TAMPA ELECTRIC

March 18, 2004

Mr. Joel Smolen,
Florida Department of
Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

Via FedEx
Airbill No. 7905 8355 1734

Re: Tampa Electric Company
Biomass Test Burn
Polk Power Station Unit 1
Facility ID No. 1050233

Dear Mr. Smolen:

Per Condition 1 of the Polk Power Station Unit 1 Biomass Test Burn Authorization, which was issued by the Florida Department of Environmental Protection (DEP) on November 25, 2003, Tampa Electric Company (TEC) is required to notify the DEP Southwest District and the Bureau of Air Regulation seven days prior to the commencement of any stack performance testing. Through this correspondence TEC is providing notification that stack performance testing of biomass is tentatively scheduled for March 31, 2004.

If you have any questions please call Shelly Castro or me at (813) 228-4408.

Sincerely,

Laura R. Crouch
Manager- Air Programs
Environmental, Health & Safety

EA/bmr/SSC184

cc: Mr. Scott Sheplak, FDEP
Mr. Mike Halpin, FDEP

TAMPA ELECTRIC COMPANY
P. O. BOX 111 TAMPA, FL 33601-0111

(813) 228-4111

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CUSTOMER SERVICE:
HILLSBOROUGH COUNTY (813) 223-0800
OUTSIDE HILLSBOROUGH COUNTY 1 (888) 223-0800

Department of Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

November 25, 2003

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ms. Laura Crouch
Manager, Air Programs – Environmental, Health and Safety
Tampa Electric Company
Post Office Box 111
Tampa, Florida 33601

Re: Biomass Test Burn – Bahia Grass
Polk Power Station Unit 1
ARMS Permit No. 1050233-013-AC

Dear Ms. Crouch:

The Department has reviewed the request from Tampa Electric Company received on October 27, 2003 concerning the gasification of a blend of coal/petcoke and biomass (Bahia grass) in your IGCC unit located at the Polk Power Station, Polk County, Florida.

You are hereby authorized to conduct performance tests on these emission units while gasifying and combusting a blend of up to 5 percent biomass by weight (Bahia grass) for pollutants described herein, for a period not to exceed 28 days, and within 45 days from the first day biomass is gasified. Test results must include a material balance for each unique blend of fuels. All conditions of existing permits related to air pollution emission limits and control equipment remain in force during the test burn. This temporary authorization shall expire on or before April 30, 2004.

The performance tests shall be conducted in order to gather data regarding pollutant emissions, any operation limitations on gasifying a blend of up to 5 percent by weight biomass, to measure syngas characteristics and to evaluate slag content from the gasifier. Unless otherwise specified, all test results shall be sent to the Department's Bureau of Air Regulation within 30 days of completion of the tests. Upon any requested change to allow permanent combustion of fuels not currently permitted for these emission units, the Department will evaluate the establishment of new or additional permit conditions resulting from either increases or improvements in emission quality or quantity.

The performance tests shall be subject to the following conditions:

1. The permittee shall notify the DEP Southwest District and the Bureau of Air Regulation upon the initial receipt of biomass, one day prior to gasifying biomass and 7 days prior to commencement of any stack performance testing. A written final report shall be submitted to these offices within 45 days of completion of the last day that biomass is gasified.
2. Biomass shall be continuously fed so as to maintain a homogenous stream of syngas for combustion gasification. The maximum biomass content shall not exceed 5 percent by weight of fuels gasified, as measured during each calendar day. A log shall be maintained at the facility demonstrating compliance with this condition, documenting the unique blend of Bahia grass with coal or petcoke. This log shall be available for inspection and submitted with the final test report. Performance

testing (mass balance, syngas testing and stack testing) shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke.

3. Emissions due to biomass gasification shall not exceed any current limit in existing permits for all impacted emission units. This test-burn shall not result in the release of objectionable odors pursuant to Rule 62-296.320(2). F.A.C. Performance testing shall cease as soon as possible if the test results in any emissions, which are not in accordance with the conditions in existing permits, or this authorization protocol. The test burn shall not resume until appropriate measures to correct the problem(s) have been implemented. The Southwest District shall be notified immediately upon such cessation and resumption.

4. Representative samples of "as-burned" coal, petcoke and biomass shall be taken and analyzed for each unique blend of biomass gasified with each unique blend of coal or petcoke. All sample results shall be submitted with the final report.

5. As-burned (syngas) fuel samples shall be collected and analyzed as "refinery gas" (as has been done with past compliance tests) upon initial gasification of each unique blend of biomass gasified with each unique blend of coal or petcoke. Sample results shall be provided to the DEP Southwest District and the Bureau of Air Regulation with the final report.

6. To provide reasonable assurance that the ash generated from any fuel blend can be disposed of in a method to be proposed by TEC, as well as to ensure compliance with the solid and hazardous waste regulations, representative samples of the gasifier slag generated as the result of gasifying coal and petcoke with biomass shall be segregated, sampled and analyzed in accordance with the requirements set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, Third Edition."

7. Stack gas emissions testing for SO_2, NO_X and CO shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke and results reported for all measured syngas constituents as well as all currently regulated pollutants. Alternatively, CEM data may be utilized (if available) provided that the CEMS are quality assured pursuant to 40 CFR 75. The data assessment reports from 40 CFR 60 for the most recent RATA and CGA shall be submitted along with most recent CEMS QA reports.

8. All stack performance tests shall be conducted using EPA Reference Methods, as contained in 40 CFR 60 (Standards of Performance for New Stationary Sources), 40 CFR 61 (National Emission Standards for Hazardous Air Pollutants), and 40 CFR 266, Appendix IX (Multi-metals), unless otherwise approved by the Department, in writing, in accordance with Chapter 62-297, F.A.C. All performance testing shall be submitted with the final report.

9. This Department action is only to authorize the temporary blend performance testing of biomass consisting of Bahia grass.

10. The Department's Southwest District, and the Bureau of Air Regulation shall be notified within 5 days, in writing, upon completion of the biomass test burn program.

11. All testing series shall include emissions testing for emissions units operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the capacity allowed by existing permits.

This letter must be attached to permit No. PSD-FL-194 (current revision) and shall become a part of the permit.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen (14) days of receipt of this notice of intent. Under Section 120.60(3), F.S., any person who asked the Department for notice of agency action may file a petition within fourteen (14) days of receipt of that notice. Petitions filed by any persons other than those entitled to written notice under section 120.60(3), F.S., must be filed within fourteen (14) days of receipt of this notice of intent. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above. Mediation is not available in this proceeding.

This permitting decision is final and effective on the date filed with the clerk of the Department unless a petition is filed in accordance with the above paragraphs or unless a request for extension of time in which to file a petition is filed within the time specified for filing a petition pursuant to Rule 62-

110.106, F.A.C., and the petition conforms to the content requirements of Rules 28-106.201 and 28-106.301, F.A.C. Upon timely filing of a petition or a request for extension of time, this action will not be effective until further order of the Department.

Any party to this permitting decision (order) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty (30) days after this order is filed with the clerk of the Department.

Sincerely,

Trina L. Vielhauer

Trina L. Vielhauer, Chief
Bureau of Air Regulation
Division of Air Resource Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Authorization to Conduct Performance Tests was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 11/25/03 to the person(s) listed:

Mark J. Hornick, TEC*
Laura Crouch, TEC*
Jim Little, EPA Region 4
Gerald Kissell, DEP SWD
Buck Oven, DEP PPSO
Jeff Spence, Polk County

Clerk Stamp

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

Victoria Gibson 11/25/03
(Clerk) (Date)

TAMPA ELECTRIC

RECEIVED

OCT 22 2003

BUREAU OF AIR REGULATION

October 21, 2003

Ms. Trina Vielhauer
Administrator- Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No. 7929 9419 6166

Re: Tampa Electric Company (TEC)
Polk Power Station Unit 1
Biomass Test Burn
Permit No. 1050233-012-AV
AIRS #1050233, EU ID #001

Dear Ms. Vielhauer:

The purpose of this letter is to request permission to conduct a test burn at Polk Power Station (PPS) Unit 1 under the authority of the current Title V Air Operation Permit No. 1050233-012-AV. The test burn would be conducted to test the feasibility of firing syngas produced from the gasification of a biomass based renewable resource fuel (biomass) blended with other currently permitted fuels (coal and petcoke). Biomass fuel is defined here as a renewable resource fuel consisting primarily of natural vegetative matter. As you are aware, TEC received authorization from the Florida Department of Environmental Protection (FDEP) to perform a biomass test burn on December 21, 2001. Upon receipt of the authorization, TEC immediately began procuring biomass fuel to facilitate the test burn. On December 30 and 31, 2001, TEC successfully gasified a blend of biomass, coal and pet coke, per the authorization. The blend consisted of approximately one-percent biomass by weight, which equates to approximately one ton of biomass gasified per hour.

Due to the initial success of the biomass test burn, TEC would like to continue to test other renewable fuels at Polk Unit 1. This is a process TEC is undertaking in an attempt to submit a construction permit application to FDEP in order to permanently be able to fire syngas produced from the gasification of biomass with coal and petcoke. The ability to gasify these renewable fuels and other environmentally friendly fuel sources supports TEC's green energy program and provides benefit to both the environment and our customers.

At this time, TEC is evaluating the use of Bahia grass, a native species indigenous to the area, which has been growing on the land at Polk. Approximately 50 acres of the overall plant site of 4,300 acres or 60 tons of Bahia grass have been harvested at Polk and will be used for the requested test burn. The biomass material proposed for gasification at Polk will not have been subject to painting, pressure treating, or other industrial chemical treatments that other wood derived fuels can be subject to. TEC does not anticipate the introduction of Bahia grass to be different than the biomass (Eucalyptus) used for the December 2001 test burn or have different results when used as a fuel, since Bahia grass (and almost all

grasses) when compared to Eucalyptus have very similar characteristics. TEC will use existing fuel handling and feed systems in place at the plant. As such, it is expected the biomass material will be unloaded from front end unloaders to the rented conveyor and feed Charrah's blunger tank, which recycles fines/water from scrubbers to the gasifier. The biomass material will ultimately be mixed and slurried with the coal/petcoke blend from the coal silos in an effort to maintain a continuous biomass/fuel blend ratio. A process flow diagram and representative analysis of the Bahia grass has been provided with this cover letter for your review (see Attachment A and B respectively for details). As with the December 2001 test burn, TEC will not change the fuel type used during this test burn. The fuel that will be blended with the biomass for the purposes of this test burn will be consistent with the types of fuel TEC is currently permitted to gasify.

TEC requests authorization to conduct the comparison test burn for a period of up to 28-days (see Attachment C for details). This will allow TEC to evaluate the impacts of the material on the fuel handling systems and other associated process equipment as well as evaluate the effects, if any, of firing syngas produced from the gasification of a blend of biomass and other currently permitted fuels. TEC does not anticipate any emission increase, as was evident by the prior biomass test burn report submitted April 16, 2002 to FDEP that combusting syngas produced from the gasification of a fuel blend of 99% petcoke/coal with a 1% biomass does not result in a significant increase in any regulated pollutant as defined in Table 212.400-2 F.A.C. A copy of the test burn report has been provided (see Attachment D for details).

TEC will conduct a baseline test burn to establish the representative emissions from Polk Unit 1 prior to the introduction of biomass into the gasifier. Baseline testing will last up to seven days and will consist of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) data collection through the use of Continuous Emissions Monitors (CEMs).

Following the baseline test, TEC will conduct a biomass blend test burn of syngas produced from the gasification of up to 5% biomass and up to 95% fuel blend. Biomass blend testing will last up to 21 days and will consist of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) data collection through the use CEMs like on the December 2001 test burn. Because of the intense gas cleaning steps involved in the gasification process, the particulate matter emissions and sulfuric acid mist emissions will not be affected by the firing of the syngas produced from the gasification of the biomass blend.

The baseline and biomass blend test burns will be conducted under standard PPS operating conditions and, to the extent possible, at least 90% of the maximum permitted heat input. Data will be compiled and results reported to the FDEP within 60 days of the completion of the test burn. Any residual biomass fuel stock that is on hand after the test burn will be consumed immediately after the test burn is completed. TEC will use enough fuel on-site to supply the needs of the test burn, with perhaps a slight margin to compensate for unforeseen circumstances. TEC intends to begin the test burn upon receiving approval from FDEP, since the Bahia grass is already on-site.

PPS is interested in firing syngas produced from the gasification of biomass for several reasons. First, certain governmental initiatives may make it financially advantageous to gasify biomass at the PPS. The possible economic advantages of one particular program are currently under investigation, and this test burn is being proposed to allow for further evaluation. Second, biomass is a renewable resource, and utilizing it as a fuel source at Polk Power Station will help support the Company's commitment to the use of renewable energy sources. Given the variability of fuel pricing, biomass may be less expensive than coal and may reduce the cost of electricity to our customers. Approval of the facility Designated Representative will be provided (see Attachment E for details).

TEC appreciates the Department's cooperation and consideration in this matter. If you need any additional information or clarification on any of the issues presented above, please do not hesitate to contact Raiza Calderon or me at (813) 641- 5261.

Sincerely,

for

Laura R. Crouch
Manager- Air Programs
Environmental, Health & Safety

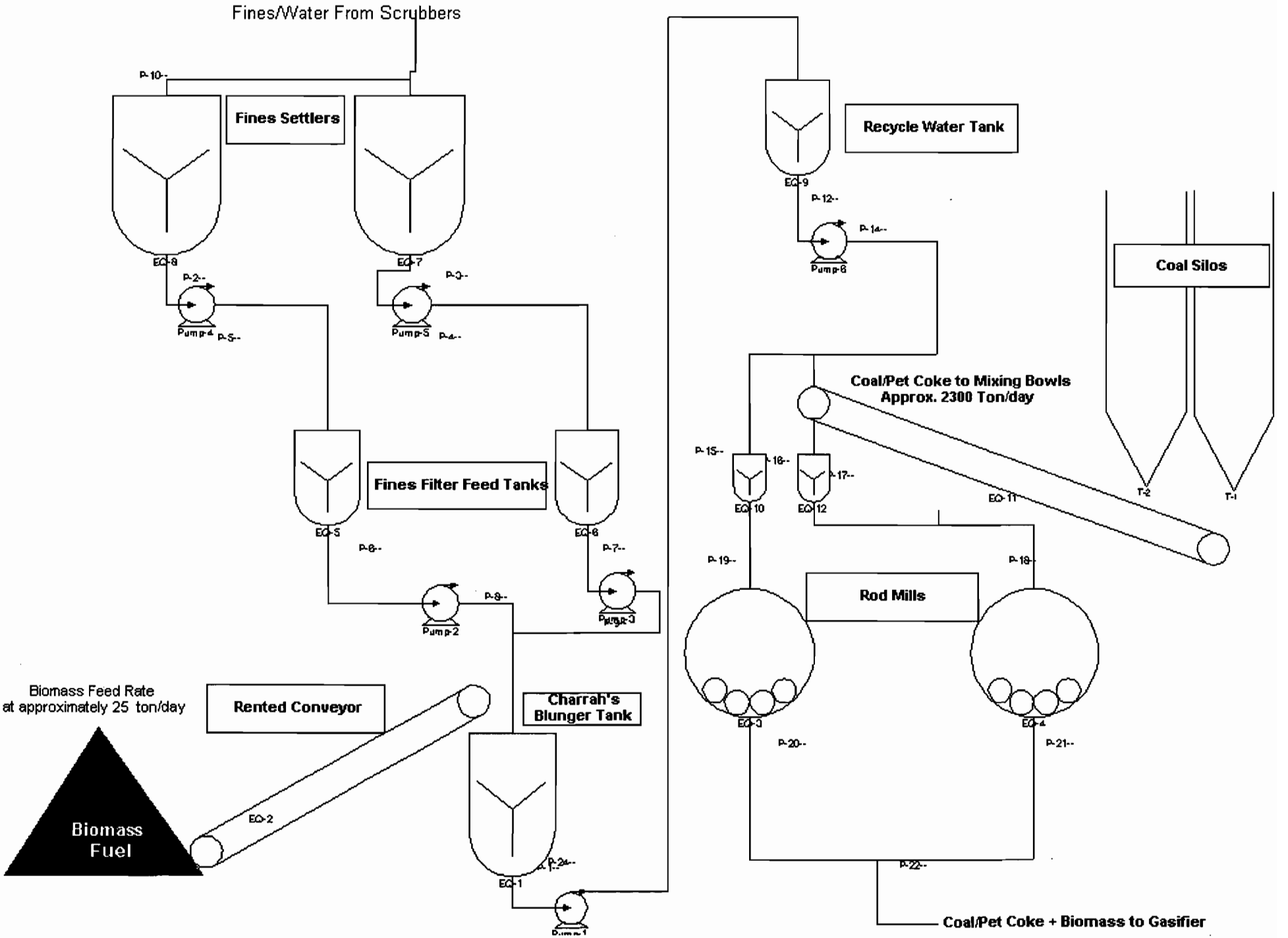
EA/bmr/RC166

c/enc: Mr. Scott Sheplak, FDEP

Enclosure

Attachment A
Polk Power Station Unit 1
Biomass Process Flow Diagram

Polk Power Station Unit 1
Bahia Grass Biomass Burn Test
Process Flow Diagram



Attachment B
Polk Power Station Unit 1
Biomass Representative Analysis

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. David Bransby
Dept. of Agronomy & Soils
202 Funchess Hall Auburn Univ.
36849
Description : Auburn Univ./Agronomy & Soils

Customer Account :
Sample Date : 21-May-03

Laboratory Account BRANSBY
Received Date :

Florida Bahia
Laboratory ID Number : AH20530

Test Name	Reference	Result	
Dry Basis			
Ash, Dry	ASTM D 5142	5.61	% By Weight
Heat of Combustion, Dry	ASTM D 5865	7934	Btu/lb
Carbon Fixed, Dry	ASTM D 3172	18.67	% By Weight
Volatiles, Dry Basis	ASTM D 5142	75.72	% By Weight
Sulfur, Dry Basis	ASTM D 4239	0.14	% By Weight
As Received			
Moisture, Total	ASTM D 2013	21.24	% By Weight
Ash, As Received	ASTM D 5142	4.42	% By Weight
Heat of Combustion, As Received	ASTM D 5865	6249	Btu/lb
Carbon Fixed, As Received	ASTM D 3172	14.70	% By Weight
Volatiles, As Received	ASTM D 5142	59.64	% By Weight
Sulfur, As Received	ASTM D 4239	0.11	% By Weight
Ignited as Element			
Aluminum, Ignited Basis	ASTM D 3682	0.77	% By Weight
Calcium, Ignited Basis	ASTM D 3682	6.91	% By Weight
Barium, Ignited Basis	ASTM D 3683	42.	mg/kg
Iron, Ignited Basis	ASTM D 3682	0.22	% By Weight
Magnesium, Ignited Basis	ASTM D 3682	3.50	% By Weight
Phosphorus, Ignited Basis	ASTM D 3682	2.05	% By Weight
Potassium, Ignited Basis	ASTM D 3682	5.36	% By Weight
Silicon, Ignited Basis	ASTM D 3682	29.34	% By Weight
Sodium, Ignited Basis	ASTM D 3682	0.38	% By Weight
Sulfur, Ignited Basis	ASTM D 5016	1.30	% By Weight

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date :
7/30/2003
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. David Bransby
Dept. of Agronomy & Soils
202 Funchess Hall Auburn Univ.
36849
Description : Auburn Univ./Agronomy & Soils

Customer Account :
Sample Date : 21-May-03

Laboratory Account BRANSBY
Received Date :

Florida Bahia
Laboratory ID Number : AH20530

Test Name	Reference	Result	
Titanium, Ignited Basis	ASTM D 3682	0.12	% By Weight
Ignited as Oxide			
Aluminum Oxide, Ignited	ASTM D 3682	1.45	% By Weight
Calcium Oxide, Ignited	ASTM D 3682	9.67	% By Weight
Iron Oxide, Ignited	ASTM D 3682	0.31	% By Weight
Magnesium Oxide, Ignited	ASTM D 3682	5.80	% By Weight
Phosphorus Pentoxide, Ignited	ASTM D 3682	4.70	% By Weight
Potassium Oxide, Ignited	ASTM D 3682	6.46	% By Weight
Silicon Dioxide, Ignited	ASTM D 3682	62.77	% By Weight
Sodium Oxide, Ignited	ASTM D 3682	0.51	% By Weight
Sulfur Trioxide, Ignited	ASTM D 5016	3.25	% By Weight
Titanium Oxide, Ignited	ASTM D 3682	0.20	% By Weight
Barium Oxide, Ignited	ASTM D 3683	46.9	mg/kg
General			
Heat of Combustion, MAF	ASTM D 5865	8406	Btu/lb
Sulfur, lbs/mmBTU	ASTM D 3180	0.176	lbs/mmBTU
Initial Ash Fusion Temp, Red. At	ASTM D 1857	2080	Deg F
Softening Ash Fusion Temp, Red	ASTM D 1857	2268	Deg F
Hemispherical Ash Fusion,Reducin	ASTM D 1857	2310	Deg F
Fluid Ash Fusion Temp, Reducing	ASTM D 1857	2338	Deg F

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date :
7/30/2003
Supervision_____

smk/coal

Attachment C
Polk Power Station Unit 1
Biomass Test Protocol

Tampa Electric Company (TEC) proposes to conduct a test burn at Polk Power Station Unit 1 (PPS) to compare the standard fuel blend of up to 60% petcoke and coal by weight to a blend containing up to 5% biomass and 95% of the standard blend.

The baseline test burn will evaluate SO_2 and NO_x emissions as a result of firing syngas produced from the gasification of a petcoke and coal fuel blend consisting of up to 60% petcoke. This baseline test will last for up to seven days to facilitate collection of representative data.

The biomass blend test burn will evaluate the SO_2 and NO_x emissions produced from the gasification of the above mentioned biomass fuel blend. This biomass blend test burn will last for up to 21 days to facilitate collection of representative data. Any residual biomass fuel stock that is on hand after the test burn will be consumed immediately after the test burn is completed.

The SO_2 and NO_x test burn data will be collected and analyzed using the methodologies found in Table 1. Prior to blending, fuel testing will be done on the standard fuel blend and the biomass fuel individually. Continuous emissions monitors (CEMS), located in the combustion turbine stack, will be used to collect representative data for SO_2 and NO_x, emissions during the test burn. CEMS will be quality assured pursuant to 40 CFR 75, Appendix B. The data assessment report from 40 CFR 60, Appendix F, for the most recent relative accuracy test audit (RATA) and most recent cylinder gas audit (CGA), will be submitted with the test burn report.

During these tests, when representative data is collected, PPS Unit 1 will be operated at a minimum of 90% of the maximum permitted heat input. Upon completion of all testing, TEC will compile test results in a report to be submitted to the Florida Department of Environmental Protection within 60 days of completion of the test burn.

Table 1. Summary of data collection and monitoring methodologies to be used during the PPS biomass test burn.

Test	SO_2	NO_x	Fuel Analysis
Baseline Test 7 Days	CEM Data[1]	CEM Data[1]	Weekly composite fuel analysis[2]
Biomass Test 21 Days	CEM Data[1]	CEM Data[1]	Weekly composite fuel analysis[2]

[1]Equivalent CEM data will be used in lieu of stack test data.

[2]Composite weekly fuel analysis results will be supplied during the baseline and test burn. Fuel analyses will include the following:

Fuel Analysis: Sulfur, wt. %,Volatiles, Content, wt. %, Nitrogen, wt. %, Ash, wt. %, Calorific Value, BTU/#, Carbon, wt. %, Moisture, wt. %

Attachment D
Polk Power Station Unit 1
December 2002 Biomass Test Burn Report

Tampa Electric Company

Biomass Test Burn Report

Polk Power Station Unit 1

April 2002

1.0 Introduction

Tampa Electric Company (TEC) conducted a test burn on December 31, 2001 at the Polk Power Station (PPS) Unit 1. The purpose of this test burn was to investigate the effects of gasifying a small portion of biomass as a constituent of the feedstock that is processed to form the synthetic gas (syngas) fired in the combustion turbine (CT). TEC performed this test under the authority of the temporary permit issued by the Florida Department of Environmental Protection (the Department) dated December 21, 2001. The data from this test indicate there is no increase in monitored air emissions (NO_x and SO_2) from PPS Unit 1 as a result of the addition of a small amount of biomass as a constituent of the feedstock for PPS Unit 1. This report constitutes the required Test Burn Report for the biomass test burn. The background for this test including materials and methods used for the test are presented within. Also, the results of the test are presented and discussed.

2.0 Background

PPS Unit 1 uses an Integrated Gasification Combined Cycle Process (IGCC) to convert solid fuels into a syngas that can be fired in a CT. The IGCC process is capable of handling a variety of fuels as feedstock to the gasification process. Currently, PPS Unit 1 is typically fired on a blend of 55% petcoke and 45% coal. Thus, a similar blend was used during the test burn with biomass fuel added to allow for direct comparisons. This biomass test burn fired a fuel blend that consisted of approximately 55% petcoke, 44% coal, and 1% biomass.

