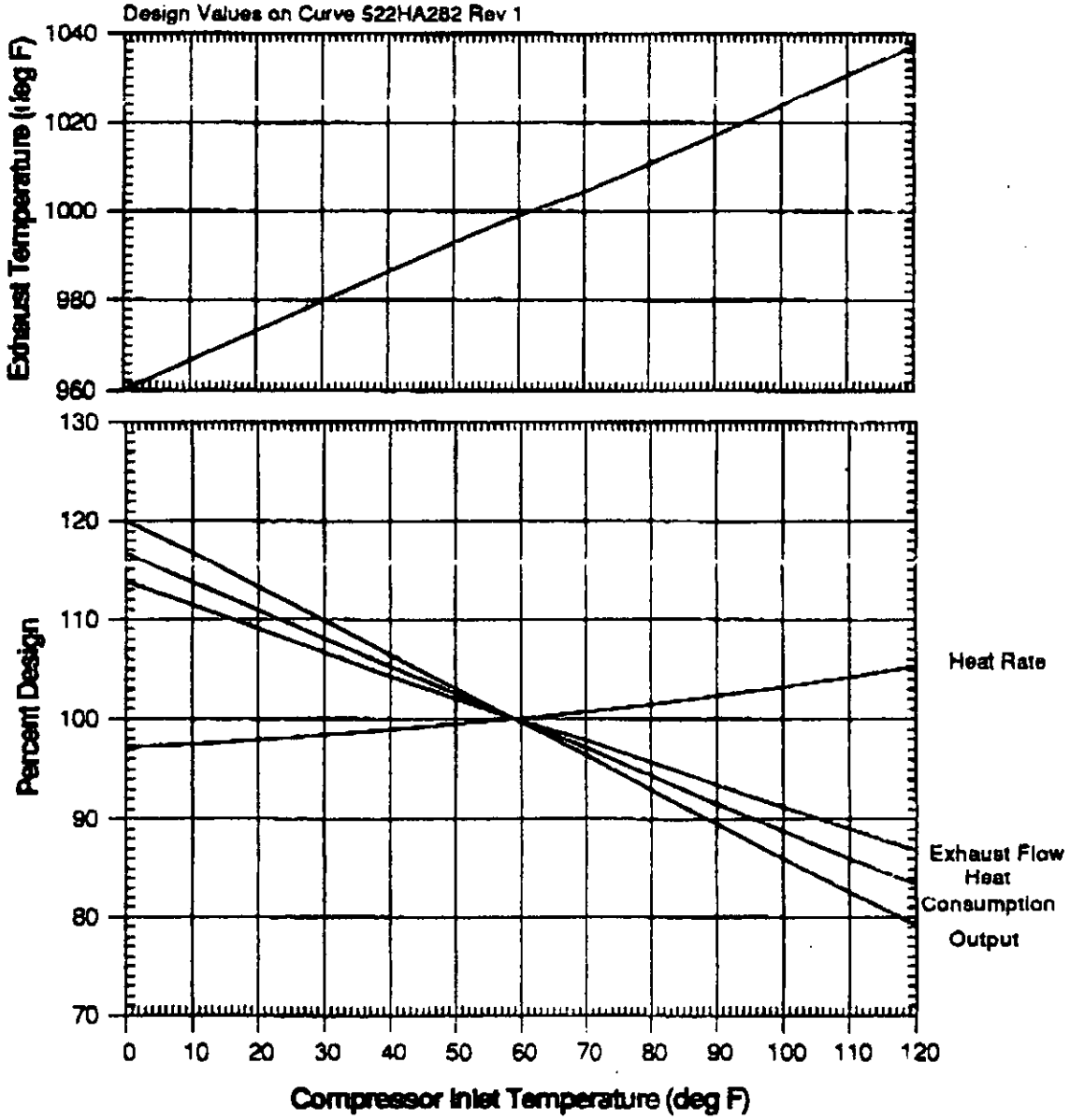
4/24/90
F.J. BROOKS

416HA662
REV A

GENERAL ELECTRIC MODEL PG7121(EA) GAS TURBINE

Effect of Compressor Inlet Temperature on Output, Heat Rate, Heat Consumption, Exhaust Flow And Exhaust Temperature at Base Load

Configuration: DLN Combustor
Fuel: Natural Gas, Distillate Oil
Design Values on Curve 522HA282 Rev 1