The test conducted on December 31, 2001 was conducted:

- To determine if any technical impediments exist to co-firing biomass as a small portion of the feedstock to the gasifier, and
- To characterize the emissions resulting from co-firing biomass.

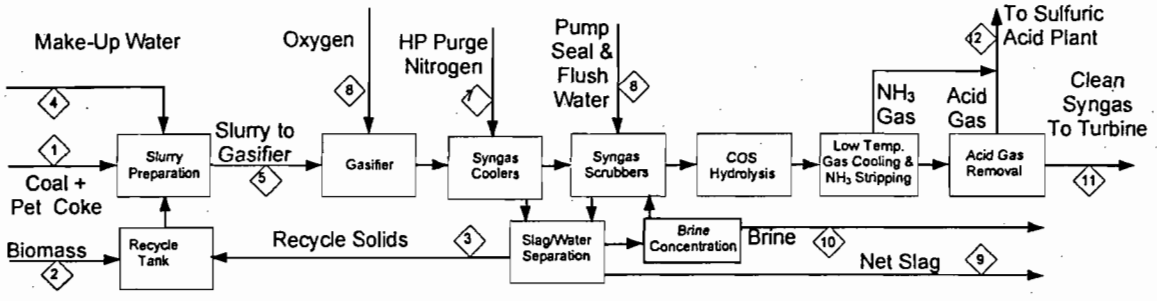
The IGCC process consists of several steps that ultimately result in the production of electrical power (Figure 1). Solid fuel is homogenized and mixed with water to produce slurry. The slurry is then passed to the gasifier that produces a high-pressure combustible gas (synthetic gas or "syngas"). After cooling the syngas, residual material from the gasification process is separated, the slag is rejected and the water and combustible fines are recycled back into the gasifier. Cooled syngas is passed through scrubbers that remove any remaining particulate matter. The syngas then is subjected to a series of steps that remove sulfur and convert the removed sulfur to H_2SO_4. This clean syngas is then fired in a CT that turns an electrical generator. Hot exhaust gasses from the CT are used to create steam that powers a steam turbine that also produces electrical power. This system is an efficient means to produce electrical power on a commercial scale.

2.1 Biomass Fuel Handling

This test used 8.8 tons of coarsely ground eucalyptus as the biomass fuel. Approximately 60 eucalyptus trees were harvested from the Common Purpose, Inc. grove located on land provided by the Tampa Airport Authority. The felled trees were sectioned into 4 foot lengths and passed through a portable hammer mill and trommel screen up to 5 times to produce material fine enough to avoid fouling the pumps and screens of PPS Unit 1's slurry feed system. The biomass fuel was transported to PPS in an enclosed trailer.

Biomass fuel was stored, handled, at processed at PPS. Biomass fuel was staged in a cleaned bin. Approximately 800 pounds of biomass fuel were loaded with a small loader into each of 22 tote sacks. The tote sacks were suspended individually over the recycled fines tank (Figure 1). The biomass fuel was introduced into the process via a stirred recycle tank and mixed with water over a period of 8 ½ hours. The mixed biomass fuel was blended with the normal coal and petcoke mixture to form slurry that was fed to the gasifier.

Figure 1. Block flow diagram of PPS Unit 1 gasifier section showing process stream designations.



2.2 Process Data Collection

Data were collected for key variables throughout IGCC process to allow for analysis of air quality impacts of this test burn. Feedstock analyses were conducted on both the standard petcoke/coal blend and the biomass fuel. Feedstock analyses include elemental, metals, and ash mineral compositions and heating value for each fuel type. Process streams were analyzed for elemental and ash composition, mass flow, and heat content at 12 points in the IGCC process corresponding to the 12 numerical labels shown in Figure 1. An overall mass balance for the gasifier was calculated during the test burn for each of the 12 process points indicated in Figure 1. Stack emissions data were collected for NO_x and SO_2 by the Continuous Emissions Monitoring System (CEMS) and reported at one-hour intervals throughout the test burn. Emissions data were reported in parts per million (ppm) for each pollutant.

2.3 Emissions data comparisons

Emissions data obtained during the test burn were compared to representative emissions data from December 29, 2001. The baseline data from December 29, 2001 were chosen as representative since those data are from the same petcoke/coal feedstock, were obtained immediately prior to the test burn, and Unit 1 was functioning normally and operating under similar conditions as those during the test burn. Larger baseline data sets were examined for possible comparison, but it was found that variability in process parameters such as heat input made statistical comparisons problematic for data that were obtained more than a few days prior to the test burn. For example, for the time period of December 26, 2001 to December 30, 2001 the sample variance for heat input in MMBtu was 12.4 times higher than the sample variance for the period December 29, 2001 to December 30, 2001 ($\sigma^2_{5\text{-day}} = 1639$ compared to $\sigma^2_{1\text{-day}} = 133$). Sample variance increased with time for heat input, power output, and for NO_x and SO_2 emissions levels.

2.4 Statistical Methods for Comparing Emissions Data

Emissions data from the test burn were analyzed and compared to the baseline data using a variety of statistical measures. Emissions data from both the test burn and the baseline periods were evaluated using the same statistical measures. Data from the CEMS were reported as the variables Heat Input (MMBtu), Power Output (MW), SO_2 (lb/MMBtu), SO_2 (ppm), NO_x (lb/MMBtu), NO_x (ppm). The statistics mean(μ), variance(σ^2), kurtosis, skewness, range, and 95% confidence interval were calculated for each variable. The mean and variance were used to compare the test burn emissions data to the baseline emissions data. Kurtosis, skewness, range, and 95% confidence interval were used to evaluate the quality of the emissions data and to make decisions about which comparative methods were appropriate to use in comparing test burn and baseline data. To compare test burn data to baseline data, each set of variables was examined using a two-sample F-test to make inferences about population variances and a two-sample t-test assuming unequal variances to make inferences about population means.

The comparative statistical methods used in this report require that certain assumptions be met before the results of these methods can be considered valid. Comparisons between the means of the test burn data and the baseline data are most useful in determining if there is a change in a process after a treatment is applied.

The statistic that is used to make comparisons between sample means is called a two-sample t-test. A t-test can be used to determine if two populations' means are equal at a given significance level. The significance level for this report is 95% ($\alpha = 0.05$) in all cases. A t-test compares the ratio of the sample means and variances to expected frequency distribution of a normal population at a specified error rate. The two-sample t-test is used to evaluate the hypothesis that two populations' means are equal against the alternative hypothesis that the two populations' means are unequal. The hypothesis of equal means is rejected when the calculated t-statistic is greater than the t-critical value at a given significance level. The validity of the t-test is based on several assumptions.

First, the two samples are independent. In practical terms, the assumption of independence means that the two samples are drawn from two different populations and that the elements of one sample are unrelated to those of the second sample. This assumption is met since the data for the test burn and the baseline emissions were taken by a discrete sampling device at different times with all variables controlled except for biomass used as a feedstock in the test burn.

Second, the two samples are drawn from a normally distributed population. Though the assumption of a normal population distribution is less critical than the assumption of independent samples it is still important to verify that the assumption is met. Since each data point collected by the CEMS is actually a discrete point sample of a continuously variable exhaust stream the potential sample population is quite large. For modest-sized samples (combined sample size ≥ 30) drawn from a large population the distribution approaches normal even with modest skewness in the two populations. The tendency of a relative frequency histogram to approach normal when samples are repeatedly drawn from a large population is called the Central Limit Theorem. Since the combined sample size of the test burn and baseline data is 28, it is prudent to verify that the Central Limit Theorem applies by calculating the skewness and kurtosis for each variable in each data set. Skewness is a measure of the central tendency of a frequency distribution that relates to the symmetry of the peak in relation to the mean, mode, and median of the distribution. Normal distributions have a skewness of 0. Kurtosis is a measure of the size of the tails of a frequency distribution. Normal distributions have a kurtosis of 0. If the sample's frequency distribution does not approximate normality, then the non-parametricWilcoxon rank rum statistic can be used to compare population means. The Wilcoxon rank sum test is not as likely to declare a difference in population means when it exists as is a t-test since the Wilcoxon rank sum is based on relative magnitudes rather than the magnitudes of the observations.

Third, variances are assumed to be equal. Since the t-test pools sample variances when computing the test statistic, unequal variances can have an effect on the nominal significance and confidence probabilities of the statistical test, especially when sample sizes are different. However, a computationally more difficult version of the t-test that allows for the use of separate variances for each sample can be used when variances are not equal.

A statistical test for comparing two population variances is the F-test. The F-test is used to check the validity of the equal variance assumption for a two-sample t-test. The F-test compares the ratio of the sample variances to an expected population variance frequency distribution that is defined by the degrees of freedom associated with the samples. The F-test can be used to test the hypothesis that two sample variances are equal against the alternative hypothesis that two sample variances are not equal. The hypothesis of equal sample variances is rejected when the calculated F-statistic exceeds the F-critical value of the frequency distribution that is defined by the degrees of freedom for the two samples.

3.0 Results and Discussion

Biomass fuel comprised approximately 1.2% of PPS Unit 1's fuel during the 8-½ hour test burn. Biomass fuel generated approximately 860 kW of electrical power during the test burn. The addition of biomass into the feedstock tended cause a decrease in the heat content of the feedstock due to biomass' elemental composition relative to the composition of the base fuel. Emissions from Unit 1 did not increase with respect to baseline

during the test burn. There were no major technical impediments to the introduction of biomass into the feedstock of Unit 1. Logs of the biomass feed rate and certified truck scale tickets of the biomass delivery were maintained, and are provided in Appendix A.

3.1 Process

Biomass was introduced to the gasifier at a rate of 1,945 lb/hr. The biomass feed rate was approximately 1.2% of the base fuel feed rate of 164,840 lb/hr. The biomass fuel accounted for approximately 860 kW of electrical power out of a total of 220.5 MW generated during the test burn based on relative heating value and feed rates of the biomass fuel and the base fuel. Process results are summarized in Table 1. Plant performance from the operators' standpoint was indistinguishable from the normal petcoke/coal feedstock. Heat input to the CT during the test burn was on average 1667 ± 9.5 MMBtu compared to the heat input during the baseline period of 1681 ± 11.5 MMBtu, which were obtained from CEM data. (Note: The actual LHV to the CT during the test was 1473 mmbtu/hr, and HHV was 1583 mmbtu/hr. The CEMS reported HHV to the CT has a large error and this is why it should not be used.) Average CT power output was steady at 167.6 ± 0.1 MW during the test burn compared to 167.5 ± 0.08 MW during the baseline period.

Table 1. General process parameters for biomass and base fuels during the biomass test burn.

Parameter	Base Fuel	Biomass Fuel	Total or Weighted Average	
Feed Rate (lb/hr)	164,840	1,945	166,786	Total
Moisture Content (Wt%)	7.82%	46.8%	8.27%	Avg
Higher Heating Value (Btu/lb)	13,322	4,424	13,218	Avg
Higher Heating Value (MMBtu/hr)	2,196	8.6	2,205	Avg
Net Power Production (kW)	219,640	860	220,500	Total

3.2 Mass Balance

The overall mass balance for the gasification process was estimated at 12 different process points. The mass balance is presented in Table 2 and the stream numbers correspond to the numerical labels in Figure 1. Process streams 1-2 and 4-8 are feed streams and have a total flow rate of 381 thousand pounds per hour (KPPH). Process streams 9-12 are output streams and have a total flow rate of 381 KPPH. Process streams 3 and 5 are key internal streams and have flow rates of 81and 264 KPPH, respectively.

Table 2. Overall mass balance for PPS Unit 1 gasifier section during biomass test burn. Units are in thousand pounds per hour (KPPH). Stream number corresponds to numerical labels in Figure 1.

Input (Feed) Streams		
Stream Number	Stream Description	Flow (KPPH)
1	Coal / Petroleum Coke Blend	164.84
2	Biomass	1.95
4	Make-Up Water To Slurry	16.5
6	Oxygen To Gasifier	166.94
7	High Pressure Purge/Sootblowing N_2	11.07
8	Pump Seal/Instrument Flush Water	19.49
TOTAL SYSTEM INPUT		380.79

Product (Output) Streams		
Stream Number	Stream Description	Flow (KPPH)
9	Slag	17.36
10	Brine	0.02
11	Clean Syngas To Combustion Turbine	337.78
12	Acid and NH_3 Gas To Sulfuric Acid Plant	25.62
TOTAL SYSTEM OUTPUT STREAMS		380.78

Key Internal Streams		
5	Slurry To Gasifier	264.4
3	Recycle Solids To Slurry Preparation	81.12

3.3 Process Stream Flows and Compositions

Each of the 12 process streams identified by numerical labels in Figure 1 was analyzed for composition and mass flows (Tables 3 and 4). Table 3 presents the stream flows and compositions for the slurry preparation area (streams 1-5). Table 3 also presents the heat content of streams 1-3 and 5. Calculated and analytically derived vales for all parameters of stream 1 (base fuel) are presented in Table 3 for comparison purposes. Calculated and laboratory analytical values agree within the sampling and analytical accuracy range of the measurements. The addition of the biomass fuel to the base fuel resulted in a net decrease in composition (as a dry weight %) for all constituents except oxygen which increased by 0.25% and ash which increased by 0.01% over the calculated base fuel composition. Table 4 presents the flows and compositions for the gasification system (streams 3 and 5-12). Table 4 presents the compositional analysis of the clean syngas (stream 11) and residual materials from the gasification process (streams 9 and 3) as requested by the Department.

Table 3. Slurry preparation area stream flows and compositions during test burn. KPPH = thousand pounds per hour, AR = as received.

	Stream Number	1	1	2		3	4	5
	Units	COKE + COAL (Lab)	COKE + COAL (Calculated)	BIOMASS	COMBINED FRESH FUELS	RECYCLE SOLIDS	MAKE-UP WATER	SLURRY TO GASIFIER
COMPOSITION								
C	Wt % Dry	82.88	82.24	49.18	82.02	66.26		80.68
H	"	4.5	4.71	5.78	4.71	0.29		4.34
N	"	1.85	1.83	0.24	1.81	0.95		1.74
S	"	2.99	3.15	0.06	3.13	2.31		3.06
O	"	3.53	3.67	39.42	3.92	0		3.58
ASH	"	4.25	4.4	5.32	4.41	30.19		6.6
TOTAL	"	100	100	100	100	100		100
SUBTOTAL FLOW	KPPH DRY	151.95	151.95	1.035	152.985	14.196		167.181
H2O	Wt % AR	7.82	7.82	46.8	8.27	82.5		36.77
H2O	KPPH	12.891	12.891	0.91	13.801	66.924	16.496	97.22
TOTAL FLOW	KPPH AR	164.841	164.841	1.945	166.786	81.12		264.401
MASS FLOW								
C	Dry Lb/Hr	125936	124962	509	125471	9406		134877
H	"	6838	7150	60	7210	41		7251
N	"	2811	2774	2	2777	135		2911
S	"	4543	4791	1	4791	328		5119
O	"	5364	5582	408	5990	0		5990
ASH	"	6458	6691	55	6746	4286		11031
Ar	"	0	0	0	0	0		0
SUBTOTAL-Dry Solids	"	151950	151950	1035	152985	14196		167181
WATER / MOISTURE	lb/hr	12891	12891	910	13801	66924	16496	97220
TOTAL	"	164841	164841	1945	166786	81120		264401
HEAT CONTENT								
Calculated HHV	BTU/Lb (Dry)	14491	14511	8419	14470	9698		14065
Measured HHV	BTU/Lb (Dry)	14435		8213		9811		13990
Balance HHV	BTU/Lb (Dry)	14452	14452	8315	14411	9701		14011
Balance HHV	BTU/Lb (AR)	13322	13322	4424	13218	1698		
Balance HHV	MMBTU/Hr	2196	2196	8.6	2205	138		2342

Table 4. Gasification system stream flows and compositions during test burn. KPPH = thousand pounds per hour.

		GASIFICATION SYSTEM INPUTS					GASIFICATION SYSTEM OUTPUTS					
STREAM NUMBER		5	6	7	8		9	3	10	11	12	
GAS STREAMS	UNITS	SLURRY TO GASIFIER	OXYGEN	HP PURGE NITROGEN	SEAL & FLUSH WATER	TOTAL SYSTEM INPUT	SLAG	RECYCLE SOLIDS	BRINE (NH_4Cl)	CLEAN SYNGAS	ACID GASES	TOTAL SYSTEM OUTPUT
CO	VOL %		0	0						44.72	2.06	
H2	VOL %		0	0						36.02	0.52	
CH4	VOL %		0	0						0.02	0.02	
CO2	VOL %		0	0						15.01	66.42	
N2	VOL %		1.08	99.99						3.33	0	
Ar	VOL %		2.01	0						0.65	0	
H2O	VOL %		0	0						0.21	5.26	
H2S	VOL %		0	0						0.01	21.02	
COS	VOL %		0	0						0.01	0.06	
NH3	VOL %		0	0						0	4.62	
O2	VOL %		96.9	0.01						0	0.01	
TOTAL	VOL %		100	100						100	100	
MOLECULAR WT	LB/MOLE		32.12	28.02						21.1	38.76	
FLOW	KSCFH		1972.6	149.9						6075.5	250.9	
SOLID AND LIQUID STREAMS												
C	WT %	80.68					42.37	66.26				
H	WT %	4.34					0.31	0.29	7.49			
N	WT %	1.74					0.44	0.95	26.22			
S	WT %	3.06					1.47	2.31				
O	WT %	3.58					0	0				
ASH	WT %	6.6					55.41	30.19	66.29			
TOTAL	WT %	100					100	100	100			
DRY FLOW	KPPH	167.181					12.149	14.196	0.021			
H2O	WT %	36.77					30	82.5				
H2O FLOW	KPPH	97.22			19.489		5.207	66.924				
TOTAL FLOW	KPPH	264.401					17.356	81.12				
ELEMENTAL FLOWS / BALANCE:												
C	LB/HR	134877	0	0		134877	5148	9406		114880	5443	134877
H	LB/HR	18130	0	0	2181	20311	620	7530	2	11709	450	20311
N	LB/HR	2911	1580	11066		15558	53	135	6	14936	428	15558
S	LB/HR	5119	0	0		5119	179	328		144	4469	5119
O	LB/HR	92331	161177	1	17308	270817	4624	59435		191926	14832	270817
ASH	LB/HR	11031	0	0		11031	6732	4286	14	0	0	11031
Ar	LB/HR	0	4184	0		4184				4184	0	4184
TOTAL	LB/HR	264401	166941	11067	19489	461898	17356	81120	21	337779	25623	461898

3.4 Feedstock Analysis

A complete feedstock laboratory analysis is presented in Table 5. Both the base fuel and the biomass fuel were analyzed for elemental composition, ash composition, metal, and heat content. Compared to the base fuel, biomass fuel has greater moisture content, ash, hydrogen, oxygen, and some metals. Compared to the base fuel, biomass fuel has lesser carbon, nitrogen, and sulfur content. The difference in elemental composition results in a much lesser heat content for biomass fuel then for the base fuel (biomass fuel heat content was 56.8% of the heat content of the base fuel) and accounts for the dilution effect observed when the fuels are blended.

Table 5. Feed stock analysis of fuels used during test burn.

	Fuel	Coal/Coke Blend	Biomass
	Units		
Total Moisture	Wt %	7.82	46.8
Ultimate Analysis			
Ash	Wt % (Dry Basis)	4.25	5.32
C	Wt % (Dry Basis)	82.88	49.18
H	Wt % (Dry Basis)	4.5	5.78
N	Wt % (Dry Basis)	1.85	0.24
S	Wt % (Dry Basis)	2.99	0.06
O	Wt % (Dry Basis)	3.53	39.42
Heating Value			
Measured HHV	BTU/Lb (Dry Basis)	14435	8213
Calculated HHV	BTU/Lb (Dry Basis)	14490	8419
Miscellaneous			
T_{250}	Deg F	2560	2188
Chlorine	Wt % (Dry Basis in Coal)	0.02	0.07
Fluorine	Wt % (Dry Basis in Coal)	<0.01	34
Chromium	PPM (Wt) In Ash	136	85.9
Vanadium	Wt % In Ash	2.286	0.63
Nickel	ug/g dry coal	166	1300
Arsenic	ug/g dry coal	2.1	35.3
Mercury	ug/g dry coal	0.03	0.02
Lead	ug/g dry coal	2.6	116
Beryllium	ug/g dry coal	1.3	9.2
Ash Minerals			
CrO	Wt % In Ash	0.02	0.01
V_2O_5	Wt % In Ash	4.08	1.12
NiO	Wt % In Ash	0.50	0.17
As_2O_3	Wt % In Ash	0.0065	0.0050
Hg	Wt % In Ash	0.000071	0.000002
PbO	Wt % In Ash	0.0066	0.0120
BeO	Wt % In Ash	0.0085	0.0030
SiO_2	Wt % In Ash	49.21	40.70
Al_2O_3	Wt % In Ash	20.52	4.98
TiO_2	Wt % In Ash	0.93	0.29
Fe_2O_3	Wt % In Ash	12.89	6.12
CaO	Wt % In Ash	3.34	22.31
MgO	Wt % In Ash	1.91	1.85
Na_2O	Wt % In Ash	0.57	1.41
K_2O	Wt % In Ash	2.04	3.64
P_2O_5	Wt % In Ash	0.16	1.44
SO_3	Wt % In Ash	3.4	3.67
Sum of Determined Minerals	Wt % In Ash	99.07	87.73
Undetermined Ash Minerals	Wt % In Ash	0.93	12.27

3.5 Emissions

A statistical analysis was performed comparing the mean NO_x and SO_2 emissions from the test burn to baseline emissions obtained immediately prior to the test burn. NO_x and SO_2 emissions were analyzed for both baseline and test burn periods on a volumetric (ppm) and mass flow (lb/hr) basis. The statistical analyses consisted of calculating descriptive statistics and making pair-wise comparisons of each pollutant's variance and mean for the baseline data and the test burn data. The results of the analyses conducted using volumetric data were consistent with the results obtained using mass data.

NO_x and SO_2 emissions during the test burn were found to be slightly lower than NO_x and SO_2 emissions during the baseline period. Figures 2 and 3 show graphs of test burn emissions compared to baseline emissions for NO_x and SO_2, respectively. Tables 6 and 7 present the summary results of the statistical analyses for the test burn and baseline emissions data for NO_x and SO_2, respectively. The results presented are in volumetric units (ppm), but identical relationships and statistical conclusions are obtained using mass flow units (lb/hr). Table 8 summarizes the statistics for NO_x and SO_2 emissions for the baseline and test burn periods in both volumetric and mass- flow units, for comparison.

Figure 2. NO_x emissions (ppm) from PPS Unit 1 during baseline and test burn periods.

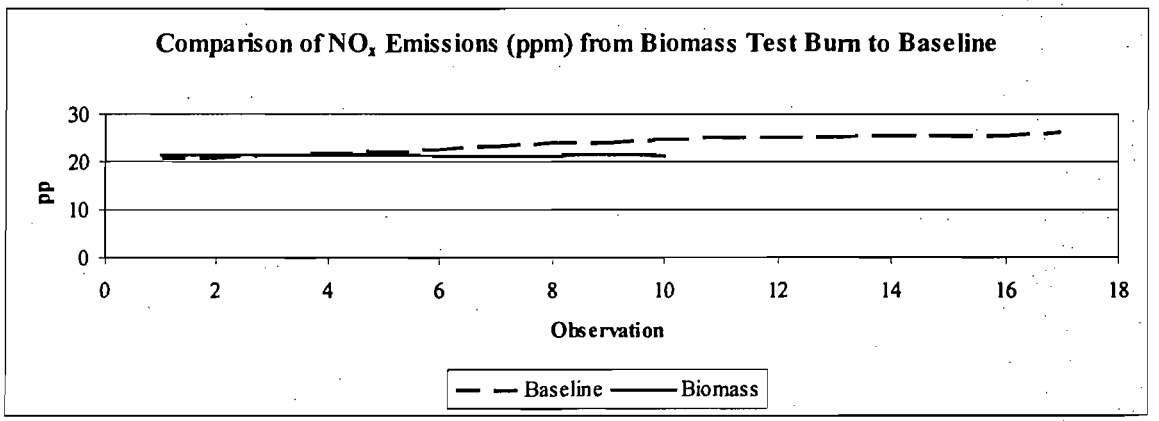
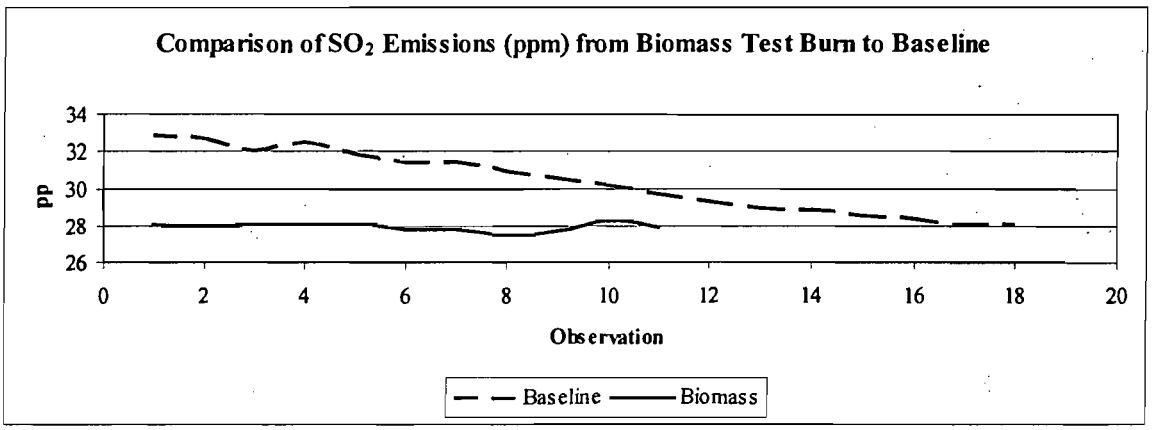


Figure 3. SO_2 emissions (ppm) from PPS Unit 1 during baseline and test burn periods.



Populations' mean and variance frequency distributions as measured by skewness and kurtosis approximated a normal distribution for both NO_x and SO_2 when the sizes of the data sets were considered. Two sample t-tests, assuming unequal variances, were used to test if the mean values for NO_x and SO_2 emissions were equal between the test burn and baseline emissions data. This was done because the F-tests rejected the hypothesis that the variances were equal between the test burn and the baseline emissions for

both NO_x and SO_2. The two sample t-tests results indicate that the observed differences in means are not due to chance at the 95% confidence level.

Table 6. Statistical analysis comparing variances and means of baseline and test burn data for NO_x emissions (ppm).

Parameter	Baseline	Biomass
Mean (ppm)	23.44	21.25
Variance	3.89	0.06
Observations	18	11
Hypothesized Difference in Variance or Mean	0	
df F-test (t-test)	17 (18)	10
F_{calc}	66.41	
Probability that calculated F is less than or equal to F_{crit}	5.02E-08	
F_{Crit}	2.81	
t_{calc}	4.64	
Probability that calculated t_{calc} is less than or equal to t_{crit}	2.03E-04	
t_{crit}	2.10	

Conclusion: Reject hypothesis that Variances or Means are equal.

Table 7. Statistical analysis comparing variances and means of baseline and test burn data for SO_2 emissions (ppm).

Parameter	Baseline	Biomass
Mean (ppm)	30.36	27.95
Variance	2.73	0.05
Observations	18	11
Hypothesized Difference in Variance or Mean	0	
df F-test (t-test)	17 (18)	10
F_{calc}	51.99	
Probability that calculated F is less than or equal to F_{crit}	1.66E-07	
F_{Crit}	2.81	
t_{calc}	6.11	
Probability that calculated t_{calc} is less than or equal to t_{crit}	9.00E-06	
t_{crit}	2.10	

Conclusion: Reject hypothesis that Variances or Means are equal.

Table 8. Comparison of baseline and test burn emissions in volumetric and mass flow units.

	NO_x				SO_2			
	ppm		lb/hr		ppm		lb/hr	
Parameter	Baseline	Test	Baseline	Test	Baseline	Test	Baseline	Test
Mean	23.4	21.3	134.1	123.2	30.4	27.9	241.6	225.1
Number of Observations	18	11	18	11	18	11	18	11
Standard Deviation	1.97	0.24	11.35	2.2	1.7	0.2	13.1	2.5
Range	6	0.7	32.8	7.1	4.8	0.8	40.9	8.3
Minimum	19.9	20.8	114.75	119.1	28.1	27.5	221.9	221.3
Maximum	25.9	21.5	147.6	126.2	32.9	28.3	262.8	229.6
95% Confidence Interval	22.4 - 24.4	21.1 - 21.5	128.5 - 139.8	121.7 - 124.7	29.6 - 31.2	27.7 - 28.1	235.1 - 248.1	223.4 - 226.8

4.0 Conclusion

The test burn data indicates that the gasification of biomass is technically feasible and will not adversely impact emissions from PPS Unit 1. PPS requests the flexibility to gasify non- treated biomass. TEC understands that an air construction permit application is be required to accommodate the changes necessary to handle the biomass fuel. TEC appreciates the Department's attention to this process.

Appendix A
Biomass Logs

DELIVERY TICKET

№ 100451

DATE: 12-30-01 DRIVER: Ernest Powell

PRODUCT: SAW DUST TRUCK NUMBER: 115

AMOUNT: ____ YDS. OR ____ TONS ENDING HUB: BEGINNING HUB:

GROSS WT: 25.89 LBS. TN MILEAGE:
TARE WT: 17.08 LBS. TN
NET WT: _____ LBS.

DELIVER TO: Teco Power Plant

DIRECTIONS: Mulberry 37 south

Received MB

RECEIVED BY: _____ COMPANY: Wherry Trucking Line

Nutri-Source, Inc.

1212 Mt. Vernon Street
Orlando, Florida 32803-5418

Any questions regarding deliveries, contact:

MIKE LITVANY

(407) 876-1130
Telephone & Fax

(407) 257-2165
Mobile/Voice Mail

(800) 871-7773
Toll Free

4:46PM 12-30-2001

LOOP ID 02
PRODUCT 02

INBOUND 25.89 TN

POLK POWER STATION

9995 SR37 SOUTH

MULBERRY FL 33860

MT WEST

5:46PM 12-30-2001

TICKET NUMBER 2

LOOP ID 02
PRODUCT 02

17.08 TN GROSS

POLK POWER STATION

9995 SR37 SOUTH

MULBERRY FL 33860

MT WEST

25.89 t
17.08 t
8.81 t

12/31/01

BIOMASS TEST

780 LB TOTES - DUMP TIMES

WOOD DUMP TIMES

	START	DONE
1	0713	0720
2	0725	0731
3	0735	0743
4	0828	0832
5	0850	0855
6	0915	0924
7	0942	0951
8	1005	1009
9	1033	1037
10	1055	1058
11	11:23	11:28
12	1145	1148
13	1210	1218
14	1235	1239
15	100	108
16	125	131
17	150	155
18	215	220
19	240	242
20	305	310
21	340	350

Appendix B
Test Burn Slag Analysis

SEVERN TRENT SERVICES
STL Tampa West
6712 Benjamin Road • Suite 100 • Tampa, FL 33634 • Tel: 813 885 7427 • Fax: 813 885 7049 • www.stl-inc.com

LOG NO: B2-10196
Received: 16 JAN 02
Reported: 31 JAN 02

Mr. Robert Dorey
Tampa Electric Company
5010 Causeway Blvd.
Tampa, FL 33619

Project: PK-MW
Sampled By: Client
Code: 105220131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
10196-5	SPECL-PK	12-31-01/15:00

PARAMETER	10196-5
Aluminum (SPLP) (SPLP), mg/l	<0.20
Prep Date	01.21.02
Analysis Date	01.22.02
Antimony (SPLP), mg/l	0.047
Prep Date	01.21.02
Analysis Date	01.22.02
Arsenic (SPLP) (6010), mg/l	0.18
Prep Date	01.21.02
Analysis Date	01.22.02
Barium (SPLP), mg/l	0.10
Prep Date	01.21.02
Analysis Date	01.22.02
Beryllium (SPLP), mg/l	<0.040*F65
Prep Date	01.21.02
Analysis Date	01.23.01
Boron (SPLP) (6010), mg/l	0.13
Prep Date	01.28.02
Analysis Date	01.30.02
Vanadium (SPLP) (6010B), mg/l	9.1
Prep Date	01.21.02
Analysis Date	01.22.02

SEVERN TRENT SERVICES

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STL Tampa West

LOG NO: B2-10196
Received: 16 JAN 02
Reported: 31 JAN 02

Mr. Robert Dorey
Tampa Electric Company
5010 Causeway Blvd.
Tampa, FL 33619

Project: PK-MW
Sampled By: Client
Code: 105220131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
10196-5	SPECL-PK	12-31-01/15:00

PARAMETER	10196-5
Cadmium (SPLP), mg/l	<0.0050
Prep Date	01.21.02
Analysis Date	01.22.02
Chromium (SPLP), mg/l	<0.010
Prep Date	01.21.02
Analysis Date	01.22.02
Copper (SPLP), mg/l	<0.020
Prep Date	01.21.02
Analysis Date	01.22.02
Iron (SPLP), mg/l	<0.050
Prep Date	01.21.02
Analysis Date	01.22.02
Zinc (SPLP), mg/l	0.030
Prep Date	01.21.02
Analysis Date	01.22.02
Lead (SPLP) (6010), mg/l	<0.0050
Prep Date	01.21.02
Analysis Date	01.22.02
Magnesium (SPLP) (6010), mg/l	<0.50
Prep Date	01.21.02
Analysis Date	01.22.02

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
10196-5	SPECL-PK	12-31-01/15:00

PARAMETER	10196-5
Manganese (SPLP) (6010), mg/l	<0.010
Prep Date	01.21.02
Analysis Date	01.22.02
Mercury (SPLP), mg/l	<0.00020
Prep Date	01.23.02
Analysis Date	01.24.02
Molybdenum (SPLP) (6010), mg/l	0.23
Prep Date	01.21.02
Analysis Date	01.22.02
Nickel (SPLP), mg/l	<0.040
Prep Date	01.21.02
Analysis Date	01.22.02
Selenium (SPLP), mg/l	0.085
Prep Date	01.21.02
Analysis Date	01.22.02
Silver (SPLP), mg/l	<0.10*F65
Prep Date	01.21.02
Analysis Date	01.23.02
Sodium (SPLP) (6010), mg/l	0.65
Prep Date	01.21.02
Analysis Date	01.22.02

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Sampled By: Client
Code: 105220131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
10196-5	SPECL-PK	12-31-01/15:00

PARAMETER	10196-5
Strontium (SPLP) (6010), mg/l	0.011
Prep Date	01.28.02
Analysis Date	01.30.02
Thallium (SPLP) (6010), mg/l	<0.010
Prep Date	01.21.02
Analysis Date	01.22.02

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Sampled By: Client
Code: 105220131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	DATE/ TIME SAMPLED
10196-6	SPECL-PK SPLP	12-31-01/15:00

PARAMETER	10196-6
Chloride (4500-Cl C), mg/l	<1.0
Analysis Date	01.23.02
Fluoride (340.2), mg/l	1.1
Analysis Date	01.22.02
Sulfate as SO4 (375.4), mg/l	12
Analysis Date	01.21.02

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Project: PK-MW
Sampled By: Client
Code: 105220131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
10196-8	Method Blank	
10196-9	Accuracy (%Rec)	
10196-10	Precision (%RPD)	
10196-11	Analyst Initials	

PARAMETER	10196-8	10196-9	10196-10	10196-11
Color (110.2)	<5	100 %	0 %	TS
Analysis Date	01.17.02	01.17.02	---	---
Polynuclear Aromatics (610)				
Naphthalene, ug/l	<10	82 %	21 %	JLB
2-Methylnaphthalene, ug/l	<10	---	---	---
1-Methylnaphthalene, ug/l	<10	---	---	---
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.27.02	01.27.02	---	---
Purgeable Aromatics (602)				
Benzene, ug/l	<1.0	98 %	4.1 %	JFB
Chlorobenzene, ug/l	<1.0	84 %	6.0 %	JFB
1,2-Dichlorobenzene, ug/l	<1.0	---	---	JFB
1,3-Dichlorobenzene, ug/l	<1.0	---	---	JFB
1,4-Dichlorobenzene, ug/l	<1.0	---	---	JFB
Ethylbenzene, ug/l	<1.0	---	---	JFB
Toluene, ug/l	<1.0	91 %	5.5 %	JFB
Xylenes, ug/l	<1.0	---	---	JFB
Methyl Tert Butyl Ether (MTBE), ug/l	<10	---	---	JFB
Analysis Date	01.24.02	01.24.02	---	---
Biochemical Oxygen Demand carbonaceous BOD-5 (SM5210B), mg/l	<2.0	97 %	10 %	EM
Analysis Date	01.16.02	01.16.02	---	---

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Tampa, FL 33619

Project: PK-MW
Sampled By: Client
Code: 140820131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
10196-12	Method Blank	
10196-13	Accuracy (%Rec)	
10196-14	Precision (%RPD)	
10196-15	Analyst Initials	

PARAMETER	10196-12	10196-13	10196-14	10196-15
Aluminum (SPLP) (SPLP), mg/l	<0.20	114 %	0.32 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Antimony (SPLP), mg/l	<0.0060	103 %	0.11 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Arsenic (SPLP) (6010), mg/l	<0.010	102 %	1.0 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Barium (SPLP), mg/l	<0.010	82 %	0.44 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Beryllium (SPLP), mg/l	<0.0040	103 %	0.53 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Boron (SPLP) (6010), mg/l	<0.050	124 %	2.4 %	BJB
Prep Date	01.28.02	01.28.02	---	---
Analysis Date	01.30.02	01.30.02	---	---

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Sampled By: Client
Code: 140820131

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
10196-12	Method Blank	
10196-13	Accuracy (%Rec)	
10196-14	Precision (%RPD)	
10196-15	Analyst Initials	

PARAMETER	10196-12	10196-13	10196-14	10196-15
Vanadium (SPLP) (6010B), mg/l	<0.010	104 %	0.21 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Cadmium (SPLP), mg/l	<0.0050	101 %	0.34 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Chromium (SPLP), mg/l	<0.010	106 %	0.34 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Copper (SPLP), mg/l	<0.020	106 %	0.76 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Iron (SPLP), mg/l	<0.050	111 %	0.89 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Zinc (SPLP), mg/l	<0.020	98 %	0.35 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
10196-12	Method Blank	
10196-13	Accuracy (%Rec)	
10196-14	Precision (%RPD)	
10196-15	Analyst Initials	

PARAMETER	10196-12	10196-13	10196-14	10196-15
Lead (SPLP) (6010), mg/l	<0.0050	101 %	0.46 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Magnesium (SPLP) (6010), mg/l	<0.50	103 %	1.8 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Manganese (SPLP) (6010), mg/l	<0.010	103 %	0.10 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Mercury (SPLP), mg/l	<0.00020	103 %	1.9 %	MEW
Prep Date	01.23.02	01.23.02	---	---
Analysis Date	01.24.02	01.24.02	---	---
Molybdenum (SPLP) (6010), mg/l	<0.010	102 %	0.060 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Nickel (SPLP), mg/l	<0.040	105 %	0.070 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
10196-12	Method Blank	
10196-13	Accuracy (%Rec)	
10196-14	Precision (%RPD)	
10196-15	Analyst Initials	

PARAMETER	10196-12	10196-13	10196-14	10196-15
Selenium (SPLP), mg/l	<0.010	101 %	0.35 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Silver (SPLP), mg/l	<0.010	110 %	0.29 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Sodium (SPLP) (6010), mg/l	<0.50	102 %	1.5 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Strontium (SPLP) (6010), mg/l	<0.010	108 %	1.9 %	BJB
Prep Date	01.28.02	01.28.02	---	---
Analysis Date	01.30.02	01.30.02	---	---
Thallium (SPLP) (6010), mg/l	<0.010	103 %	1.2 %	LP
Prep Date	01.21.02	01.21.02	---	---
Analysis Date	01.22.02	01.22.02	---	---
Chloride (4500-Cl C), mg/l	<1.0	97 %	3.0 %	DN
Analysis Date	01.23.02	01.23.02	---	---
Fluoride (340.2), mg/l	<0.20	106 %	5.7 %	TS
Analysis Date	01.22.02	01.22.02	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	DATE/ TIME SAMPLED
10196-12	Method Blank	
10196-13	Accuracy (%Rec)	
10196-14	Precision (%RPD)	
10196-15	Analyst Initials	

PARAMETER	10196-12	10196-13	10196-14	10196-15
Sulfate as SO4 (375.4), mg/l	<5.0	97 %	2.6 %	MJC
Analysis Date	01.21.02	01.21.02	---	---

Method : SW-846, EPA 600/4-79-020, EPA 40 CFR PART 136
DOH Certification #: E84282, E87052.
These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

*F65 = Elevated detection limits were reported due to sample matrix interference which required sample or extract dilution.

Michael F. Valder, Project Manager

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Serial Number 005362

SEVERN TRENT SERVICES

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

STL Tampa West

2 10196

(✓) STL Tampa West
6712 Benjamin Road, Suite 100
Tampa, FL 33634

Website: www.stl-inc.com
Phone: (813) 885-7427
Fax: (813) 885-7049

( ) Alternate Laboratory Name/Location

Phone:
Fax:

Field	Value
PROJECT REFERENCE	PK-MW
PROJECT NO.	
PROJECT LOCATION (STATE)	FL
SAMPLER'S SIGNATURE	[signature]
P.O. NUMBER	
CONTRACT NO.	
CLIENT (SITE) PM	MIKE VALDER
CLIENT PHONE	630-7378
CLIENT FAX	630-7360
CLIENT NAME	PLO ENVIRON. AFFAIRS
CLIENT E-MAIL	
CLIENT ADDRESS	010 CAUSEWAY BLVD. TAMPA, FL 33619
COMPANY CONTRACTING THIS WORK (if applicable)	
PAGE	1 OF 1
STANDARD REPORT DELIVERY	( ) DATE DUE
EXPEDITED REPORT DELIVERY (SURCHARGE)	( ) DATE DUE
NUMBER OF COOLERS SUBMITTED PER SHIPMENT	2

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT, ...)

REQUIRED ANALYSIS / PRESERVATIVE / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	C/G	AQUEOUS	SOLID	AIR	NONAQUEOUS	602 (HCl)	610 (NAPHTHALENE, METHYL NAPTH)	COLOR	BOD	SPLP (SEE ATTACHMENT)	VOLATILES	SEMI-VOLATILES	TOTAL As, Ba, Cd, Cr, Pb, Se, Ag	TOTAL CHLORIDE		REMARKS
15-02	1405	PK-2S-SA	G	✓				3	2	1	—	—	—	—	—			DUE: 2-5-02
15-02	1510	PK-2LI-Q	G	✓				3	2	1	—	—	—	—	—			DUE: 2-5-02
15-02	1435	PK-2F-Q	G	✓				3	2	1	—	—	—	—	—			DUE: 2-5-02
15-02	1155	AA63846	G	✓				—	—	—	1	—	—	—	—	→		DUE: 1-29-02
-31-01	1500	SPECL-PK	C		✓			—	—	—	—	1	—	—	—	→		SEE ATTACHMENT DUE: 2-1-02
-14-02	1015	WD02-008	C				✓	—	—	—	—	—	3	1	1	→		CAUTION: HIGH pH (11.6) DUE: 2-4-02 *ACID NOT ADDED TO VOA VIALS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
[signature]	~~12-26-01~~	~~0815~~	[signature]	1-16-02	0925			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
[signature] 1-15-02			[signature]	011602	0925			

LABORATORY USE ONLY 4.0

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	CUSTODY SEAL NO.	STL TAMPA WEST LOG NO.	LABORATORY REMARKS
[signature]	1-16-02	1230	YES (X) NO ( )	N/S	B210196	

Appendix C
Biomass Emissions Data

Baseline Emissions Data for Coal and Petcoke Blend

Begin Date	Gross Unit Load (MWhr)	Heat Input (mmBtu)	SO2 (ppm)	SO2 (lb/hr)	NOx (ppm)	NOx (lb/hr)
12/29/2001 12:00:00 AM	177.00	1770.6	40.1	336.1	18.3	109.7772
12/29/2001 1:00:00 AM	177.00	1761	39.3	327.6	18.1	109.182
12/29/2001 2:00:00 AM	176.00	1771.3	39.3	329.5	17.7	106.278
12/29/2001 3:00:00 AM	174.00	1743.9	37	305.5	18.1	108.1218
12/29/2001 4:00:00 AM	174.00	1712.2	36.6	296.7	18.7	109.5808
12/29/2001 5:00:00 AM	173.00	1739.3	37.8	311.2	18.3	107.8366
12/29/2001 6:00:00 AM	170.00	1698.9	34.7	279.1	18.7	108.7296
12/29/2001 7:00:00 AM	168.00	1687.5	32.9	262.8	19.9	114.75
12/29/2001 8:00:00 AM	168.00	1694.9	32.7	262.4	20.6	118.643
12/29/2001 9:00:00 AM	168.00	1660.4	32	251.5	20.7	116.228
12/29/2001 10:00:00 AM	168.00	1696.7	32.5	257.9	21.3	122.1624
12/29/2001 11:00:00 AM	168.00	1675.3	31.8	252.2	21.7	123.9722
12/29/2001 12:00:00 PM	167.00	1668.2	31.4	248	22.2	126.7832
12/29/2001 1:00:00 PM	167.00	1679.3	31.4	249.6	22.4	127.6268
12/29/2001 2:00:00 PM	167.00	1680.6	30.9	245.8	23.3	132.7674
12/29/2001 3:00:00 PM	168.00	1681.9	30.6	243.6	23.8	136.2339
12/29/2001 4:00:00 PM	168.00	1687.1	30.2	241.2	24	138.3422
12/29/2001 5:00:00 PM	168.00	1691.7	29.7	237.9	24.6	142.1028
12/29/2001 6:00:00 PM	168.00	1672.4	29.3	232	24.9	142.154
12/29/2001 7:00:00 PM	168.00	1682.3	29	231	25.1	142.9955
12/29/2001 8:00:00 PM	168.00	1691.7	28.9	231.5	25.1	143.7945
12/29/2001 9:00:00 PM	168.00	1687.3	28.6	228.5	25.4	145.1078
12/29/2001 10:00:00 PM	168.00	1689.8	28.4	227.2	25.5	147.0126
12/29/2001 11:00:00 PM	168.00	1668	28.1	221.9	25.5	145.116

Test Burn Emissions Data for Coal, Petcoke, and Biomass Blend

Begin Date	Gross Unit Load (MWhr)	Heat Input (mmBtu)	SO2 (ppm)	SO2 (lb/hr)	NOx (ppm)	NOx (lb/hr)
12/31/2001 7:00:00 AM	167.00	1661.9	28.1	226.7	21.4	124.6425
12/31/2001 8:00:00 AM	168.00	1671.9	28	227.2	21.5	125.3925
12/31/2001 9:00:00 AM	168.00	1683	28.1	229.6	21.5	126.225
12/31/2001 10:00:00 AM	168.00	1656.7	28.1	226	21.5	124.2525
12/31/2001 11:00:00 AM	168.00	1681.5	28.1	226.5	21.4	124.431
12/31/2001 12:00:00 PM	168.00	1662.5	27.8	224.3	21.2	123.025
12/31/2001 1:00:00 PM	168.00	1659.4	27.8	223.9	21.2	122.7956
12/31/2001 2:00:00 PM	168.00	1670.3	27.5	223	21.1	123.6022
12/31/2001 3:00:00 PM	168.00	1670.9	27.7	221.8	21.3	121.9757
12/31/2001 4:00:00 PM	168.00	1664.6	28.3	225.8	20.9	119.8512
12/31/2001 5:00:00 PM	168.00	1654.4	27.9	221.3	20.8	119.1168

Attachment E
Polk Power Station Unit 1
Designated Representative Signature

Responsible Official Certification

I have reviewed the letter of request for authorization to conduct a biomass test burn at Polk Power Station. I hereby certify that these documents are authentic and accurate to the best of my knowledge.

Date: 10/20/03

Signature: Mark Hornick

General Manager
Polk Power Station

TAMPA ELECTRIC

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MAY 17 2004
BUREAU OF AIR REGULATION

May 14, 2004

Mr. Scott Sheplak, P.E.
Administrator- Title V Section
Florida Department of Environmental Protection
111 South Magnolia Drive, Suite 4
Tallahassee, FL 32301

Via FedEx
Airbill No.7926 4081 8953

Re: Tampa Electric Company
Polk Power Station Unit 1
Biomass Test Burn Report
Facility ID No. 1050233-009-AV

Dear Mr. Sheplak:

Please find enclosed the biomass test burn report for the gasification of approximately 95% petcoke/coal with a 5% biomass blend test burn at the Polk Power Station (PPS). As evidenced by the report, combusting syngas produced from the gasification of a fuel blend of approximately 95% petcoke/coal with a 5% biomass does not result in a significant increase in any regulated pollutant as defined in Table 212.400-2 F.A.C.

This correspondence is intended to provide a response to each specific condition issued by the Florida Department of Environmental Protection (Department) in the Test Burn Authorization Conditions. For your convenience, Tampa Electric Company (TEC) has restated each point and provided a response below each specific issue.

FDEP Condition 1
The permittee shall notify the DEP Southwest District and the Bureau of Air Regulation upon the initial receipt of biomass, one day prior to gasifying biomass and 7 days prior to commencement of any stack performance testing. A written final report shall be submitted to these offices within 45 days of completion of the last day that biomass is gasified.