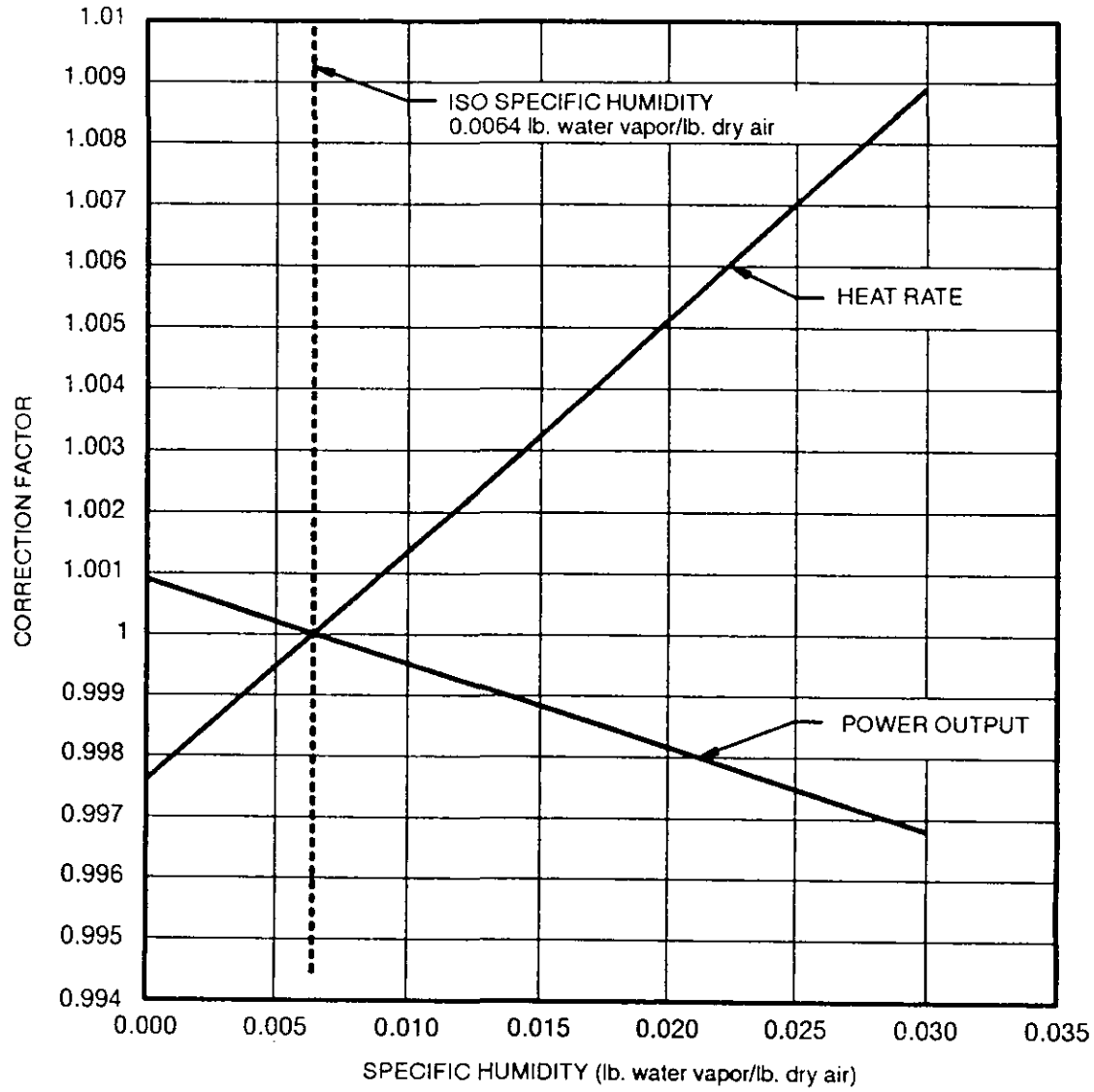
T Albert
7/13/95

522HA283
Rev - 1

General Electric MS6001, MS7001 And MS9001 Gas Turbines

Corrections To Output And Heat Rate
For Non–Iso Specific Humidity Conditions

For Operation At Base Load On Exhaust
Temperature Control Curve



10/10/89
DA JAQUEWAY

498HA697
REV B

GAINESVILLE REGIONAL UTILITIES
Strategic Planning

June 28, 1995

Mr. Hamilton S. (Buck) Oven, Jr., Coordinator
Office of Siting Coordination
Department of Environmental Protection
2600 Blair Stone Road, MS 48
Tallahassee, FL 32399-2400

Received by BAR on 10/31/95 as info

Re: Gainesville Regional Utilities
Deerhaven Unit No. 2
Site Certification No. PA 74-04

Dear Mr. Oven:

Gainesville Regional Utilities' (GRU) Deerhaven Unit No. 2 was certified in May of 1978. While our records do not indicate that the use of particulate matter control devices is required by the Department for Unit No. 2's coal handling facilities, certain control devices were installed when the unit was originally constructed to help minimize fugitive emissions. Recent visible emissions testing indicates, however, that these pollution control devices are not necessary to meet the 20 percent opacity limit established in the conditions of certification.