TEC Response 1
This Condition has been satisfied per TEC's letter to the Department and DEP Southwest District dated March 18, 2004.

FDEP Condition 2
Biomass shall be continuously fed so as to maintain a homogenous stream of syngas for combustion gasification. The maximum biomass content shall not exceed 5 percent by weight of fuels gasified, as measured during each calendar day. A log shall be maintained at the facility demonstrating compliance with this condition, documenting the unique blend of Bahia grass with coal or petcoke. This log shall be available for inspection and submitted with the final test report. Performance testing (mass balance, syngas testing, and stack testing) shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke.

TEC Response 2
The log is provided in Attachment A – the Biomass Test Burn Report, Appendix A. The material balance for the syngas test constituents and ash is provided in Attachment A – the Biomass Test Burn Report in Sections 3.2 and 3.3.

FDEP Condition 3
Emissions due to biomass gasification shall not exceed any current limit in existing permits for all impacted emission units. This test-burn shall not result in the release of objectionable odors pursuant to Rule 62-296.320(2). F.A.C. Performance testing shall cease as soon as possible if the test results in any emissions, which are not in accordance with the conditions in existing permits, or this authorization protocol. The test burn shall not resume until appropriate measures to correct the problem(s) have been implemented. The Southwest District shall be notified immediately upon such cessation and resumption.

TEC Response 3
There was no exceedance of emissions of any current limits in TEC's existing permits. Also, no release of objectionable odors occurred during the test burn.

FDEP Condition 4
Representative samples of "as-burned" coal, petcoke and biomass shall be taken and analyzed for each unique blend of biomass gasified with each unique blend of coal or petcoke. All sample results shall be submitted with the final report.

TEC Response 4
The analysis is provided in Attachment A – the Biomass Test Burn Report, Table 5.

FDEP Condition 5
As-burned (syngas) fuel samples shall be collected and analyzed as "refinery gas" (as has been done with past compliance tests) upon initial gasification of each unique blend of coal or petcoke. Sample results shall be provided to the DEP Southwest District and the Bureau of Air Regulation with the final report.

TEC Response 5
A syngas fuel analysis is provided in Attachment A – the Biomass Test Burn Report, Table 4.

FDEP Condition 6
To provide reasonable assurance that the ash generated from any fuel blend can be disposed of in a method to be proposed by TEC, as well as to ensure compliance with the solid and hazardous waste regulations, representative samples of the gasifier slag generated as the result of gasifying coal and petcoke with biomass shall be segregated, sampled and analyzed in accordance with the requirements set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, Third Edition."

TEC Response 6
The TCLP analysis of the slag is provided in Attachment A – the Biomass Test Burn Report, Appendix B.

FDEP Condition 7
Stack gas emissions testing for SO2, NOx and CO shall be conducted for each unique blend of biomass gasified with each unique blend of coal or petcoke and results reported for all measured syngas constituents as well as all currently regulated pollutants. Alternatively, CEM data may be utilized (if

available) provided that the CEMS are quality assured pursuant to 40 CFR 75. The data assessment reports from 40 CFR 60 for the most recent RATA and CGA shall be submitted along with the most recent CEMS QA reports.

TEC Response 7
The emissions data is provided in Attachment A – the Biomass Test Burn Report, Appendix C. Attachment G contains the most recent CEMS QA reports. The Polk Power Station Title V Permit 1050233-009-AV does not require data assessment report for the RATA and CGA. Therefore, this information is not included.

FDEP Condition 8
All stack performance tests shall be conducted using EPA Reference Methods, as contained in 40 CFR 60 (Standards of Performance for New Stationary Sources), 40 CFR 61 (National Emissions Standards for Hazardous Air Pollutants), and 40 CFR 266, Appendix IX (Multi-metals), unless otherwise approved by the Department, in writing, in accordance with Chapter 62-297, F.A.C. All performance testing shall be submitted with the final report.

TEC Response 8
This Condition has been satisfied through the use of CEMS, TEC's primary method of compliance. In addition, TEC submitted to the Department the stack performance test results for the biomass test burn in a letter dated April 29, 2004 and the results are in Attachment G.

FDEP Condition 9
This Department action is only to authorize the temporary blend performance testing of biomass consisting of Bahia grass.

TEC Response 9
This test burn was conducted using Bahia grass. The previous biomass test was conducted using eucalyptus. The two consecutive biomass tests have demonstrated that the gasification of biomass is technically feasible and will not adversely impact emissions from PPS Unit 1. Based on these favorable results, TEC would like the Department to consider granting PPS the flexibility to gasify a variety of non-treated biomass without the requirement of additional testing.

FDEP Condition 10
The Department's Southwest District and the Bureau of Air Regulation shall be notified within 5 days, in writing, upon completion of the biomass test burn program.

TEC Response 10
This Condition has been satisfied per TEC's letter to the Department and DEP Southwest District data April 5, 2004.

FDEP Condition 11
All testing series shall include emissions testing for emissions units operating at permitted capacity. Permitted capacity is defined at 90-100 percent of the capacity allowed by existing permits.

TEC Response 11
The biomass test was conducted between 90 and 100 percent of the allowed capacity. Therefore, this condition has been satisfied.

TEC has conducted two test burns of untreated biomass at PPS to date; the first with eucalyptus and this one with Bahia grass. Neither biomass test burn showed emissions increases as a result of including untreated biomass in the fuel blend at PPS. Accordingly, TEC would like the Department to consider authorizing TEC to include other similar non-treated biomass products in the fuel blend at PPS without further testing. TEC will formally pursue this request.

TEC thanks the Department for its cooperation in allowing TEC to perform the test burn. If you have any questions please call Shelly Castro or me at (813) 228-4408.

Sincerely,

Shelly Castro for

Laura R. Crouch
Manager- Air Programs
Environmental, Health & Safety

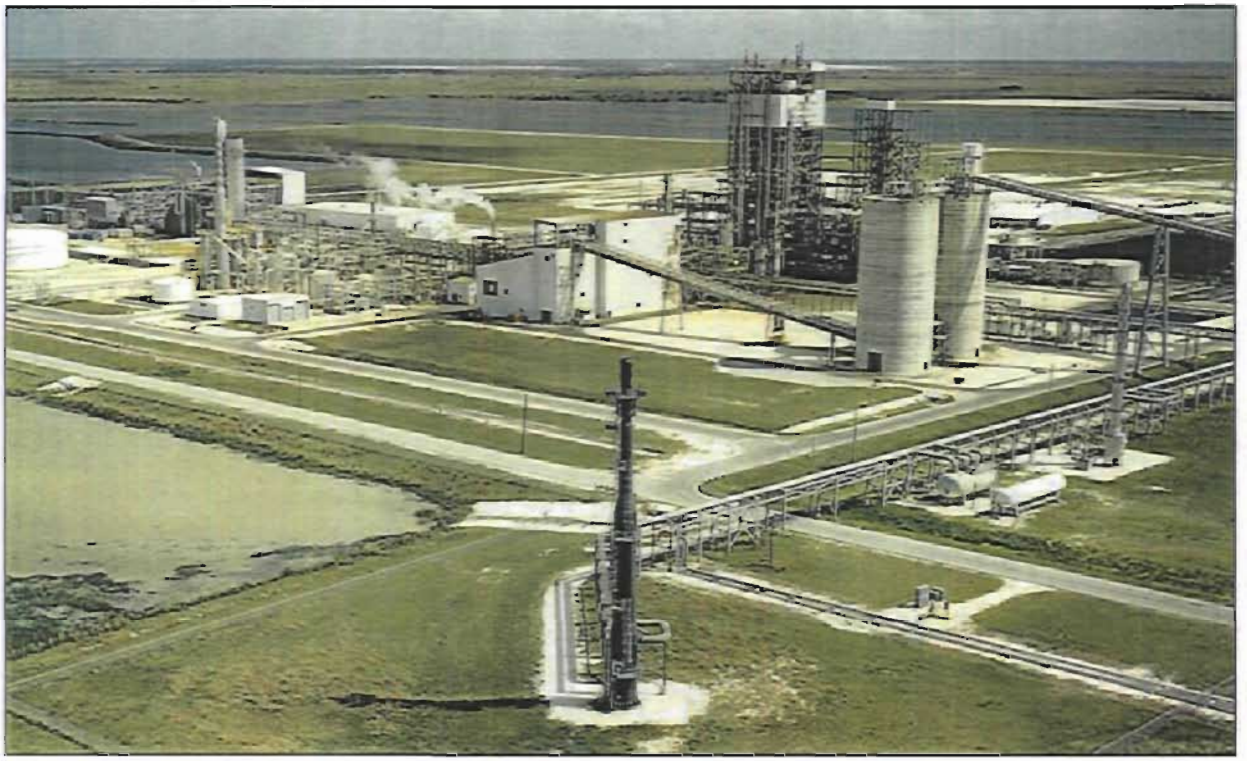
EHS/gm/SSC193

Enclosures

c/enc: Mr. Jerry Kissel - FDEP
Mr. Tina Vielhauer - FDEP

Attachment A
Polk Power Station Unit 1
May 2004 Biomass Test Burn Report

Tampa Electric Company



Biomass Test Burn Report
Polk Power Station Unit 1

TECO
TAMPA ELECTRIC

May 2004

1.0 INTRODUCTION

Tampa Electric Company (TEC) conducted a test burn on April 1, 2004 at the Polk Power Station (PPS) Unit 1. The purpose of this test burn was to investigate the effects of gasifying a small portion of biomass as a constituent of the feedstock that is processed to form the synthesis gas (syngas) fired in the combustion turbine (CT). TEC performed this test under the authority of the temporary permit issued by the Florida Department of Environmental Protection (the Department) dated November 25, 2003. The data from this test indicate there is no increase in monitored air emissions (NO_x, SO_2 and CO) from PPS Unit 1 as a result of the addition of a small amount of biomass as a constituent of the feedstock for PPS Unit 1. This report constitutes the required Test Burn Report for the biomass test burn. The background for this test including materials and methods used for the test are presented within. Also, the results of the test are presented and discussed.

2.0 BACKGROUND

PPS Unit 1 uses an Integrated Gasification Combined Cycle Process (IGCC) to convert solid fuels into a syngas that can be fired in a CT. The IGCC process is capable of handling a variety of fuels as feedstock to the gasification process. Currently, PPS Unit 1 is typically fired on a blend of approximately 55% petcoke and 45% coal. Thus, a similar blend was used during the test burn with biomass fuel added to allow for direct comparisons. This biomass test burn fired a fuel blend that consisted of approximately 52% petcoke, 43% coal, and 5% biomass.

The test on April 1, 2004 was conducted:

- To determine if any technical impediments exist to co-firing biomass as a small portion of the feedstock to the gasifier, and
- To characterize the emissions resulting from co-firing biomass.

The IGCC process consists of several steps that ultimately result in the production of electrical power (Figure 1). Solid fuel is homogenized and mixed with water to produce slurry. The slurry is then passed to the gasifier which produces a high pressure combustible gas (synthesis gas or "syngas"). After cooling the syngas, residual material from the gasification process is separated, the slag is rejected and the water and combustible fines are recycled back into the gasifier. Cooled syngas is passed through scrubbers that remove any remaining particulate matter. The syngas then is subjected to a series of steps that remove sulfur and convert the removed sulfur to H_2SO_4. This clean syngas is then fired in a CT that turns an electrical generator. Hot exhaust gasses from the CT are used to create steam that powers a steam turbine that also produces electrical power. This system is an efficient means to produce electrical power on a commercial scale.

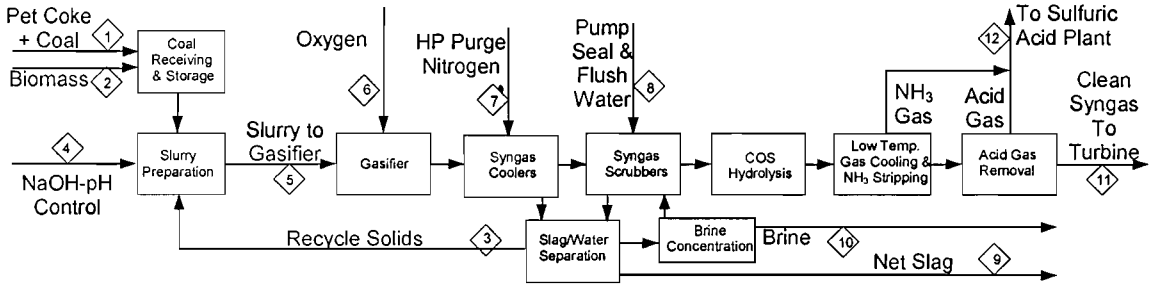
2.1 BIOMASS FUEL HANDLING

In the course of conducting this test burn, 52.9 tons of field chopped Bahia grass was harvested, stored, and gasified at the Polk Power Station site. The objective was to demonstrate and test all aspects of generating electricity from biomass including field harvesting, material size reduction, field storage, handling and feeding, and gasification. The Bahia grass was successfully stored on site for approximately ten months without cover using the self-thatching properties and the shedding ability of grass stack piling.

The biomass was loaded in a walking floor conveyor truck by pay loader and introduced into the plant along with the petroleum coke/coal mixture through the fuel truck unloading facility. The biomass was unloaded and sent to the "A" silo while maintaining a ratio of biomass to coal/coke of approximately 5.0% by weight

to assure that test permit conditions were met. Finally, the fuel mixture was sent from the silo to the slurry processing equipment and consumed over a period of approximately 13 hours.

Figure 1. Block flow diagram of PPS Unit 1 gasifier section showing process stream designations.



2.2 PROCESS DATA COLLECTION

Data were collected for key variables throughout IGCC process to allow for analysis of air quality impacts of this test burn. Feedstock analyses were conducted on both the standard petcoke/coal blend and the biomass fuel. Feedstock analyses include elemental, metals, and ash mineral compositions and heating value for each fuel type. Process streams were analyzed for elemental and ash composition, mass flow, and heat content at 12 points in the IGCC process corresponding to the 12 numerical labels shown in Figure 1. An overall mass balance for the gasifier was calculated during the test burn for each of the 12 process points indicated in Figure 1. Stack emissions data were collected for NO_x and SO_2 by the Continuous Emissions Monitoring System (CEMS) and reported at one-hour intervals throughout the test burn. Stack emissions data were collected for CO by the stack performance test. Emissions data were reported in ppm for each pollutant.

2.3 EMISSIONS DATA COMPARISONS

Emissions data obtained during the test burn were compared to representative emissions data from March 30, 2004 since those data are from the same petcoke/coal feedstock, were obtained immediately prior to the test burn, and Unit 1 was functioning normally and operating under similar conditions as those during the test burn.

2.4 STATISTICAL METHODS FOR COMPARING EMISSIONS DATA

Emissions data from the test burn were analyzed and compared to the baseline data using a variety of statistical measures. Emissions data from both the test burn and the baseline periods were evaluated using the same statistical measures. Data from the CEMS were reported as the variables Heat Input (MMBtu), Power Output (MW), SO_2 (lb/MMBtu), SO_2 (ppm), NO_x (lb/MMBtu), NO_x (ppm). The statistics mean(μ), variance(σ^2), kurtosis, skewness, range, and 95% confidence interval were calculated for each variable. The mean and variance were used to compare the test burn emissions data to the baseline emissions data. Kurtosis, skewness, range, and 95% confidence interval were used to evaluate the quality of the emissions data and to make decisions about which comparative methods were appropriate to use in comparing test burn and baseline data. To compare test burn data to baseline data, each set of variables was examined using a two-sample F-test to make inferences about population variances and a two-sample t-test assuming equal variances to make inferences about population means.

The comparative statistical methods used in this report require that certain assumptions be met before the results of these methods can be considered valid. Comparisons between the means of the test burn data and the baseline data are most useful in determining if there is a change in a process after a treatment is applied.

The statistic that is used to make comparisons between sample means is called a two sample t-test. A t-test can be used to determine if two population means are equal at a given significance level. The significance level for this report is 95% ($\alpha = 0.10$) in all cases. A t-test compares the ratio of the sample means and variances to expected frequency distribution of a normal population at a specified error rate. The two sample t-test is used to evaluate the hypothesis that two populations' means are equal against the alternative hypothesis that the two populations' means are unequal. The hypothesis of equal means is rejected when the calculated t-statistic is greater than the t-critical value at a given significance level. The validity of the t-test is based on several assumptions.

First, the two samples are independent. In practical terms, the assumption of independence means that the two samples are drawn from two different populations and that the elements of one sample are unrelated to those of the second sample. This assumption is met since the data for the test burn and the baseline emissions were taken by a discrete sampling device at different times with all variables controlled except for biomass used as a feedstock in the test burn.

Second, the two samples are drawn from a normally distributed population. Though the assumption of a normal population distribution is less critical than the assumption of independent samples it is still important to verify that the assumption is met. Since each data point collected by the CEMS is actually a discrete point sample of a continuously variable exhaust stream the potential sample population is quite large. For modest-sized samples (combined sample size ≥ 30) drawn from a large population the distribution approaches normal even with modest skewness in the two populations. The tendency of a relative frequency histogram to approach normal when samples are repeatedly drawn from a large population is called the Central Limit Theorem. Since the combined sample size of the test burn and baseline data is 48, it is prudent to verify that the Central Limit Theorem applies by calculating the skewness and kurtosis for each variable in each dataset. Skewness is a measure of the central tendency of a frequency distribution that relates to the symmetry of the peak in relation to the mean, mode, and median of the distribution. Normal distributions have a skewness of 0. Kurtosis is a measure of the size of the tails of a frequency distribution. Normal distributions have a kurtosis of 0. If the sample's frequency distribution does not approximate normality, then the non-parametric Wilcoxon rank rum statistic can be used to compare population means. The Wilcoxon rank sum test is not as likely to declare a difference in population means when it exists as is a t-test since the Wilcoxon rank sum is based on relative magnitudes rather than the magnitudes of the observations.

Third, variances are assumed to be equal. Since the t-test pools sample variances when computing the test statistic, unequal variances can have an effect on the nominal significance and confidence probabilities of the statistical test, especially when sample sizes are different. However, a computationally more difficult version of the t-test that allows for the use of separate variances for each sample can be used when variances are not equal.

A statistical test for comparing two population variances is the F-test. The F-test is used to check the validity of the equal variance assumption for a two sample t-test. The F-test compares the ratio of the sample variances to an expected population variance frequency distribution that is defined by the degrees of freedom associated with the samples. The F-test can be used to test the hypothesis that two sample variances are equal against the alternative hypothesis that two sample variances are not equal. The hypothesis of equal sample variances is rejected when the calculated F-statistic exceeds the F-critical value of the frequency distribution that is defined by the degrees of freedom for the two samples.

3.0 RESULTS AND DISCUSSION

Biomass fuel comprised 4.5% by weight of the fuel for PPS Unit 1 during the 13 hour test burn. Biomass fuel generated approximately 4640 kW of electrical power during the test burn. The addition of biomass into the feedstock tended to cause a decrease in the heat content of the feedstock due to biomass' elemental composition relative to the composition of the base fuel. Emissions from PPS Unit 1 did not increase with respect to baseline emissions during the test burn. There were no major technical impediments to the introduction of biomass into the feedstock of PPS Unit 1. A logs of the biomass feed rate and weights of the biomass delivery was maintained, and is provided in Appendix A.

3.1 PROCESS

Biomass was introduced to the gasifier at a rate of 8,200 lb/hr. The biomass fuel accounted for approximately 4640 kW of electrical power out of a total of 243.4 MW generated during the test burn based on relative heating value and feed rates of the biomass fuel and the base fuel. Process results are summarized in Table 1. Gasifier performance from the operators' standpoint was indistinguishable from the normal petcoke/coal feedstock.

Table 1. General process parameters for biomass and base fuels during the biomass test burn.

Parameter	Base Fuel	Biomass Fuel	Total or Weighted Average	
Feed Rate (lb/hr)	172,651	8,164	180,815	Total
Moisture Content (Wt%)	8.43%	29.23%	9.37%	Avg
Higher Heating Value (Btu/lb)	13,268	5,449	12,916	Avg
Higher Heating Value (MMBtu/hr)	2,291	44.5	2,335	Total
Net Power Production (kW)	238,760	4,640	243,400	Total

3.2 MASS BALANCE

Multiple flow and composition measurements were made on the 12 key process streams identified in Figure 1. Closed heat and mass balances shown in Tables 2, 3, and 4 were calculated using a least-squares technique. All key values reported in the tables were within 1 standard deviation of the mean value of the measurements. The mass balance is presented in Table 2 and the stream numbers correspond to the numerical labels in Figure 1. Process streams 1-2 and 4-8 are feed streams and have a total flow rate of 433 thousand pounds per hour (KPPH). Process streams 9-12 are output streams and have a total flow rate of 433 KPPH. Process streams 3 and 5 are key internal streams and have flow rates of 152 and 333 KPPH, respectively.

Table 2. Overall mass balance for PPS Unit 1 gasifier section during biomass test burn. Units are in thousand pounds per hour (KPPH). Stream number corresponds to numerical labels in Figure 1.

Input (Feed) Streams		
Stream Number	Stream Description	Flow (KPPH)
1	Coal / Petroleum Coke Blend	172.65
2	Biomass	8.16
4	NaOH for pH Adjustment	0.61
6	Oxygen To Gasifier	188.42
7	High Pressure Purge/Sootblowing N_2	23.65
8	Pump Seal/Instrument Flush Water	39.31
TOTAL SYSTEM INPUT		**432.8**

Product (Output) Streams		
Stream Number	Stream Description	Flow (KPPH)
9	Slag	8.29
10	Brine	0.04
11	Clean Syngas To Combustion Turbine	399.12
12	Acid and NH_3 Gas To Sulfuric Acid Plant	25.34
TOTAL SYSTEM OUTPUT STREAMS		**432.8**

Key Internal Streams		
5	Slurry To Gasifier	333.48
3	Recycle Solids To Slurry	152.06

3.3 PROCESS STREAM FLOWS AND COMPOSITIONS

Each of the 12 process streams identified by numerical labels in Figure 1 was analyzed for composition and mass flow (Tables 3 and 4). Table 3 presents the stream flows and compositions for the slurry preparation area (streams 1-5). Table 3 also presents the heat content of streams 1-3 and 5. Calculated and laboratory analytical values agree within the sampling and analytical accuracy range of the measurements. Table 4 presents the flows and compositions for the gasification system (streams 3 and 5-12). Table 4 presents the compositional analysis of the clean syngas (stream 11) and residual materials from the gasification process (streams 9 and 3) as requested by the Department.

Table 3. Slurry preparation area stream flows and compositions during test burn. KPPH = thousand pounds per hour, AR = as received.

	Units	COAL + COKE	BIOMASS	NaOH-pH CONTROL	COMBINED FUELS	RECYCLE CHAR	SLURRY TO GASIFIER
COMPOSITION							
C	Wt % Dry	82.83	47.87		81.44	73.84	79.88
H	"	4.45	5.04	1.93	4.47	0.74	3.7
N	"	1.61	1.22		1.59	1.29	1.53
S	"	3.40	0.15		3.27	3.01	3.22
O	"	3.27	40.54	30.96	4.63	0.00	3.68
ASH	"	4.44	5.18	67.11	4.59	21.12	7.99
TOTAL	"	100	100	100	100	100	100
SUBTOTAL FLOW	KPPH DRY	158.088	5.778	0.304	164.169	42.317	206.660
H2O	Wt % AR	8.43	29.23	50.00	9.51	72.14	38.03
H2O	KPPH	14.563	2.386	0.304	17.253	109.571	126.824
TOTAL FLOW	KPPH AR	172.651	8.164	0.608	181.423	151.888	333.484
MASS FLOW							
C	Dry Lb/Hr	130938	2766		133704	31376	165080
H	"	7034	291	6	7331	315	7646
N	"	2542	70		2612	550	3162
S	"	5368	9		5376	1278	6654
O	"	5168	2343	94	7605	0	7605
ASH	"	7037	298	204	7540	8972	16512
Ar	"	0	0				
SUBTOTAL-Dry Solids	"	158087	5777	304	164169	42491	206660
WATER / MOISTURE	lb/hr	14563	2386	304	17253	109571	126824
TOTAL	"	172650	8163	608	181423	152061	333484
HEAT CONTENT							
Calculated HHV	BTU/Lb (Dry)	14490	7699		14222	11122	13578
Measured HHV	BTU/Lb (Dry)	14435	8159			11223	13663
Total HHV	MMBTU/Hr	2291	44.5	0	2335	471	2806

Table 4. Gasification system stream flows and compositions during test burn. KPPH = thousand pounds per hour.

STREAM NUMBER		GASIFICATION SYSTEM INPUTS					GASIFICATION SYSTEM OUTPUTS					
		5	6	7	8		9	3	10	11	12	
GAS STREAMS	UNITS	SLURRY TO GASIFIER	OXYGEN	HP PURGE NITROGEN	SEAL & FLUSH WATER	TOTAL SYSTEM INPUT	SLAG	RECYCLE SOLIDS	BRINE (NH4Cl)	CLEAN SYNGAS	ACID GASES	TOTAL SYSTEM OUTPUT
CO	VOL %									42.68	1.51	
H2	VOL %									32.84	0.48	
CH4	VOL %									0.03	0.03	
CO2	VOL %									15.36	70.40	
N2	VOL %		0.86	99.99						5.34	1.00	
Ar	VOL %		2.64							0.84	0.05	
H2O	VOL %									2.89	0.00	
H2S	VOL %									0.02	26.28	
COS	VOL %									0.00	0.04	
NH3	VOL %									0.00	0.19	
O2	VOL %		96.50	0.01						0.00	0.02	
TOTAL	VOL %		100	100						100	100	
MOLE WT	LB/MOLE		32.15	28.00						21.73	40.74	
FLOW	KSCFH		2224	320						6971	236	
SOLID AND LIQUID STREAMS												
C	WT %	80.68					3.50	73.84				
H	WT %	4.34					0.00	0.74	7.49			
N	WT %	1.74					0.00	1.29	26.22			
S	WT %	3.06					0.00	3.01				
O	WT %	3.58					0.00	0.00				
ASH	WT %	6.60					96.50	21.12	66.29			
TOTAL	WT %	100					100	100	100			
DRY FLOW	KPPH	167.181					7.783	42.317	0.044			
H2O	WT %	36.77					6.12	72.14	0.00			
H2O FLOW	KPPH	97.220			39.309		0.507	109.571	0.000			
TOTAL FLOW	KPPH	264.401					8.290	151.888	0.044			
ELEMENTAL FLOWS / BALANCE:												
C	LB/HR	165080	0	0		**165080**	272	31376		128054	5378	**165080**
H	LB/HR	21838	0	0	4399	**26237**	57	12576	3	13261	340	**26236.8**
N	LB/HR	3162	1406	23643		**28211**	0	550	12	27459	190	**28211**
S	LB/HR	6654	0	0		**6654**	0	1278		127	5250	**6654.59**
O	LB/HR	120237	180833	3	34911	**335984**	451	97310		224052	14171	**335984**
ASH	LB/HR	16512	0	0		**16512**	7511	8972	29	0	0	**16512.1**
Ar	LB/HR	0	6180	0		**6180**				6168	12	**6179.96**
TOTAL	LB/HR	333484	188419	23646	39309	**584859**	8290	152061	44	399120	25342	**584858**

3.4 FEEDSTOCK ANALYSIS

A complete feedstock laboratory analysis is presented in Table 5. Both the base fuel and the biomass fuel were analyzed for elemental composition, ash composition, metal, and heat content. Compared to the base fuel, biomass fuel has greater moisture content, ash, hydrogen, oxygen, and some metals. Compared to the base fuel, biomass fuel has lesser carbon, nitrogen, and sulfur content. The difference in elemental composition results in a much lesser heat content for biomass fuel then for the base fuel (biomass fuel heat content was 41% of the heat content of the base fuel) and accounts for the dilution effect observed when the fuels are blended.

Table 5. Feed stock analysis of fuels used during the biomass test burn.

		Fuel Units	Coal/Coke Blend	Biomass
Total Moisture		Wt %	8.43	29.23
Ultimate Analysis				
	Ash	Wt % (Dry Basis)	4.44	5.18
	C	Wt % (Dry Basis)	82.83	47.87
	H	Wt % (Dry Basis)	4.45	5.04
	N	Wt % (Dry Basis)	1.61	1.22
	S	Wt % (Dry Basis)	3.40	0.15
	O	Wt % (Dry Basis)	3.27	40.54
Heating Value				
	Measured HHV	BTU/Lb (Dry Basis)	14435	8159
	Calculated HHV	BTU/Lb (Dry Basis)	14490	7699
Miscellaneous				
	Chlorine	Wt % (Dry Basis)	0.02	0.06
	Fluorine	Wt % (Dry Basis)	<0.01	<0.01
Ash Minerals				
	Cr	ppmw in Ash	180	37.9
	V	ppmw in Ash	23804	68.5
	Ni	ppmw in Ash	5244	60.7
	As	ppmw in Ash	28.3	7.6
	Hg	ppmw in Ash	1.03	0.425
	Pb	ppmw in Ash	51.4	7.4
	Be	ppmw in Ash	7.7	N/D
	SiO_2	Wt % In Ash	51.74	64.29
	Al_2O_3	Wt % In Ash	18.3	2.03
	TiO_2	Wt % In Ash	0.92	0.25
	Fe_2O_3	Wt % In Ash	11.1	0.74
	CaO	Wt % In Ash	4.59	18.12
	MgO	Wt % In Ash	1.59	3.58
	Na_2O	Wt % In Ash	0.55	N/D
	K_2O	Wt % In Ash	1.82	3.15
	P_2O_5	Wt % In Ash	0.14	3.42
	SO_3	Wt % In Ash	3.54	4.06
	Sum of Determined Minerals	Wt % In Ash	97.22	99.66
	Undetermined Ash Minerals	Wt % In Ash	2.78	0.34

3.5 EMISSIONS

A statistical analysis was performed comparing the mean NO_x, SO_2 and CO emissions from the test burn to baseline emissions obtained immediately prior to the test burn. NO_x, SO_2 and CO emissions were analyzed for both baseline and test burn periods on a volumetric (ppm or ppmvd) and mass flow (lb/hr) basis. The statistical analyses consisted of calculating descriptive statistics and making pair-wise comparisons of each pollutant's variance and mean for the baseline data and the test burn data. The

results of the analyses conducted using volumetric data were consistent with the results obtained using mass data.

NO_x, SO_2 and CO emissions during the test burn were found to be statistically the same as the NO_x, SO_2 and CO emissions during the baseline period. Figures 2, 3 and 4 show graphs of test burn emissions compared to baseline emissions for NO_x, SO_2 and CO, respectively. Tables 6, 7 and 8 present the summary results of the statistical analyses for the test burn and baseline emissions data for NO_x, SO_2 and CO, respectively. The results presented are in volumetric units (ppm or ppmvd), but identical relationships and statistical conclusions are obtained using mass flow units (lb/hr). Table 9 summarizes the statistics for NO_x, SO_2 and CO emissions for the baseline and test burn periods in both volumetric and mass flow units, for comparison.

Figure 2. NO_x emissions (ppm) from PPS Unit 1 during baseline and test burn periods.

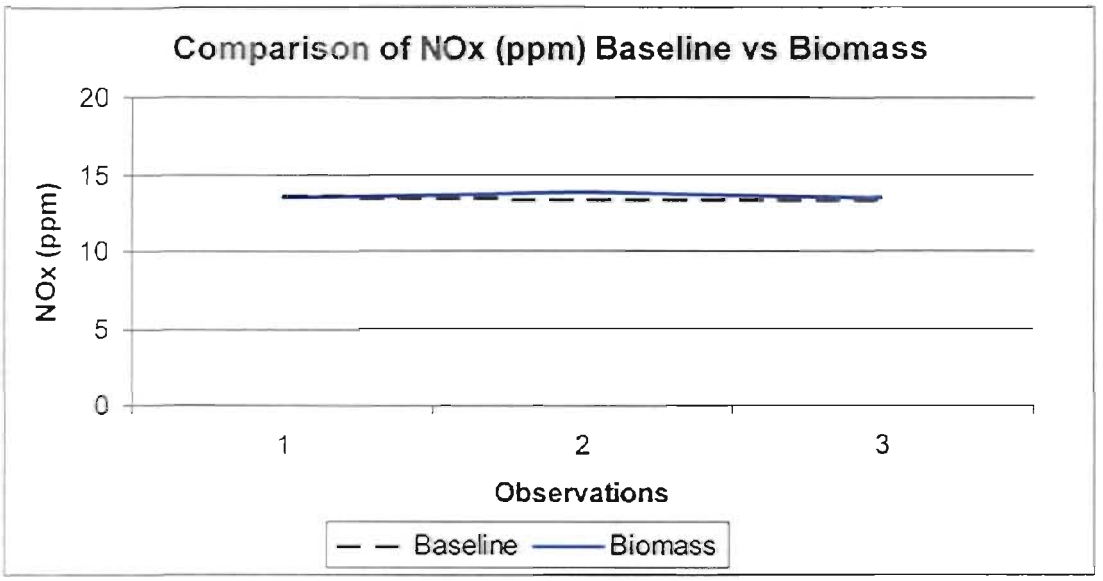


Figure 3. SO_2 emissions (ppm) from PPS Unit 1 during baseline and test burn periods.

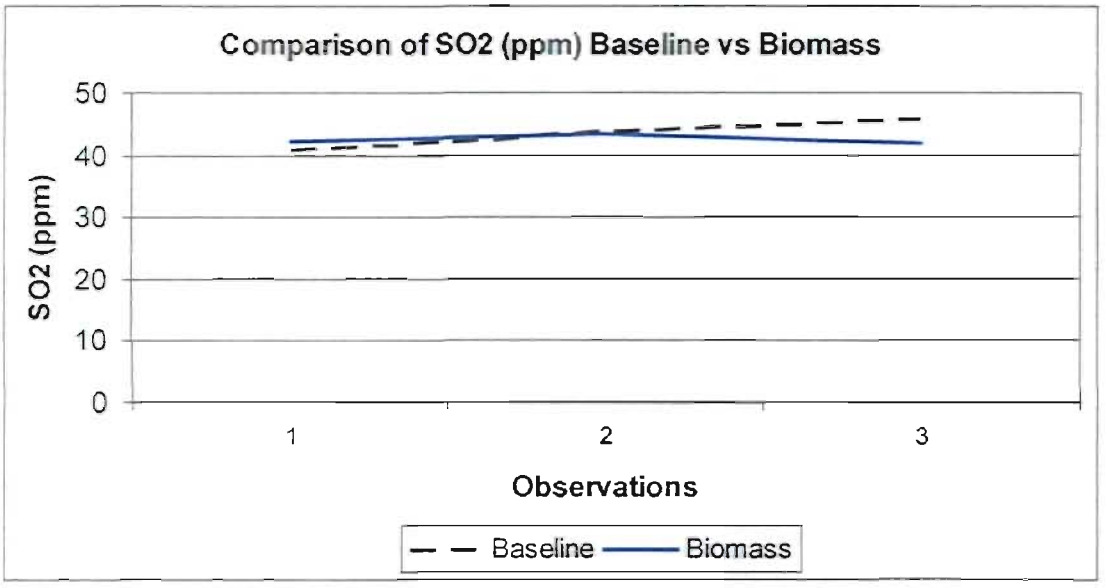
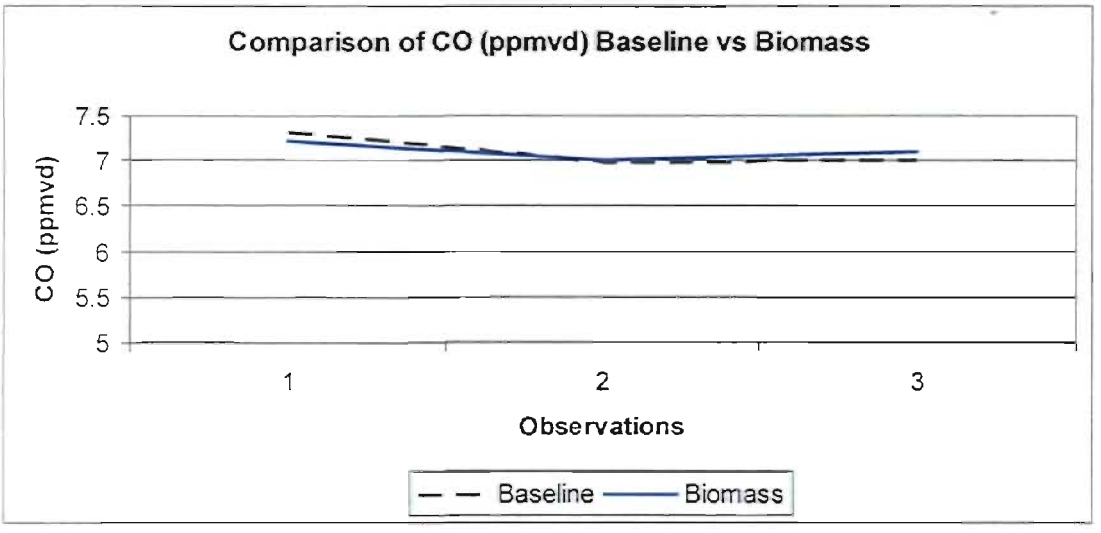


Figure 4. CO emissions (ppmvd) from PPS Unit 1 during baseline and test burn periods.



Populations' mean and variance frequency distributions as measured by skewness and kurtosis approximated a normal distribution for both NO_x, SO_2 and CO when the sizes of the datasets were considered. Two sample t-tests assuming equal variances were used to test if the mean values for NO_x, SO_2 and CO emissions were equal between the test burn and baseline emissions data. This was done because F-tests accepted the hypothesis that the variances were equal between the test burn and the baseline emissions for both NO_x, SO_2 and CO. The two sample t-tests results indicate that the observed differences in means are not due to chance at the 95% confidence level.

Table 6. Statistical analysis comparing variances and means of baseline and test burn data for NO_x emissions (ppm).

Parameter	Baseline	Biomass
Mean (ppm)	12.08	12.47
Variance	2.02	1.36
Observations	24	24
Hypothesized Difference in Variance or Mean	0	
df F-test (t-test)	23	23
F_{calc}	1.49	
Probability that calculated F is less than or equal to F_{crit}	0.17	
F_{Crit}	2.01	
t_{calc}	1.04	
Probability that calculated t_{calc} is less than or equal to t_{crit}	0.30	
t_{crit}	1.68	
Conclusion: Accept hypothesis that Variances or Means are equal.		

Table 7. Statistical analysis comparing variances and means of baseline and test burn data for SO_2 emissions (ppm).

Parameter	Baseline	Biomass
Mean (ppm)	44.65	42.69
Variance	27.06	22.37
Observations	24	24
Hypothesized Difference in Variance or Mean	0	
df F-test (t-test)	23	23
F_{calc}	1.21	
Probability that calculated F is less than or equal to F_{crit}	0.33	
F_{Crit}	2.01	
t_{calc}	1.36	
Probability that calculated t_{calc} is less than or equal to t_{crit}	0.18	
t_{crit}	1.68	
Conclusion: Accept hypothesis that Variances or Means are equal.		

Table 8. Statistical analysis comparing variances and means of baseline and test burn data for CO emissions (ppmvd).

Parameter	Baseline	Biomass
Mean (ppm)	7.10	7.11
Variance	0.03	0.01
Observations	3	3
Hypothesized Difference in Variance or Mean	0	
df F-test (t-test)	2	2
F_{calc}	3.20	
Probability that calculated F is less than or equal to F_{crit}	0.24	
F_{Crit}	19.00	
t_{calc}	0.03	
Probability that calculated t_{calc} is less than or equal to t_{crit}	0.98	
t_{crit}	2.35	

Conclusion: Accept hypothesis that Variances or Means are equal.

Table 9. Comparison of baseline and test burn emissions in volumetric and mass flow units.

	NO_x				SO_2				CO			
	ppm		lb/hr		ppm		lb/hr		ppmvd		lb/hr	
Parameter	Baseline	Test	Baseline	Test	Baseline	Test	Baseline	Test	Baseline	Test	Baseline	Test
Mean	12.1	12.5	103.7	104.5	44.6	42.7	372.4	351.8	7.1	7.1	16.7	17
Number of Observations	24	24	24	24	24	24	24	24	3	3	3	3
Standard Deviation	1.4	1.2	11.4	10.3	5.2	4.7	44	38.5	0.2	0.1	0.4	0.2
Range	4.3	3.5	34.4	28.8	24.1	23.7	197.8	192.1	0.3	0.2	0.74	0.4
Minimum	9.6	10.4	83.5	87.6	37.9	37.1	322.8	303.1	7	7	16.6	16.8
Maximum	13.9	13.9	117.9	116.4	62	60.8	520.6	495.2	7.31	7.2	17.5	17.1
95% Confidence Level	0.60	0.50	4.8	4.4	2.2	2	18.6	16.3	0.4	0.2	1	0.5

4.0 CONCLUSION

The test burn data indicate that the gasification of biomass is technically feasible and will not adversely impact emissions from PPS Unit 1. Based on the success of this biomass test burn and the success of the previous biomass test burn firing eucalyptus, PPS requests the Department to consider allowing PPS the flexibility to gasify a variety of non-treated biomass without additional testing. TEC appreciates the Department's attention to this process.

Appendix A
Biomass Log

Polk Power Station Unit 1
Bahia Biomass Test
Silo A Loading Sheet

Date	Time	Truck Count	Fuel Truck No.	Coal / Pet Coke Fuel Weight (tn)	Bahia Buckets	Bahia Wt. (tn)
03/29/2004	15:47	1	14360	26.61	4	1.73
03/29/2004	15:56	2	14353	26.56	3	1.92
03/31/2004	7:37	3	14355	26.73	2	1.3
03/31/2004	8:00	4	14356	26.61	2	0.98
03/31/2004	8:15	5	14359	26.67	2	0.71
03/31/2004	8:50	6	14352	26.67	3	1.5
03/31/2004	8:58	7	14351	26.88	2	0.89
03/31/2004	9:19	8	14360	26.64	2.5	1.03
03/31/2004	9:40	9	14355	26.9	2.5	1.02
03/31/2004	9:58	10	14356	26.56	3	1.46
03/31/2004	10:10	11	14359	26.7	3	1.25
03/31/2004	10:25	12	14353	26.73	3	1.38
03/31/2004	10:50	13	14352	26.63	3	1.37
03/31/2004	11:05	14	14351	26.66	3	1.3
03/31/2004	11:20	15	14360	26.75	3	1.04
03/31/2004	11:55	16	14355	26.67	3	1.23
03/31/2004	12:02	17	14356	26.78	3	1.4
03/31/2004	12:07	18	14359	26.63	3	1.47
03/31/2004	12:38	19	14352	26.73	3	1.07
03/31/2004	13:00	20	14360	26.71	3	1.08
03/31/2004	13:20	21	14355	26.75	4	1.45
03/31/2004	13:40	22	14356	26.61	4	1.18
03/31/2004	13:47	23	14354	26.8	4	1.44
03/31/2004	14:07	24	14359	26.75	4	0.93
03/31/2004	14:22	25	14351	26.65	5	1.58
03/31/2004	14:37	26	14353	26.65	4	0.99
03/31/2004	15:00	27	14355	26.62	5	1.61
03/31/2004	15:25	28	14356	26.73	5	1.66
03/31/2004	15:35	29	14354	26.75	5	1.48
03/31/2004	15:58	30	14360	26.73	5	1.83
03/31/2004	16:18	31	14351	26.66	4	1.39
03/31/2004	16:38	32	14359	26.78	4	1.2
03/31/2004	16:48	33	14353	26.72	4	1.39
03/31/2004	17:05	34	14352	26.6	3	1.26
03/31/2004	17:25	35	14354	27.18	3	1.17
03/31/2004	17:45	36	14360	26.57	3	0.84
03/31/2004	17:55	37	14355	26.73	3	1.19
03/31/2004	18:05	38	14356	26.59	3	1.11
03/31/2004	18:13	39	14351	26.64	3	1.02
03/31/2004	18:28	40	14359	26.83	3	0.78
03/31/2004	18:38	41	14356	26.68	7	2.3
03/31/2004	19:00	42	14352	26.66		

Total Fuel trucks	42 trucks
Average weight fuel trucks	26.70 tn
Total fuel weight	1121.5 tn
Total Bahia grass trucks	41 trucks
Average weight Bahia trucks	2581.95 lbs
Total Bahia Weight	52.93 tn
Percentage Bahia grass	4.72 %

Appendix B
Test Burn Slag Analysis

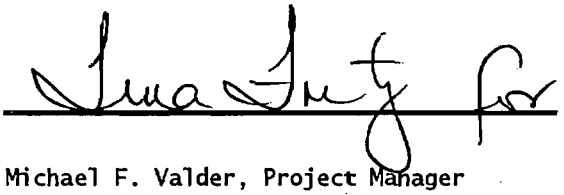
SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Report

For: Mr. Robert Dorey
Tampa Electric Company
5010 Causeway Blvd.
Tampa, FL 33619
CC:

Order Number: B422088
SDG Number:
Client Project ID:
Project: TCLP/BIOMASS SLAG
Report Date: 05/06/2004
Sampled By: Client
Sample Received Date: 05/04/2004
Requisition Number:
Purchase Order:



Michael F. Valder, Project Manager
mvalder@stl-inc.com

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Sample Summary

Order: B422088
Date Received: 05/04/2004

Client: Tampa Electric Company
Project: TCLP/BIOMASS SLAG

Client Sample ID	Lab Sample ID	Matrix	Date Sampled
BIOMASS SLAG	B422088*1	Solid	04/01/2004 12:00

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
22088-1	BIOMASS SLAG	Solid	05/04/04	04/01/04 12:00	

Parameter	Units	Lab Sample IDs 22088-1
Metals in TCLP (6010)		
Arsenic (TCLP)	mg/l	0.20U
Barium (TCLP)	mg/l	1.0U
Cadmium (TCLP)	mg/l	0.10U
Chromium (TCLP)	mg/l	0.20U
Lead (TCLP)	mg/l	0.20U
Selenium (TCLP)	mg/l	0.50U
Silver (TCLP)	mg/l	0.10U
Prep Date		05/05/04
Prep Time		09:30
Analysis Date		05/05/04
Beryllium (TCLP) (6010)		
Beryllium (TCLP)	mg/l	0.020U
Prep Date		05/05/04
Prep Time		09:30
Analysis Date		05/05/04
Thallium (TCLP) (6010)		
Thallium (TCLP)	mg/l	0.050U
Prep Date		05/05/04
Prep Time		09:30
Analysis Date		05/05/04

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
22088-1	BIOMASS SLAG	Solid	05/04/04	04/01/04 12:00	

Parameter	Units	Lab Sample IDs 22088-1
Nickel (TCLP)		
Nickel (TCLP)	mg/l	11
Prep Date		05/05/04
Prep Time		09:30
Analysis Date		05/05/04
Antimony (TCLP) (6010)		
Antimony (TCLP)	mg/l	0.030U
Prep Date		05/05/04
Prep Time		09:30
Analysis Date		05/05/04
Mercury in TCLP Extract (7470)		
Mercury in TCLP Extract	mg/l	0.020U
Prep Date		05/05/04
Prep Time		10:00
Analysis Date		05/05/04
TCLP extraction - non-volatile (1311)		
Phases *		1
% Solids *	%	100 %
% that passes 9.5 mm sieve *	%	100 %
pH (7.1.4.2) *		5.5
pH (7.1.4.4) *		1.6
Extraction Fluid *		1
Prep Date		05/04/04
Prep Time		16:11
Analysis Date		05/04/04

SEVERN TRENT STL

STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Telephone:(813) 885-7427 Fax:(813) 885-7049

Order Number: B422088

Method :EPA SW-846
DOH Certification #:E84282

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.
The estimated uncertainty associated with these reported results is available upon request.
I = The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

U = Indicates that the compound was analyzed for but not detected.