Like other sources throughout the State, GRU is currently in the process of completing its Title V air operation permit application, and would like confirmation from the Department that these particulate matter control devices are not necessary. Pursuant to Special Condition I.A.5.b., the Department has the authority to determine whether certain control devices are adequate to comply with the visible emission limit of 20 percent opacity, and GRU can demonstrate that no pollution control equipment is necessary for compliance with the opacity limit.

Using approved methods, GRU recently conducted visible emissions testing on its coal handling facilities for Unit No. 2. The particulate matter control devices were not operating during these recent tests. The results indicate that the 20 percent opacity limit can be met without the use of any particulate matter control devices. A copy of the test results is enclosed for your review and information. While there are some fugitive particulate matter emissions from the coal conveyance, storage, transfer, and processing facilities, the test results indicate that the visible emissions ranged from zero to just over four percent opacity--much below the 20 percent standard.

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

Again, GRU would like confirmation from the Department that particulate matter control devices are not required for Unit No. 2's coal handling facilities since the opacity standard can be met without the use of such devices. After you have had an opportunity to review this information, please let us know if you have any questions or concerns. We would be happy to meet with you to discuss this matter in greater detail.

Your continued cooperation and assistance are very much appreciated.

Sincerely,

Yolanta E. Jonynas
Sr. Environmental Engineer

Enclosure

xc: Randy Casserleigh
Fred Hancock
Angela Morrison, HGSS
A2.2

W:\U0070\ENV\SITECERT.DH2

Cubix Corporation

FLORIDA OFFICE
2106 NW 67th Place, #7
Gainesville, Florida 32653
904-378-0332 TEL
904-378-0354 FAX

CORPORATE HEADQUARTERS
9225 Lockhart Highway
Austin, Texas 78747
512-243-0202 TEL
512-243-0222 FAX

May 23, 1995

Ms. Yolanta Jonynas
Gainesville Regional Utilities
P.O. Box 147117
Gainesville, Florida

Dear Ms. Jonynas

Visual emission testing was conducted at the Deerhaven Station for Gainesville Regional Utilities (GRU) on April 27th and 30th, 1995. The testing followed the procedures of 40 CFR 60, Appendix A, Method 9; an observer, certified within the state of Florida, performed the opacity readings. The purpose of these tests was to determine the opacity of fugitive emissions from the coal handling process at this facility. Cubix Corporation, Florida Office performed the testing.

The Deerhaven Station is a power plant at which two coal-fired boilers are used to generate electrical power; this power is then sold to residents and businesses located within the city of Gainesville, Florida. In order to operate these boilers, coal is transported to the facility via rail-car, stacked into a pile for reserve usage, transported to a crusher, and then transported to set of coal bunkers. The coal is injected into the boilers directly from the bunkers.

The Visual Emissions Summary contains the results of the testing. Each test was one hour in duration with readings taken every 15 seconds. A total of four sources were monitored with one test run performed on each source. Within the summary table, the highest average refers to the average opacity emissions from 24 contiguous readings. Operational and process data was collected and supplied by GRU personnel.

All other data relevant to this testing is contained in the Appendix of this report. Contained within the Appendix are field data sheets, operational data, and the observer certifications. Cubix collected and reported the enclosed test data in accordance with the procedures described in EPA Method 9. Cubix makes no warranty as to the suitability of the test methods. Cubix assumes no liability relating to the interpretation and use of the test data.

Sincerely,

Leonard Brenner

Visual Emissions Summary

Source Desciption	Process Operation	Maximum Opacity (%)	Minimum Opacity (%)	Highest 24 Ave. Opacity (%)
Primary Crusher Baghouse	300 tons/hr	10	0	1.25
Coal Bunkering Baghouse	300 tons/hr	0	0	0
Tower Chute Coal Piling	1467 tons/hr	25	0	4.38
Rail-Car House Unloading	15 cars/hr	5	0	0.42

April 27th & 30th, 1995
Gainesville Regional Utilities
Deerhaven Station
Alachua County, Florida

V.E. observer: Leonard Brenner
Test Run Duration: 60 minutes
Total Readings per Run: 240 readings