TECO
TAMPA ELECTRIC

ANALYSIS REQUEST & CHAIN OF CUSTODY

LABORATORY SERVICES

5012 CAUSEWAY BLVD., TAMPA, FL, 33619 PHONE:(813)228-4111

42 2088

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE) FLORIDA	REQUIRED ANALYSIS	Sample Kit Number	DUE DATE 5-6-04
SAMPLER'S PRINTED NAME JOHN McDANIEL	SAMPLER'S SIGNATURE		TCLP: As, Pb, Be, Th, Cd, Sb, Cr, Se, Hg, Ba, Ag, Ni		☑ EMAIL OR FAX RESULTS
P.O. NUMBER	CONTRACT NO.	SITE POLK POWER STATION			☑ MAIL RESULTS
CLIENT NAME ROBERT L. DOREY	CLIENT PHONE 813-630-7378	CLIENT FAX	PRESERVATIVE		NUMBER OF COOLERS SUBMITTED PER SHIPMENT:
CLIENT EMAIL RLDOREY@TECOENERGY.COM	CLIENT ADDRESS		NONE		

SAMPLE ID	SAMPLE DESCRIPTION	SAMPLING DATE	SAMPLING TIME	* MATRIX	NO. OF CONTAINERS SUBMITTED	REMARKS
	BIOMASS SLAG	4-1-04	1200	SO	1	

* GW - GROUND WATER SW - SURFACE WATER DW - DRINKING WATER WW - WASTE WATER C - COAL O - OIL SO - SOLID/SOIL SL - SLUDGE W - WASTE SAMPLE A - AIR

CONTAINERS/SEALS INTACT ☐ Yes ☐ No

ON ICE/ 4°C ☐ Yes ☑ No

SAMPLE TRANSFERS

RELINQUISHED BY:	RECEIVED BY:	DATE	TIME
PERSON'S NAME: Robert L. Dorey FACILITY NAME: TEC	PERSON'S NAME: FACILITY NAME: STL Tampa	05/4/04	9:40
PERSON'S NAME: FACILITY NAME:	PERSON'S NAME: FACILITY NAME:		
PERSON'S NAME: FACILITY NAME:	PERSON'S NAME: FACILITY NAME:		
PERSON'S NAME: FACILITY NAME:	PERSON'S NAME: FACILITY NAME:		
SHIPPING VENDOR:	BILL OF LADING NO:		
LOGGED IN BY: DATE:			

H:\Environmental Services\Lab\Forms\Admin Forms\Chain of Custody

SEVERN TRENT STL

Remit To: SEVERN TRENT LABORATORIES,INC. P.O. Box 7777 W4305 Philadelphia, PA 19175-4305
STL Tampa 6712 Benjamin Road, Suite 100 - Tampa FL 33634 Tel:813-885-7427 Fax:813-885-7049

INVOICE

Mr. Robert Dorey
Tampa Electric Company
5010 Causeway Blvd.
Tampa, FL 33619

Federal ID# 23-2919996

Invoice CC:

DATE	TERMS	CLIENT PO #	CLIENT PROJECT #	PROJECT
05/06/04	Net 0 Days			TCLP/BIOMASS SLAG

INVOICE #	CONTRACT #	CODE	
66016426		MV*426918	

LOG #	CREDIT / DEBIT	ORIGINATING LOG #	SDG #	REQUISITION #
B422088				

QUANTITY	MATRIX	METHOD	DESCRIPTION	UNIT PRICE	EXTENDED AMOUNT
1	Solid	6010	Metals in TCLP	105.00	105.00
1	Solid	6010	Beryllium (TCLP)	15.00	15.00
1	Solid	6010	Thallium (TCLP)	15.00	15.00
1	Solid	****	Nickel (TCLP)	15.00	15.00
1	Solid	6010	Antimony (TCLP)	15.00	15.00
1	Solid	7470	Mercury in TCLP Extract	42.00	42.00
1	Solid	1311	TCLP extraction - non-volatile	53.00	53.00
			Total for this page		$260.00
			INVOICE TOTAL		$260.00

REPORTED TO	OFFICE	OFFICE PHONE
Mr. Robert Dorey	Tampa Electric Company	(813) 630-7378

For proper credit, please show INVOICE NUMBER on your remittance.
After 30 days, service charges of 1.5% per 30 days will be applied to unpaid balance.

Appendix C
Biomass Emissions Data

Baseline Emissions Data for Coal and Petcoke Blend

Begin Date	SO2 (ppm)	SO2 (lb/hr)	NOx (ppm)	NOx (lb/hr)	CO (ppmvd)	CO lb/hr
3/30/04 7:00 AM	40.4	334.4	12.9	108.9	-	-
3/30/04 8:00 AM	40.8	336.6	13.6	115.9	7.3	17.4
3/30/04 9:00 AM	43.8	361.7	13.4	114.6	7.0	16.6
3/30/04 10:00 AM	45.9	375.8	13.4	112.7	7.0	16.6
3/30/04 11:00 AM	43.5	357.5	13.8	115.5	-	-
3/30/04 12:00 PM	42.6	351.2	13.7	114.4	-	-
3/30/04 1:00 PM	38.9	325.5	13.9	117.9	-	-
3/30/04 2:00 PM	41.9	354.8	13.5	115.9	-	-
3/30/04 3:00 PM	37.9	322.8	13.2	113.0	-	-
3/30/04 4:00 PM	40.2	339.8	13.1	113.6	-	-
3/30/04 5:00 PM	43.8	371.2	12.9	112.0	-	-

Test Burn Emissions Data for Coal, Petcoke and Biomass Blend

Begin Date	SO2 (ppm)	SO2 (lb/hr)	NOx (ppm)	NOx (lb/hr)	CO (ppmvd)	CO lb/hr
4/1/04 7:00 AM	46.5	385.7	13.2	110.9	-	-
4/1/04 8:00 AM	42.4	350.5	13.5	113.4	7.2	17.2
4/1/04 9:00 AM	43.3	358.4	13.8	116.3	7.0	16.8
4/1/04 10:00 AM	42.1	346.4	13.5	112.1	7.1	17.0
4/1/04 11:00 AM	42.9	353.3	13.6	114.2	-	-
4/1/04 12:00 PM	39.0	325.4	13.6	115.7	-	-
4/1/04 1:00 PM	39.3	325.6	13.8	116.4	-	-
4/1/04 2:00 PM	45.2	373.5	13.9	116.3	-	-
4/1/04 3:00 PM	40.6	335.8	13.0	109.2	-	-
4/1/04 4:00 PM	38.5	316.7	12.1	100.7	-	-
4/1/04 5:00 PM	39.7	323.7	10.9	90.0	-	-

Tampa Electric Company

Biomass Test Protocol
Polk Power Station Unit 1

TECO
TAMPA ELECTRIC

May 2004

Tampa Electric Company (TEC) proposes to conduct a test burn at Polk Power Station Unit 1 (PPS) to compare the standard fuel blend of up to 60% petcoke and coal by weight to a blend containing up to 5% biomass and 95% of the standard blend.

The baseline test burn will evaluate NO_x, SO_2 and CO emissions as a result of firing syngas produced from the gasification of a petcoke and coal fuel blend consisting of up to 60% petcoke. This baseline test will last for one day to facilitate collection of representative data.

The biomass blend test burn will evaluate the NO_x, SO_2 and CO emissions produced from the gasification of the above mentioned biomass fuel blend. This biomass blend test burn will last for one day to facilitate collection of representative data. Any residual biomass fuel stock that is on hand after the test burn will be consumed immediately after the test burn is completed.

The NO_x, SO_2 and CO test burn data will be collected and analyzed using the methodologies found in Table 1. Prior to blending, fuel testing will be done on the standard fuel blend and the biomass fuel individually. Continuous emissions monitors (CEMS), located in the combustion turbine stack, will be used to collect representative data for SO_2 and NO_x, emissions during the test burn. A stack test will be performed to collect representative data for CO. CEMS will be quality assured pursuant to 40 CFR 75, Appendix B. The data assessment report from 40 CFR 60, Appendix F, for the most recent relative accuracy test audit (RATA) and most recent cylinder gas audit (CGA), will be submitted with the test burn report.

During these tests, PPS Unit 1 will be operated at a minimum of 90% of the maximum permitted heat input. Upon completion of all testing, TEC will compile test results in a report to be submitted to the Florida Department of Environmental Protection within 45 days of completion of the test burn.

Table 1. Summary of data collection and monitoring methodologies to be used during the PPS biomass test burn.

Test	SO_2	NO_x	CO	Fuel Analysis
Baseline Test 1 Day	CEM Data[1]	CEM Data[1]	Stack Test Data	Weekly composite fuel analysis[2]
Biomass Test 1 Day	CEM Data[1]	CEM Data[1]	Stack Test Data	Weekly composite fuel analysis[2]

[1] Equivalent CEM data will be used in lieu of stack test data.

[2] Composite weekly fuel analysis results will be supplied during the baseline and test burn. Fuel analyses will include the following:

Fuel Analysis: Sulfur, wt. %, Volatiles, Content, wt. %, Nitrogen, wt. %, Ash, wt. %, Calorific Value, BTU/#, Carbon, wt. %, Moisture, wt. %

Attachment B
Responsible Official Signature

I, the undersigned, am the responsible official as defined in Chapter 62-213, F.A.C., of the Title V source for which this document is being submitted. I have reviewed the letter of request for authorization to conduct a biomass test burn at Polk Power Station. I hereby certify, based on the information and belief formed after reasonable inquiry, that the statements made and data contained in this document are true, accurate, and complete to the best of my knowledge.

Mark J. Hornick — 05/13/04

Signature — Date

Mark J. Hornick — General Manager, Polk Power Station

Name — Title

Attachment C
Professional Engineer's Certification

ATTACHMENT B

TAMPA ELECTRIC COMPANY
POLK POWER STATION UNIT 1
BIOMASS TEST BURN REPORT

Professional Engineer Certification

Professional Engineer Statement:

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

(1) To the best of my knowledge, the information provided in this submittal concerning tested emissions from Unit 1 while burning biomass at the Tampa Electric Company (TEC) Polk Power Station is true, accurate, and complete based on my review of material provided by TEC engineering and environmental staff; and

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

Signature

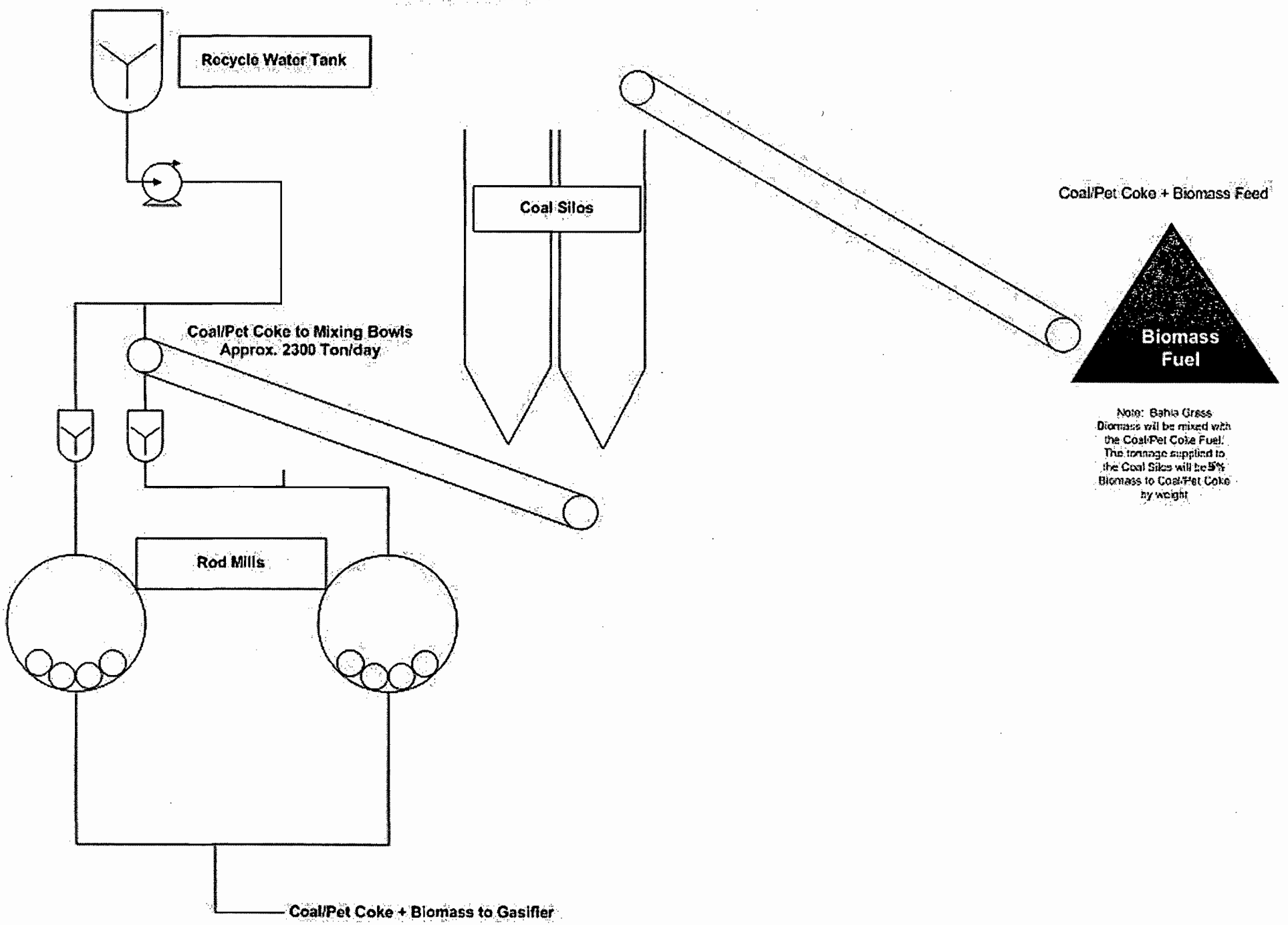
5/13/04
Date

(seal)

* Certification is applicable to the Tampa Electric Company (TEC) Biomass Test Burn Report for Polk Power Station Unit 1.

Attachment D
Biomass Process Flow Diagram

Polk Power Station Unit 1
Bahia Grass Biomass Burn Test
Process Flow Diagram
Revised 2/2/04



Note: Bahia Grass Biomass will be mixed with the Coal/Pet Coke Fuel. The tonnage supplied to the Coal Silos will be 5% Biomass to Coal/Pet Coke by weight

Attachment E
Biomass Representative Analysis

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass
Laboratory ID Number : AI09783

Test Name	Reference	Result	
Dry Basis			
Ash, Dry	ASTM D 5142	5.12	% By Weight
Heat of Combustion, Dry	ASTM D 5865	8159	Btu/lb
Carbon, Dry Basis	ASTM D 5373	47.87	% By Weight
Hydrogen, Dry Basis	ASTM D 5373	5.04	% By Weight
Nitrogen, Dry Basis	ASTM D 5373	1.22	% By Weight
Oxygen, Dry Basis	ASTM D 3176	40.60	% By Weight
Carbon Fixed, Dry	ASTM D 3172	13.43	% By Weight
Volatiles, Dry Basis	ASTM D 5142	81.45	% By Weight
Chlorine, Dry Basis	XRF	555	mg/kg
Fluorine, Dry Basis	XRF	49.	mg/kg
Sulfur, Dry Basis	ASTM D 4239	0.15	% By Weight
Aluminum, Dry Basis	XRF	0.055	% By Weight
Barium, Dry Basis	XRF	0.017	mg/kg
Calcium, Dry Basis	XRF	0.663	% By Weight
Iron, Dry Basis	XRF	0.027	% By Weight
Magnesium, Dry Basis	XRF	0.111	% By Weight
Phosphorus, Dry Basis	XRF	0.076	% By Weight
Potassium, Dry Basis	XRF	0.134	% By Weight
Silicon, Dry Basis	XRF	1.539	% By Weight
Antimony, Dry Basis	ASTM D 6357	0.2	mg/kg
Sodium, Dry Basis	XRF	Not Detected	% By Weight
Strontium, Dry Basis	XRF	Not Detected	per cent
Titanium, Dry Basis	XRF	0.008	% By Weight

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass
Laboratory ID Number : AI09783

Test Name	Reference	Result	
Beryllium, Dry Basis	ASTM D 6357	Not Detected	mg/kg
Cadmium, Dry Basis	ASTM D 6357	0.36	mg/kg
Chromium, Dry Basis	ASTM D 6357	1.9	mg/kg
Cobalt, Dry Basis	ASTM D 6357	0.3	mg/kg
Copper, Dry Basis	ASTM D 6357	6.1	mg/kg
Manganese, Dry Basis	ASTM D 6357	75.2	mg/kg
Nickel, Dry Basis	ASTM D 6357	3.1	mg/kg
Vanadium, Dry Basis	ASTM D 6357	3.5	mg/kg
Zinc, Dry Basis	ASTM D 6357	36.9	mg/kg
Arsenic, Dry Basis	ASTM D6357	0.4	mg/kg
Lead, Dry Basis	ASTM D6357	0.4	mg/kg
Mercury, Dry	ASTM D6414	0.022	mg/kg
As Received			
Moisture, Total	ASTM D 2013	29.23	% By Weight
Ash, As Received	ASTM D 5142	3.62	% By Weight
Heat of Combustion, As Received	ASTM D 5865	5774	Btu/lb
Carbon, As Received	ASTM D 5373	33.88	% By Weight
Hydrogen, As Received	ASTM D 5373	3.57	% By Weight
Nitrogen, As Received	ASTM D 5373	0.86	% By Weight
Oxygen, As Received	ASTM D 3176	28.73	% By Weight
Carbon Fixed, As Received	ASTM D 3172	9.50	% By Weight
Volatiles, As Received	ASTM D 5142	57.64	% By Weight
Chlorine, As Received	XRF	393.	mg/kg
Fluorine, As Received	XRF	35.	mg/kg

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass

Laboratory ID Number : AI09783

Test Name	Reference	Result	
Sulfur, As Received	ASTM D 4239	0.11	% By Weight
Aluminum, As Received	XRF	0.039	% By Weight
Barium, As Received	XRF	0.012	mg/kg
Calcium, As Received	XRF	0.469	% By Weight
Iron, As Received	XRF	0.019	% By Weight
Magnesium, As Received	XRF	0.078	% By Weight
Phosphorus, As Received	XRF	0.054	% By Weight
Potassium, As Received	XRF	0.094	% By Weight
Silicon, As Received	XRF	1.088	% By Weight
Sodium, As Received	XRF	Not Detected	% BY Weight
Antimony, As Received	ASTM D 6357	0.1	mg/kg
Strontium, As Received	XRF	Not Detected	per cent
Titanium, As Received	XRF	0.005	% By Weight
Beryllium, As Received	ASTM D 6357	Not Detected	mg/kg
Cadmium, As Received	ASTM D 6357	0.26	mg/kg
Chromium, As Received	ASTM D 6357	1.4	mg/kg
Cobalt, As Received	ASTM D 6357	0.2	mg/kg
Copper, As Received	ASTM D 6357	4.3	mg/kg
Manganese, As Received	ASTM D 6357	53.1	mg/kg
Nickel, As Received	ASTM D 6357	2.2	mg/kg
Vanadium, As Received	ASTM D 6357	2.5	mg/kg
Zinc, As Received	ASTM D 6357	26.1	mg/kg
Arsenic, As Received	ASTM D6357	0.3	mg/kg
Lead, As Received	ASTM D6357	0.3	mg/kg

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass
Laboratory ID Number : AI09783

Test Name	Reference	Result	
Mercury, As Received	ASTM D6414	0.016	mg/kg
Ignited as Element			
Sulfur, Ignited	XRF	1.62	% By Weight
Antimony, Ignited Basis	ASTM D 6357	3.6	mg/kg
Beryllium, Ignited Basis	ASTM D 6357	Not Detected	mg/kg
Cadmium, Ignited Basis	ASTM D 6357	7.10	mg/kg
Chromium, Ignited Basis	ASTM D 6357	37.9	mg/kg
Cobalt, Ignited Basis	ASTM D 6357	6.2	mg/kg
Arsenic, Ignited Basis	ASTM D 6357	7.6	mg/kg
Selenium, Ignited Basis	ASTM D 6357	10.6	mg/kg
Copper, Ignited Basis	ASTM D 6357	119.3	mg/kg
Lead, Ignited Basis	ASTM D 6357	7.4	mg/kg
Aluminum, Ignited Basis	XRF	1.07	% By Weight
Barium, Ignited Basis	XRF	0.336	% by Wt.
Manganese, Ignited Basis	ASTM D 6357	1468.0	mg/kg
Nickel, Ignited Basis	ASTM D 6357	60.7	mg/kg
Calcium, Ignited	XRF	12.95	% By Weight
Vanadium, Ignited Basis	ASTM D 6357	68.5	mg/kg
Zinc, Ignited Basis	ASTM D 6357	721.3	mg/kg
Iron, Ignited	XRF	0.52	% By Weight
Magnesium, Ignited	XRF	2.16	% By Weight
Phosphorus, Ignited	XRF	1.49	% By Weight
Potassium, Ignited	XRF	2.61	% By Weight
Silicon, Ignited	XRF	30.05	% By Weight

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass

Laboratory ID Number : AI09783

Test Name	Reference	Result	
Sodium, Ignited Basis	XRF	Not Detected	% By Weight
Titanium, Ignited	XRF	0.15	% By Weight
Ignited as Oxide			
Aluminum Oxide, Ignited Basis	XRF	2.03	% By Weight
Calcium Oxide, Ignited Basis	XRF	18.12	% By Weight
Iron Oxide, Ignited Basis	XRF	0.74	% By Weight
Magnesium Oxide, Ignited Basis	XRF	3.58	% By Weight
Phosphorus Oxide, Ignited Basis	ASTM D 3682	3.42	% By Weight
Potassium Oxide, Ignited Basis	XRF	3.15	% By Weight
Silicon Oxide, Ignited Basis	XRF	64.29	% By Weight
Sodium Oxide, Ignited	XRF	Not Detected	% By Weight
Sulfur Trioxide, Ignited	XRF	4.06	% By Weight
Titanium Oxide, Ignited	XRF	0.25	% By Weight
Antimony Oxide, Ignited	ASTM D 6357	4.8	mg/kg
Barium Oxide, Ignited	XRF	0.375	% by Wt.
Beryllium Oxide, Ignited	ASTM D 6357	Not Detected	mg/kg
Cadmium Oxide, Ignited	ASTM D 6357	8.11	mg/kg
Chromium Oxide, Ignited	ASTM D 6357	49.6	mg/kg
Cobalt Oxide (Co2O3), Ignited	ASTM D 6357	8.7	mg/kg
Copper Oxide, Ignited	ASTM D 6357	149.3	mg/kg
Lead Oxide, Ignited	ASTM D 6357	8.5	mg/kg
Manganese Oxide, Ignited	ASTM D 6357	2323.1	mg/kg
Nickel Oxide, Ignited	ASTM D 6357	77.2	mg/kg
Vanadium Pentoxide, Ignited	ASTM D 6357	122.3	mg/kg

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

General Test Laboratory
P.O. Box 2641
Birmingham, Alabama 35291
(205) 664 - 6081

CERTIFICATE OF ANALYSIS

TO: Mr. Robert Dorey
Central Testing Lab
Tampa Electric

Customer Account :
Sample Date : 01-Apr-04

Laboratory Account CTAMPA
Received Date : 07-Apr-04

Description : Tampa Electric

BIOMASS / Bahia Grass

Laboratory ID Number : AI09783

Test Name	Reference	Result	
Zinc Oxide, Ignited Basis	ASTM D 6357	897.8	mg/kg
General			
Heat of Combustion, MAF	ASTM D 5865	8599	Btu/lb
Sulfur, lbs/mmBTU	ASTM D 3180	0.184	lbs/mmBTU

This Certificate states the physical and/or chemical characteristics of the sample as submitted.

Comments:

CC:

Quality Control _____ Date : 5/7/2004
Supervision_____

smk/coal

Attachment F
Biomass Test Protocol

Attachment G
Biomass Stack Performance Test Report

EMISSIONS TEST REPORT

CARBON MONOXIDE, NITROGEN OXIDE, and SULFUR DIOXIDE
MARCH 30, 2004 and APRIL 1, 2004
POLK POWER STATION
BIOMASS TEST BURN
FACILITY ID NUMBER: 1050233
EMISSION UNIT ID NO: -001
UNIT #1

Prepared For:
Tampa Electric Company
Polk Power Station
P.O. Box 111
Tampa, Florida 33601-0111

Prepared By:
Tampa Electric Company
Environmental, Health & Safety
Environmental Services
Air Services Group

TECO
TAMPA ELECTRIC

Environmental Services
Air Services Group
5010 Causeway Boulevard
Tampa, Florida 33619- 6130

REPORT CERTIFICATION

I have reviewed the test performance, associated quality assurance activities, the resultant calculations, and the contents of this report, and certify that all project quality objectives have been met. This report is approved for submittal.

Date: 13 May 2004 Signature: _____

Raymond A. McDarby, Jr.
Senior Environmental Technician
Quality Assurance/Quality Control Specialist
Air Services Group
Environmental Health & Safety
Tampa Electric Company

The sampling and subsequent data entry/reduction detailed in this report were conducted at my direction, and I hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date: 13 May 2004 Signature: _____

Juan P. Ramirez
Environmental Technician
Test Team Lead
Air Services Group
Environmental Health & Safety
Tampa Electric Company

I have reviewed the testing details and results submitted in this report, and hereby certify that this test report is authentic and accurate to the best of my knowledge.

Date: 5/13/04 Signature: _____

David A. Smith
Coordinator – Air Services Group
Environmental Health & Safety
Tampa Electric Company

TABLE OF CONTENTS

1.0 INTRODUCTION

On March 30 and April 1, 2004, Tampa Electric Company's, Environmental Services, Air Services Group, performed Carbon Monoxide (CO) source emission tests on IGCC Unit No. 1 at the Polk Power Generating Station. During the testing on March 30, 2004, a baseline was established while the combustion turbine was fired with syngas (derived from a blend of 60% petroleum coke/40% coal) from a coal gasification system; during the testing on April 1, 2004, the combustion turbine was fired with Syngas (derived from a blend of 60% petroleum coke/35% coal/5% biomass). Testing was conducted according to United States Environmental Protection Agency (USEPA) test methods stipulated in 40 CFR Part 60, Appendix A and Florida Department of Environmental Protection (FDEP) permit no. 1050233-012-AV. CO testing was conducted using USEPA reference method 10. Data from the Continuous Emissions Monitoring System (CEMS) was used to determine Nitrogen Oxides (NO_x) and SO_2 emission levels.

2.0 DISCUSSION OF RESULTS

Carbon Monoxide (CO) emission rates were derived from 3, 1-hour test runs. During the baseline test conducted on March 30, 2004, the calculated average emission rate was 17 lbs CO/hr. During the biomass test conducted on April 1, 2004, the calculated average emission rate was 17 lbs CO/hr.

Nitrogen Oxides (NO_x) concentrations and emission rates were derived from 3, 1-hour CEMS averages, corresponding to the CO test periods. During the baseline test conducted on March 30, 2004, the calculated average concentration was 13 ppmvd NO_x @ 15% O2, with an average emission rate of 112 lbs NO_x/hr. During the biomass test conducted on April 1, 2004, the calculated average concentration was 13 ppmvd NO_x @ 15% O2, with an average emission rate of 113 lbs NO_x/hr.

The Sulfur Dioxide (SO_2) emission rate was derived from 3, 1-hour CEMS averages, corresponding to the CO test periods. During the baseline test conducted on March 30, 2004, the calculated average was 325 lbs SO_2/hr. During the biomass test conducted on April 1, 2004, the calculated average was 325 lbs SO_2/hr.

During the test on, March 30, 2004, Unit No. 1 Combustion Turbine was operated at an average load of 185 megawatts and an average heat input of 1740 mmBtu/hr. During the test on, April 1, 2004, Unit No. 1 Combustion Turbine was operated at an average load of 185 megawatts and an average heat input of 1744 mmBtu/hr. Details of turbine operation are included in Appendix C.

3.0 SOURCE DESCRIPTION/TEST PROCEDURES

Polk Power Electrical Generating Station is located at County Road 630 approximately 13 miles southwest of Bartow, Polk County, Florida. Unit No. 1 is an IGCC generating unit, 192 MW capacity when fired with Syngas fuel. The source sampling location consists of a circular stack 19 feet in diameter with four sample ports located 90 degrees apart on the stack circumference. A diagram of the stack sampling location is included along with other pertinent information on the test site.

Carbon monoxide sampling was performed in accordance with USEPA Reference Method 10 (40 CFR Part 60, Appendix A) "Determination of Carbon Monoxide Emissions from Stationary Sources". Testing was performed using a Thermo Environmental Model 48 gas filter correlation CO analyzer.

Nitrogen oxides and sulfur dioxide data was provided by the CEMS Data Acquisition and Handling System (DAHS). Three 1-hour samples were selected from the time period bracketed by the carbon monoxide test period. All data was taken from the DBFHIST program. These reports are contained in Appendix B.

All mass emission rates were calculated based on the Heat Input value calculated from the mass fuel flow, corrected for saturator moisture, and the fuel analysis supplied by the plant's laboratory. The details are contained in Appendix C.

4.0 TEST RESULTS

TECO
TAMPA ELECTRIC

POLK POWER STATION
CARBON MONOXIDE DATA

BASELINE
UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
March 30, 2004

Run	Run Times		RM - 10 CO	RM - 3A O_2	CO
Number	Start	Stop	ppmvd	%, volume dry	lbs/hr
1	0758	0858	7.31	11.68	17.35
2	0905	1005	6.99	11.69	16.61
3	1015	1115	7.01	11.68	16.64
				Average:	16.864

CO, lbs/hr calculated as:

CO, ppmvd x C_f x F_d x (20.9 / (20.9 - O_2 %, volume)) x Heat Input

where:

C_f = 7.2725E-08 lb/scf

F_d = 8276 dscf/mmBtu, from fuel analysis

Heat Input = 1739.5 mmBtu/hr, from heat input calculations

TECO
TAMPA ELECTRIC

POLK POWER STATION
CARBON MONOXIDE DATA

BIOMASS
UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
April 1, 2004

Run	Run Times		RM - 10 CO	RM - 3A O_2	CO
Number	Start	Stop	ppmvd	%, volume dry	lbs/hr
1	0801	0901	7.21	11.68	17.17
2	0907	1007	7.01	11.72	16.77
3	1014	1114	7.1	11.70	16.95
				Average:	16.962

CO, lbs/hr calculated as:

CO, ppmvd x C_f x F_d x (20.9 / (20.9 - O_2 %, volume)) x Heat Input

where:

C_f = 7.2725E-08 lb/scf

F_d = 8286 dscf/mmBtu, from fuel analysis

Heat Input = 1743.7 mmBtu/hr, from heat input calculations

TECO
TAMPA ELECTRIC

POLK POWER STATION
NITROGEN OXIDES DATA FROM CEMS

BASELINE

UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
March 30, 2004

			CEMS Data			
Run	Run Times		NO_x	NO_x	CO_2	NO_x
Number	Start	Stop	ppm, wet	ppmvd @ 15% O2	%, vw	lbs/hr
1	0758	0858	19.143	13.358	8.275	112.28
2	0905	1005	19.217	13.481	8.263	112.88
3	1015	1115	18.996	13.357	8.285	111.29
			Averages:	13.3988	8.2740	112.147

NO_x, lbs/hr is calculated as:

NO_x, ppm wet x C_f x F_c x (100 / CO_2 %, vw)) x Heat Input

where:

C_f = 1.1946E-07 lb/scf

F_c = 2336 dscf/mmBtu, from fuel analysis

Heat Input = 1739.5 mmBtu/hr, from heat input calculations

CEMS Data source is Data Acquisition and Handling System DBFHIST program.

TECO
TAMPA ELECTRIC

POLK POWER STATION
NITROGEN OXIDES DATA FROM CEMS

BIOMASS
UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
April 1, 2004

			CEMS Data			
Run	Run Times		NO_x	NO_x	CO_2	NO_x
Number	Start	Stop	ppm, wet	ppmvd @ 15% O2	%, vw	lbs/hr
1	0801	0901	19.144	13.522	8.250	113.58
2	0907	1007	19.165	13.565	8.227	114.01
3	1014	1114	18.859	13.319	8.234	112.10
			Averages:	13.4685	8.2368	113.231

NO_x, lbs/hr is calculated as:

NO_x, ppm wet x C_f x F_c x (100 / CO_2 %, vw)) x Heat Input

where:

C_f = 1.1946E-07 lb/scf

F_c = 2350 dscf/mmBtu, from fuel analysis

Heat Input = 1743.7 mmBtu/hr, from heat input calculations

CEMS Data source is Data Acquisition and Handling System DBFHIST program.

TECO
TAMPA ELECTRIC

POLK POWER STATION
SULFUR DIOXIDE DATA FROM CEMS

BASELINE

UNIT # 1

COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS

March 30, 2004

			CEMS Data		
Run	Run Times		SO_2	CO_2	SO_2
Number	Start	Stop	ppm, wet	%, vw	lbs/hr
1	0758	0858	37.349	8.275	305.05
2	0905	1005	40.724	8.263	333.11
3	1015	1115	41.449	8.285	338.14
				Averages:	325.43

SO_2, lbs/hr is calculated as:

SO_2, ppm x C_f x F_c x (100 / CO2 % vw) x Heat Input

where:

C_f = 1.6635E-07 lb/scf

F_c = 2336 dscf/mmBtu, from fuel analysis

Heat Input = 1739.5 mmBtu/hr, from heat input calculations

CEMS Data source is Data Acquisition and Handling System DBFHIST program.

TECO
TAMPA ELECTRIC

POLK POWER STATION
SULFUR DIOXIDE DATA FROM CEMS

BIOMASS
UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
April 1, 2004

			CEMS Data		
Run	Run Times		SO_2	CO_2	SO_2
Number	Start	Stop	ppm, wet	%, vw	lbs/hr
1	0801	0901	39.280	8.250	324.52
2	0907	1007	39.733	8.227	329.15
3	1014	1114	38.659	8.234	320.00
				Averages:	324.56

SO_2, lbs/hr is calculated as:

SO_2, ppm x C_f x F_c x (100 / CO2 % vw) x Heat Input

where:

C_f = 1.6635E-07 lb/scf

F_c = 2350 dscf/mmBtu, from fuel analysis

Heat Input = 1743.7 mmBtu/hr, from heat input calculations

CEMS Data source is Data Acquisition and Handling System DBFHIST program.

TECO
TAMPA ELECTRIC

POLK POWER STATION
HEAT INPUT CALCULATIONS

BASELINE

UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
March 30, 2004

Average Fuel Flow for Test Period =	110.07952	lbs/sec
Average Satuator Moisture for Test Period =	2.0706211	% H_2O
Fuel Flow Corrected for Moisture =	107.80019	lbs/sec
Fuel Density =	0.0565057	
Volumetric Fuel Flow Rate, F =	6.868E+06	ft^3/hr
Higher Heating Value of syngas fuel, H_g =	253	Btu/ft^3
Average Heat Input =	H_g x F	
=	1.740E+09	Btu/hr
=	1739.5	mmBtu/hr

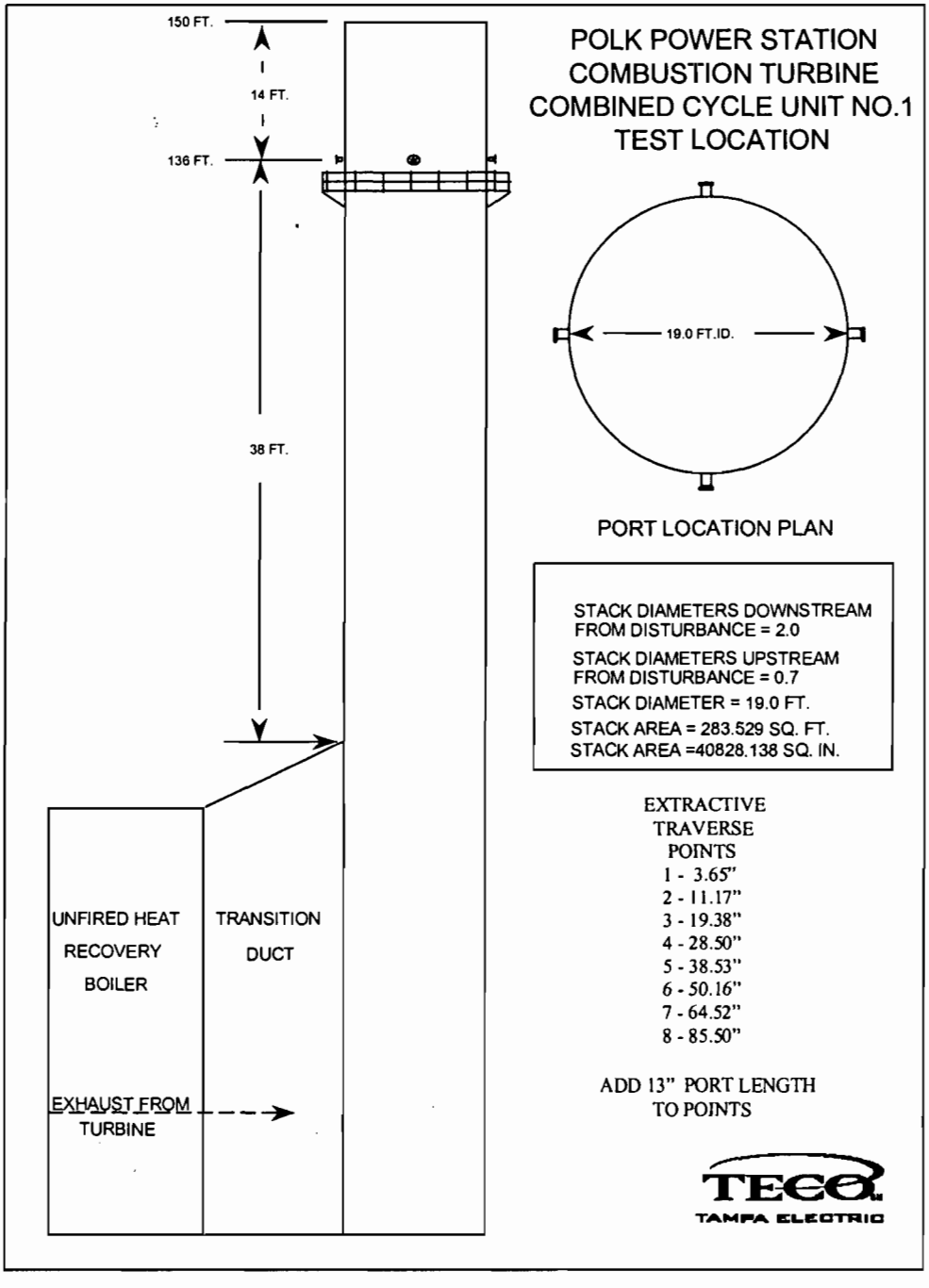
TECO
TAMPA ELECTRIC

POLK POWER STATION
HEAT INPUT CALCULATIONS

BIOMASS
UNIT # 1
COMBINED CYCLE COMBUSTION TURBINE - FIRING SYNGAS
April 1, 2004

Average Fuel Flow for Test Period =	111.39787	lbs/sec
Average Satuator Moisture for Test Period =	2.8701868	% H_2O
Fuel Flow Corrected for Moisture =	108.20054	lbs/sec
Fuel Density =	0.0565396	
Volumetric Fuel Flow Rate, F =	6.889E+06	ft^3/hr
Higher Heating Value of syngas fuel, H_g =	253	Btu/ft^3
Average Heat Input =	H_g x F	
=	1.744E+09	Btu/hr
=	1743.7	mmBtu/hr

5.0 FIGURES


150 FT.
14 FT.
136 FT.
38 FT.
UNFIRED HEAT RECOVERY BOILER
TRANSITION DUCT
EXHAUST FROM TURBINE
POLK POWER STATION
COMBUSTION TURBINE
COMBINED CYCLE UNIT NO.1
TEST LOCATION
19.0 FT.ID.
PORT LOCATION PLAN
STACK DIAMETERS DOWNSTREAM FROM DISTURBANCE = 2.0
STACK DIAMETERS UPSTREAM FROM DISTURBANCE = 0.7
STACK DIAMETER = 19.0 FT.
STACK AREA = 283.529 SQ. FT.
STACK AREA =40828.138 SQ. IN.
EXTRACTIVE TRAVERSE POINTS
1 - 3.65"
2 - 11.17"
3 - 19.38"
4 - 28.50"
5 - 38.53"
6 - 50.16"
7 - 64.52"
8 - 85.50"
ADD 13" PORT LENGTH TO POINTS
TECO
TAMPA ELECTRIC

APPENDIX A

CARBON MONOXIDE TEST AND SUPPORTING DATA

A-1 RM 10/3A BASELINE DATA REPORT

Polk Unit 1 Biomass - Report			
RUN 1			
03/30/2004			
7:58			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	-0.186
Low Level Observed	6.301	4.978	6.045
Mid Level Observed	12.41	11.18	12.32
High Level Observed	21.01	18.31	-
% Difference from Zero to Target	0.06	0.47	-0.93
% Difference from Low to Target	0.12	-0.21	0.13
% Difference from Mid to Target	0.42	0.9	-1.38
% Difference from High to Target	0.45	1.55	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	-0.186
Actual Span From Linearity	12.41	11.18	6.045
Initial Readings			
Zero	0.014	0.095	-0.127
Span	12.34	11.18	6.123
Final Readings			
Zero	0.014	0.095	-0.03
Span	12.34	11.18	6.152
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.29
Span Bias	-0.24	0	0.39
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.78
Span Bias	-0.24	0	0.54
Calculated Drift			
Zero Drift (Run-Run)	0	0	0.48
Span Drift	0	0	0.14
Run Results			
Raw Results	11.72	9.15	7.47
Corrected Results (ppmv)	11.68	8.98	7.31

Polk Unit 1 Biomass - Report			
RUN 2			
03/30/2004			
9:05			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	-0.186
Low Level Observed	6.301	4.978	6.045
Mid Level Observed	12.41	11.18	12.32
High Level Observed	21.01	18.31	-
% Difference from Zero to Target	0.06	0.47	-0.93
% Difference from Low to Target	0.12	-0.21	0.13
% Difference from Mid to Target	0.42	0.9	-1.38
% Difference from High to Target	0.45	1.55	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	-0.186
Actual Span From Linearity	12.41	11.18	6.045
Initial Readings			
Zero	0.014	0.095	-0.03
Span	12.34	11.18	6.152
Final Readings			
Zero	0.014	0.095	-0.049
Span	12.34	11.18	6.123
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.78
Span Bias	-0.24	0	0.54
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.69
Span Bias	-0.24	0	0.39
Calculated Drift			
Zero Drift (Run-Run)	0	0	-0.1
Span Drift	0	0	-0.14
Run Results			
Raw Results	11.73	9.13	7.13
Corrected Results (ppmv)	11.69	8.96	6.99

Polk Unit 1 Biomass - Report			
RUN 3			
03/30/2004			
10:15			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	-0.186
Low Level Observed	6.301	4.978	6.045
Mid Level Observed	12.41	11.18	12.32
High Level Observed	21.01	18.31	-
% Difference from Zero to Target	0.06	0.47	-0.93
% Difference from Low to Target	0.12	-0.21	0.13
% Difference from Mid to Target	0.42	0.9	-1.38
% Difference from High to Target	0.45	1.55	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	-0.186
Actual Span From Linearity	12.41	11.18	6.045
Initial Readings			
Zero	0.014	0.095	-0.049
Span	12.34	11.18	6.123
Final Readings			
Zero	0.014	0.095	-0.049
Span	12.34	11.18	6.123
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.69
Span Bias	-0.24	0	0.39
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.69
Span Bias	-0.24	0	0.39
Calculated Drift			
Zero Drift (Run-Run)	0	0	0
Span Drift	0	0	0
Run Results			
Raw Results	11.72	9.14	7.14
Corrected Results (ppmv)	11.68	8.97	7.01

A-2 RM 10/3A BASELINE DATA LOG

Date	Time	O2 (PPM)	CO2 (PPM)	CO (PPM)	CO (PPM) @ 15% O2	Status
03/30/2004	7:14:29 AM	11.73	9.23	6.84	4.400061	
03/30/2004	7:14:59 AM	11.67	9.18	6.91	4.42091	
03/30/2004	7:15:29 AM	11.73	9.18	6.65	4.280626	
03/30/2004	7:15:59 AM	11.67	9.18	6.7	4.283531	
03/30/2004	7:16:29 AM	11.55	7.57	6.38	4.024221	
03/30/2004	7:16:59 AM	12.34	11.03	2.22	1.528548	
03/30/2004	7:17:29 AM	12.34	11.18	-0.03	-0.020398	Linearity Check
03/30/2004	7:17:59 AM	15.4	9.37	-0.12	-0.125932	Linearity Check
03/30/2004	7:18:29 AM	21.01	5.03	-0.19	9.778046	Linearity Check
03/30/2004	7:18:59 AM	21.5	4.98	-0.12	1.154252	Linearity Check
03/30/2004	7:19:29 AM	6.3	18.12	-0.09	-0.035635	Linearity Check
03/30/2004	7:19:59 AM	6.12	18.26	-0.11	-0.04299	Linearity Check
03/30/2004	7:20:29 AM	0.08	0.14	0.59	0.165929	Linearity Check
03/30/2004	7:20:59 AM	-0.05	0.09	5.56	1.565061	Linearity Check
03/30/2004	7:21:29 AM	0.01	0.09	6.14	1.735159	Linearity Check
03/30/2004	7:21:59 AM	0.01	0.09	6.16	1.740676	Linearity Check
03/30/2004	7:22:29 AM	0.01	0.09	6.04	1.707571	Linearity Check
03/30/2004	7:22:59 AM	21.26	0.09	9.13	-151.197527	Linearity Check
03/30/2004	7:23:29 AM	21.38	0.09	11.96	-147.54181	Linearity Check
03/30/2004	7:23:59 AM	21.38	0.09	12.25	-151.034721	Linearity Check
03/30/2004	7:24:29 AM	21.38	0.09	12.26	-151.155218	Linearity Check
03/30/2004	7:24:59 AM	21.38	0.09	12.42	-153.202791	Linearity Check
03/30/2004	7:25:29 AM	2.15	0.05	12.19	3.835102	Linearity Check
03/30/2004	7:25:59 AM	0.01	0.09	8.98	2.537948	Linearity Check
03/30/2004	7:26:29 AM	0.01	0.09	6.04	1.707571	Linearity Check
03/30/2004	7:26:59 AM	11.98	10.84	6.04	3.990912	Linearity Check
03/30/2004	7:27:29 AM	12.41	11.18	0.76	0.528874	Linearity Check
03/30/2004	7:27:59 AM	12.47	11.23	-0.2	-0.136837	Linearity Check
03/30/2004	7:28:29 AM	18.75	1.32	-0.12	-0.322908	
03/30/2004	7:28:59 AM	19.18	0.68	-0.18	-0.60427	
03/30/2004	7:29:29 AM	11.67	9.13	2.91	1.860674	
03/30/2004	7:29:59 AM	8.25	3.61	7.6	3.544809	
03/30/2004	7:30:29 AM	12.28	11.08	5.01	3.430155	
03/30/2004	7:30:59 AM	12.34	11.13	0.27	0.188373	
03/30/2004	7:31:29 AM	12.34	11.13	-0.14	-0.094478	Initial Span - Span
03/30/2004	7:31:59 AM	12.34	11.18	-0.1	-0.067539	Initial Span - Span
03/30/2004	7:32:29 AM	3.07	1.41	-0.04	-0.013016	Initial Span - Span
03/30/2004	7:32:59 AM	0.01	0.14	3.92	1.106169	Initial Span - Span
03/30/2004	7:33:29 AM	0.01	0.09	6.04	1.704813	Initial Span - Zero
03/30/2004	7:33:59 AM	0.08	0.09	6.11	1.731944	Initial Span - Zero
03/30/2004	7:34:29 AM	0.01	0.09	6.14	1.735159	Initial Span - Zero
03/30/2004	7:34:59 AM	11.49	8.98	6.29	3.943011	Initial Span - Zero
03/30/2004	7:35:29 AM	11.73	9.13	7.4	4.764653	Initial Span - Zero
03/30/2004	7:35:59 AM	11.73	9.13	7.76	4.997238	Initial Span - Zero
03/30/2004	7:36:29 AM	11.73	9.13	7.7	4.959521	Initial Span - Zero
03/30/2004	7:36:59 AM	11.73	9.13	7.64	4.915519	Initial Span - Zero
03/30/2004	7:37:29 AM	11.73	9.13	7.63	4.909233	Initial Span - Zero
03/30/2004	7:37:59 AM	11.73	9.18	7.63	4.909233	Initial Span - Zero
03/30/2004	7:38:29 AM	11.73	9.18	7.78	5.009809	Initial Span - Zero
03/30/2004	7:38:59 AM	11.73	9.18	7.73	4.978379	Initial Span - Zero
03/30/2004	7:39:29 AM	11.73	9.23	7.62	4.902947	Initial Span - Zero
03/30/2004	7:39:59 AM	11.67	9.18	7.86	5.026624	Initial Span - Zero
03/30/2004	7:40:29 AM	11.67	9.18	7.9	5.051602	Initial Span - Zero
03/30/2004	7:40:59 AM	11.67	9.18	7.71	4.932957	Initial Span - Zero
03/30/2004	7:41:29 AM	11.67	9.18	7.69	4.914224	Initial Span - Zero

03/30/2004	7:41:59 AM	11.73	9.18	7.66	4.928091	Initial Span - Zero
03/30/2004	7:42:29 AM	11.73	9.18	7.64	4.915519	Initial Span - Zero
03/30/2004	7:42:59 AM	11.73	9.18	7.6	4.890374	Initial Span - Zero
03/30/2004	7:43:29 AM	11.73	9.13	7.62	4.902947	Initial Span - Zero
03/30/2004	7:43:59 AM	11.67	9.13	7.61	4.864268	Initial Span - Zero
03/30/2004	7:44:29 AM	11.73	9.18	7.5	4.827514	Initial Span - Zero
03/30/2004	7:44:59 AM	11.67	9.18	7.78	4.976668	Initial Span - Zero
03/30/2004	7:45:29 AM	11.67	9.18	7.91	5.057846	Initial Span - Zero
03/30/2004	7:45:59 AM	11.73	9.23	8.05	5.179533	Initial Span - Zero
03/30/2004	7:46:29 AM	11.73	9.23	7.81	5.028668	Initial Span - Zero
03/30/2004	7:46:59 AM	11.73	9.18	7.7	4.953235	Initial Span - Zero
03/30/2004	7:47:29 AM	11.73	9.18	7.77	5.003523	Initial Span - Zero
03/30/2004	7:47:59 AM	11.73	9.13	7.71	4.965807	Initial Span - Zero
03/30/2004	7:48:29 AM	11.73	9.13	7.8	5.022382	Initial Span - Zero
03/30/2004	7:48:59 AM	11.73	9.18	7.77	5.003523	Initial Span - Zero
03/30/2004	7:49:29 AM	11.73	9.18	7.7	4.953235	Initial Span - Zero
03/30/2004	7:49:59 AM	11.73	9.18	7.81	5.028668	Initial Span - Zero
03/30/2004	7:50:29 AM	11.73	9.18	7.71	4.965807	Initial Span - Zero
03/30/2004	7:50:59 AM	11.73	9.18	7.8	5.022382	Initial Span - Zero
03/30/2004	7:51:29 AM	11.67	9.18	7.65	4.889245	Initial Span - Zero
03/30/2004	7:51:59 AM	11.67	9.18	7.77	4.970424	Initial Span - Zero
03/30/2004	7:52:29 AM	11.67	9.23	7.94	5.07658	Initial Span - Zero
03/30/2004	7:52:59 AM	11.73	9.13	7.8	5.022382	Initial Span - Zero
03/30/2004	7:53:29 AM	11.73	9.13	7.7	4.959521	Initial Span - Zero
03/30/2004	7:53:59 AM	11.73	9.18	7.48	4.814942	Initial Span - Zero
03/30/2004	7:54:29 AM	11.73	9.23	7.52	4.840086	Initial Span - Zero
03/30/2004	7:54:59 AM	11.73	9.23	7.84	5.047526	Initial Span - Zero
03/30/2004	7:55:29 AM	11.73	9.18	7.88	5.07267	Initial Span - Zero
03/30/2004	7:55:59 AM	11.73	9.13	7.84	5.047526	Initial Span - Zero
03/30/2004	7:56:29 AM	11.73	9.13	7.8	5.022382	Initial Span - Zero
03/30/2004	7:56:59 AM	11.73	9.18	7.58	4.877803	Initial Span - Zero
03/30/2004	7:57:29 AM	11.73	9.18	7.64	4.915519	Initial Span - Zero
03/30/2004	7:57:59 AM	11.73	9.18	7.84	5.047526	Initial Span - Zero
03/30/2004	7:58:29 AM	11.73	9.18	7.7	4.959521	Initial Span - Zero
03/30/2004	7:58:59 AM	11.67	9.18	7.62	4.870512	Run 1 - 1
03/30/2004	7:59:29 AM	11.73	9.13	7.92	5.097815	Run 1 - 1
03/30/2004	7:59:59 AM	11.67	9.13	7.9	5.051602	Run 1 - 1
03/30/2004	8:00:29 AM	11.73	9.18	8	5.148103	Run 1 - 1
03/30/2004	8:00:59 AM	11.73	9.18	7.6	4.890374	Run 1 - 1
03/30/2004	8:01:29 AM	11.67	9.23	7.56	4.833046	Run 1 - 1
03/30/2004	8:01:59 AM	11.73	9.18	7.58	4.877803	Run 1 - 1
03/30/2004	8:02:29 AM	11.73	9.18	7.9	5.085243	Run 1 - 1
03/30/2004	8:02:59 AM	11.73	9.18	7.76	4.997238	Run 1 - 1
03/30/2004	8:03:29 AM	11.73	9.23	7.66	4.928091	Run 1 - 1
03/30/2004	8:03:59 AM	11.73	9.18	7.64	4.915519	Run 1 - 1
03/30/2004	8:04:29 AM	11.73	9.18	7.62	4.902947	Run 1 - 1
03/30/2004	8:04:59 AM	11.73	9.18	7.6	4.890374	Run 1 - 1
03/30/2004	8:05:29 AM	11.73	9.18	7.6	4.890374	Run 1 - 1
03/30/2004	8:05:59 AM	11.73	9.13	7.76	4.997238	Run 1 - 1
03/30/2004	8:06:29 AM	11.73	9.13	7.54	4.852658	Run 1 - 1
03/30/2004	8:06:59 AM	11.73	9.18	7.5	4.827514	Run 1 - 1
03/30/2004	8:07:29 AM	11.67	9.18	7.54	4.820556	Run 1 - 1
03/30/2004	8:07:59 AM	11.67	9.18	7.6	4.858023	Run 1 - 1
03/30/2004	8:08:29 AM	11.67	9.23	7.76	4.96418	Run 1 - 1
03/30/2004	8:08:59 AM	11.67	9.18	7.88	5.039113	Run 1 - 1
03/30/2004	8:09:29 AM	11.67	9.18	7.64	4.883001	Run 1 - 1

03/30/2004	8:09:59 AM	11.67	9.13	7.62	4.870512	Run 1 - 1
03/30/2004	8:10:29 AM	11.67	9.18	7.66	4.89549	Run 1 - 1
03/30/2004	8:10:59 AM	11.67	9.18	7.68	4.907979	Run 1 - 1
03/30/2004	8:11:29 AM	11.73	9.18	7.78	5.009809	Run 1 - 1
03/30/2004	8:11:59 AM	11.67	9.18	7.5	4.795579	Run 1 - 1
03/30/2004	8:12:29 AM	11.67	9.18	6.64	4.246065	Run 1 - 1
03/30/2004	8:12:59 AM	11.67	9.18	7	4.47711	Run 1 - 1
03/30/2004	8:13:29 AM	11.73	9.18	7.8	5.022382	Run 1 - 1
03/30/2004	8:13:59 AM	11.73	9.18	7.8	5.022382	Run 1 - 1
03/30/2004	8:14:29 AM	11.67	9.13	7.81	4.995402	Run 1 - 1
03/30/2004	8:14:59 AM	11.67	9.13	7.98	5.101558	Run 1 - 1
03/30/2004	8:15:29 AM	11.67	9.13	7.94	5.07658	Run 1 - 1
03/30/2004	8:15:59 AM	11.67	9.13	7.94	5.07658	Run 1 - 1
03/30/2004	8:16:29 AM	11.67	9.08	7.88	5.039113	Run 1 - 1
03/30/2004	8:16:59 AM	11.67	9.13	7.96	5.089068	Run 1 - 1
03/30/2004	8:17:29 AM	11.73	9.18	7.84	5.047526	Run 1 - 1
03/30/2004	8:17:59 AM	11.67	9.18	7.63	4.876757	Run 1 - 1
03/30/2004	8:18:29 AM	11.73	9.18	7.74	4.984665	Run 1 - 1
03/30/2004	8:18:59 AM	11.67	9.18	7.67	4.901735	Run 1 - 1
03/30/2004	8:19:29 AM	11.73	9.13	7.58	4.877803	Run 1 - 1
03/30/2004	8:19:59 AM	11.73	9.18	7.44	4.789797	Run 1 - 1
03/30/2004	8:20:29 AM	11.67	9.18	7.47	4.776845	Run 1 - 1
03/30/2004	8:20:59 AM	11.73	9.18	7.72	4.972093	Run 1 - 1
03/30/2004	8:21:29 AM	11.73	9.18	7.92	5.097815	Run 1 - 1
03/30/2004	8:21:59 AM	11.73	9.13	7.73	4.978379	Run 1 - 1
03/30/2004	8:22:29 AM	11.73	9.18	7.38	4.752081	Run 1 - 1
03/30/2004	8:22:59 AM	11.73	9.23	7.49	4.821228	Run 1 - 1
03/30/2004	8:23:29 AM	11.67	9.13	7.32	4.683178	Run 1 - 1
03/30/2004	8:23:59 AM	11.67	9.18	7.58	4.845535	Run 1 - 1
03/30/2004	8:24:29 AM	11.73	9.13	7.38	4.752081	Run 1 - 1
03/30/2004	8:24:59 AM	11.67	9.18	7.44	4.758111	Run 1 - 1
03/30/2004	8:25:29 AM	11.73	9.18	7.46	4.802369	Run 1 - 1
03/30/2004	8:25:59 AM	11.73	9.13	7.74	4.984665	Run 1 - 1
03/30/2004	8:26:29 AM	11.73	9.13	7.62	4.902947	Run 1 - 1
03/30/2004	8:26:59 AM	11.73	9.08	7.48	4.814942	Run 1 - 1
03/30/2004	8:27:29 AM	11.73	9.13	7.29	4.689221	Run 1 - 1
03/30/2004	8:27:59 AM	11.73	9.13	7.42	4.777226	Run 1 - 1
03/30/2004	8:28:29 AM	11.73	9.13	7.32	4.714365	Run 1 - 1
03/30/2004	8:28:59 AM	11.73	9.13	7.52	4.840086	Run 1 - 1
03/30/2004	8:29:29 AM	11.73	9.18	7.92	5.097815	Run 1 - 1
03/30/2004	8:29:59 AM	11.67	9.18	7.54	4.820556	Run 1 - 1
03/30/2004	8:30:29 AM	11.73	9.18	7.36	4.739509	Run 1 - 1
03/30/2004	8:30:59 AM	11.67	9.18	7.4	4.733134	Run 1 - 1
03/30/2004	8:31:29 AM	11.67	9.13	7.5	4.795579	Run 1 - 1
03/30/2004	8:31:59 AM	11.73	9.13	7.46	4.802369	Run 1 - 1
03/30/2004	8:32:29 AM	11.73	9.13	7.66	4.928091	Run 1 - 1
03/30/2004	8:32:59 AM	11.73	9.13	7.5	4.827514	Run 1 - 1
03/30/2004	8:33:29 AM	11.73	9.18	7.58	4.877803	Run 1 - 1
03/30/2004	8:33:59 AM	11.73	9.13	7.15	4.601216	Run 1 - 1
03/30/2004	8:34:29 AM	11.73	9.18	7.36	4.739509	Run 1 - 1
03/30/2004	8:34:59 AM	11.73	9.18	7.42	4.777226	Run 1 - 1
03/30/2004	8:35:29 AM	11.67	9.13	7.44	4.758111	Run 1 - 1
03/30/2004	8:35:59 AM	11.67	9.13	7.54	4.820556	Run 1 - 1
03/30/2004	8:36:29 AM	11.73	9.13	7.51	4.8338	Run 1 - 1
03/30/2004	8:36:59 AM	11.73	9.18	7.2	4.632646	Run 1 - 1
03/30/2004	8:37:29 AM	11.67	9.13	7.18	4.58951	Run 1 - 1

03/30/2004	8:37:59 AM	11.67	9.18	7.31	4.676933	Run 1 - 1
03/30/2004	8:38:29 AM	11.67	9.13	7.66	4.89549	Run 1 - 1
03/30/2004	8:38:59 AM	11.73	9.13	7.52	4.840086	Run 1 - 1
03/30/2004	8:39:29 AM	11.73	9.13	7.4	4.764653	Run 1 - 1
03/30/2004	8:39:59 AM	11.73	9.13	7.42	4.777226	Run 1 - 1
03/30/2004	8:40:29 AM	11.73	9.13	7.31	4.708078	Run 1 - 1
03/30/2004	8:40:59 AM	11.73	9.18	7.36	4.739509	Run 1 - 1
03/30/2004	8:41:29 AM	11.67	9.18	7.29	4.6582	Run 1 - 1
03/30/2004	8:41:59 AM	11.73	9.13	7.52	4.840086	Run 1 - 1
03/30/2004	8:42:29 AM	11.73	9.18	7.37	4.745795	Run 1 - 1
03/30/2004	8:42:59 AM	11.73	9.18	7.11	4.576072	Run 1 - 1
03/30/2004	8:43:29 AM	11.67	9.13	7.18	4.58951	Run 1 - 1
03/30/2004	8:43:59 AM	11.67	9.13	7.32	4.683178	Run 1 - 1
03/30/2004	8:44:29 AM	11.73	9.13	7.52	4.840086	Run 1 - 1
03/30/2004	8:44:59 AM	11.73	9.18	7.34	4.726937	Run 1 - 1
03/30/2004	8:45:29 AM	11.79	9.13	7.36	4.771283	Run 1 - 1
03/30/2004	8:45:59 AM	11.73	9.13	7.16	4.607502	Run 1 - 1
03/30/2004	8:46:29 AM	11.67	9.13	7.13	4.558288	Run 1 - 1
03/30/2004	8:46:59 AM	11.67	9.13	7.23	4.620733	Run 1 - 1
03/30/2004	8:47:29 AM	11.73	9.18	7.27	4.676648	Run 1 - 1
03/30/2004	8:47:59 AM	11.73	9.18	7.21	4.638932	Run 1 - 1
03/30/2004	8:48:29 AM	11.73	9.13	7.25	4.664076	Run 1 - 1
03/30/2004	8:48:59 AM	11.73	9.18	7.17	4.613788	Run 1 - 1
03/30/2004	8:49:29 AM	11.73	9.13	7.29	4.695507	Run 1 - 1
03/30/2004	8:49:59 AM	11.73	9.13	7.29	4.689221	Run 1 - 1
03/30/2004	8:50:29 AM	11.73	9.13	7.11	4.576072	Run 1 - 1
03/30/2004	8:50:59 AM	11.73	9.18	7.18	4.620074	Run 1 - 1
03/30/2004	8:51:29 AM	11.79	9.13	7.18	4.651046	Run 1 - 1
03/30/2004	8:51:59 AM	11.79	9.13	7.08	4.587765	Run 1 - 1
03/30/2004	8:52:29 AM	11.73	9.13	7.06	4.544641	Run 1 - 1
03/30/2004	8:52:59 AM	11.73	9.13	7.2	4.632646	Run 1 - 1
03/30/2004	8:53:29 AM	11.73	9.13	7.22	4.645218	Run 1 - 1
03/30/2004	8:53:59 AM	11.67	9.13	7.06	4.514577	Run 1 - 1
03/30/2004	8:54:29 AM	11.73	9.18	7.23	4.651504	Run 1 - 1
03/30/2004	8:54:59 AM	11.73	9.13	7.32	4.714365	Run 1 - 1
03/30/2004	8:55:29 AM	11.67	9.13	7.08	4.527066	Run 1 - 1
03/30/2004	8:55:59 AM	11.73	9.13	7.28	4.682934	Run 1 - 1
03/30/2004	8:56:29 AM	11.73	9.13	6.96	4.48178	Run 1 - 1
03/30/2004	8:56:59 AM	11.73	9.13	7.32	4.714365	Run 1 - 1
03/30/2004	8:57:29 AM	11.73	9.13	7.32	4.714365	Run 1 - 1
03/30/2004	8:57:59 AM	11.73	9.13	7.07	4.550927	Run 1 - 1
03/30/2004	8:58:29 AM	11.73	9.13	6.96	4.48178	Run 1 - 1
03/30/2004	8:58:59 AM	11.73	9.13	7.11	4.576072	Run 1 - 2
03/30/2004	8:59:29 AM	11.67	9.13	7.26	4.639466	
03/30/2004	8:59:59 AM	12.16	10.99	6.22	4.199821	
03/30/2004	9:00:29 AM	12.28	11.13	0.87	0.594936	Run 1 Span - Span
03/30/2004	9:00:59 AM	12.34	11.18	-0.03	-0.020398	Run 1 Span - Zero
03/30/2004	9:01:29 AM	12.28	11.18	-0.03	-0.020253	Run 1 Span - Span
03/30/2004	9:01:59 AM	0.56	0.34	0.08	0.022584	Run 1 Span - Span
03/30/2004	9:02:29 AM	0.08	0.14	4.17	1.181349	Run 1 Span - Span
03/30/2004	9:02:59 AM	0.01	0.14	6.1	1.724124	Run 1 Span - Zero
03/30/2004	9:03:29 AM	0.01	0.09	6.16	1.740676	Run 1 Span - Span
03/30/2004	9:03:59 AM	10.39	8.79	6.17	3.464966	Run 1 Span - Span
03/30/2004	9:04:29 AM	11.73	9.13	7.17	4.613788	Run 1 Span - Span
03/30/2004	9:04:59 AM	11.73	9.18	7.42	4.777226	Run 1 Span - Span
03/30/2004	9:05:29 AM	11.73	9.18	7.21	4.638932	Run 2 - 1

03/30/2004	9:05:59 AM	11.73	9.23	7.38	4.752081 Run 2 - 1
03/30/2004	9:06:29 AM	11.73	9.13	7.44	4.789797 Run 2 - 1
03/30/2004	9:06:59 AM	11.67	9.18	7.36	4.708156 Run 2 - 1
03/30/2004	9:07:29 AM	11.73	9.18	7.36	4.739509 Run 2 - 1
03/30/2004	9:07:59 AM	11.73	9.18	7.02	4.519497 Run 2 - 1
03/30/2004	9:08:29 AM	11.73	9.18	7.08	4.557213 Run 2 - 1
03/30/2004	9:08:59 AM	11.73	9.23	7.32	4.714365 Run 2 - 1
03/30/2004	9:09:29 AM	11.79	9.13	7.17	4.644719 Run 2 - 1
03/30/2004	9:09:59 AM	11.73	9.13	6.86	4.412634 Run 2 - 1
03/30/2004	9:10:29 AM	11.73	9.18	7.28	4.682934 Run 2 - 1
03/30/2004	9:10:59 AM	11.79	9.13	7.2	4.663703 Run 2 - 1
03/30/2004	9:11:29 AM	11.73	9.13	6.9	4.444064 Run 2 - 1
03/30/2004	9:11:59 AM	11.79	9.18	6.94	4.49917 Run 2 - 1
03/30/2004	9:12:29 AM	11.73	9.13	6.87	4.425206 Run 2 - 1
03/30/2004	9:12:59 AM	11.73	9.13	6.16	3.966324 Run 2 - 1
03/30/2004	9:13:29 AM	11.73	9.18	6.02	3.872033 Run 2 - 1
03/30/2004	9:13:59 AM	11.73	9.13	6.97	4.488066 Run 2 - 1
03/30/2004	9:14:29 AM	11.73	9.13	7.16	4.607502 Run 2 - 1
03/30/2004	9:14:59 AM	11.73	9.13	7.09	4.563499 Run 2 - 1
03/30/2004	9:15:29 AM	11.73	9.13	6.87	4.41892 Run 2 - 1
03/30/2004	9:15:59 AM	11.73	9.13	7.13	4.588643 Run 2 - 1
03/30/2004	9:16:29 AM	11.73	9.13	7.08	4.557213 Run 2 - 1
03/30/2004	9:16:59 AM	11.73	9.13	6.87	4.425206 Run 2 - 1
03/30/2004	9:17:29 AM	11.73	9.13	6.89	4.437778 Run 2 - 1
03/30/2004	9:17:59 AM	11.73	9.13	7.16	4.607502 Run 2 - 1
03/30/2004	9:18:29 AM	11.73	9.13	7.15	4.601216 Run 2 - 1
03/30/2004	9:18:59 AM	11.79	9.13	7.06	4.575108 Run 2 - 1
03/30/2004	9:19:29 AM	11.73	9.13	6.79	4.368631 Run 2 - 1
03/30/2004	9:19:59 AM	11.73	9.18	6.84	4.400061 Run 2 - 1
03/30/2004	9:20:29 AM	11.73	9.13	6.86	4.412634 Run 2 - 1
03/30/2004	9:20:59 AM	11.67	9.13	6.91	4.42091 Run 2 - 1
03/30/2004	9:21:29 AM	11.73	9.08	7.14	4.59493 Run 2 - 1
03/30/2004	9:21:59 AM	11.79	9.13	7.04	4.562452 Run 2 - 1
03/30/2004	9:22:29 AM	11.73	9.13	6.86	4.412634 Run 2 - 1
03/30/2004	9:22:59 AM	11.67	9.13	6.88	4.402177 Run 2 - 1
03/30/2004	9:23:29 AM	11.73	9.18	7.13	4.588643 Run 2 - 1
03/30/2004	9:23:59 AM	11.73	9.13	7.24	4.65779 Run 2 - 1
03/30/2004	9:24:29 AM	11.73	9.08	7.02	4.519497 Run 2 - 1
03/30/2004	9:24:59 AM	11.73	9.13	7.17	4.613788 Run 2 - 1
03/30/2004	9:25:29 AM	11.67	9.13	7.2	4.602 Run 2 - 1
03/30/2004	9:25:59 AM	11.73	9.13	7.5	4.827514 Run 2 - 1
03/30/2004	9:26:29 AM	11.73	9.13	7.22	4.645218 Run 2 - 1
03/30/2004	9:26:59 AM	11.73	9.13	7.18	4.620074 Run 2 - 1
03/30/2004	9:27:29 AM	11.79	9.13	6.96	4.511826 Run 2 - 1
03/30/2004	9:27:59 AM	11.73	9.08	7	4.506925 Run 2 - 1
03/30/2004	9:28:29 AM	11.73	9.13	6.92	4.456636 Run 2 - 1
03/30/2004	9:28:59 AM	11.73	9.13	7.08	4.557213 Run 2 - 1
03/30/2004	9:29:29 AM	11.67	9.18	7.42	4.745623 Run 2 - 1
03/30/2004	9:29:59 AM	11.73	9.18	7.71	4.965807 Run 2 - 1
03/30/2004	9:30:29 AM	11.67	9.13	7.32	4.683178 Run 2 - 1
03/30/2004	9:30:59 AM	11.73	9.13	7.24	4.65779 Run 2 - 1
03/30/2004	9:31:29 AM	11.73	9.13	7.26	4.670362 Run 2 - 1
03/30/2004	9:31:59 AM	11.67	9.13	7.27	4.645711 Run 2 - 1
03/30/2004	9:32:29 AM	11.73	9.13	7.27	4.676648 Run 2 - 1
03/30/2004	9:32:59 AM	11.67	9.13	7.33	4.689422 Run 2 - 1
03/30/2004	9:33:29 AM	11.73	9.13	7.33	4.720651 Run 2 - 1

03/30/2004	9:33:59 AM	11.73	9.13	7.5	4.827514	Run 2 - 1
03/30/2004	9:34:29 AM	11.73	9.13	7.49	4.821228	Run 2 - 1
03/30/2004	9:34:59 AM	11.67	9.13	7.27	4.645711	Run 2 - 1
03/30/2004	9:35:29 AM	11.73	9.08	7.18	4.620074	Run 2 - 1
03/30/2004	9:35:59 AM	11.67	9.13	7.06	4.514577	Run 2 - 1
03/30/2004	9:36:29 AM	11.67	9.08	7.54	4.820556	Run 2 - 1
03/30/2004	9:36:59 AM	11.67	9.13	7.46	4.7706	Run 2 - 1
03/30/2004	9:37:29 AM	11.67	9.13	7.26	4.639466	Run 2 - 1
03/30/2004	9:37:59 AM	11.73	9.18	7.3	4.701792	Run 2 - 1
03/30/2004	9:38:29 AM	11.79	9.13	7.2	4.663703	Run 2 - 1
03/30/2004	9:38:59 AM	11.73	9.08	6.92	4.456636	Run 2 - 1
03/30/2004	9:39:29 AM	11.73	9.08	6.86	4.412634	Run 2 - 1
03/30/2004	9:39:59 AM	11.73	9.08	6.89	4.437778	Run 2 - 1
03/30/2004	9:40:29 AM	11.73	9.13	7.02	4.519497	Run 2 - 1
03/30/2004	9:40:59 AM	11.73	9.13	7	4.506925	Run 2 - 1
03/30/2004	9:41:29 AM	11.73	9.08	6.91	4.45035	Run 2 - 1
03/30/2004	9:41:59 AM	11.73	9.08	6.87	4.41892	Run 2 - 1
03/30/2004	9:42:29 AM	11.79	9.13	6.96	4.511826	Run 2 - 1
03/30/2004	9:42:59 AM	11.73	9.13	6.91	4.45035	Run 2 - 1
03/30/2004	9:43:29 AM	11.73	9.08	6.87	4.425206	Run 2 - 1
03/30/2004	9:43:59 AM	11.73	9.13	6.98	4.494352	Run 2 - 1
03/30/2004	9:44:29 AM	11.67	9.13	7.08	4.527066	Run 2 - 1
03/30/2004	9:44:59 AM	11.79	9.13	7.19	4.657375	Run 2 - 1
03/30/2004	9:45:29 AM	11.73	9.13	6.76	4.349773	Run 2 - 1
03/30/2004	9:45:59 AM	11.73	9.13	6.97	4.488066	Run 2 - 1
03/30/2004	9:46:29 AM	11.73	9.13	7.22	4.645218	Run 2 - 1
03/30/2004	9:46:59 AM	11.67	9.13	7.18	4.58951	Run 2 - 1
03/30/2004	9:47:29 AM	11.67	9.08	7.08	4.527066	Run 2 - 1
03/30/2004	9:47:59 AM	11.73	9.13	6.9	4.444064	Run 2 - 1
03/30/2004	9:48:29 AM	11.73	9.13	6.91	4.45035	Run 2 - 1
03/30/2004	9:48:59 AM	11.73	9.13	7.14	4.59493	Run 2 - 1
03/30/2004	9:49:29 AM	11.79	9.13	7.04	4.562452	Run 2 - 1
03/30/2004	9:49:59 AM	11.73	9.18	7.07	4.550927	Run 2 - 1
03/30/2004	9:50:29 AM	11.67	9.13	7.25	4.633222	Run 2 - 1
03/30/2004	9:50:59 AM	11.67	9.13	7.27	4.645711	Run 2 - 1
03/30/2004	9:51:29 AM	11.73	9.13	7.15	4.601216	Run 2 - 1
03/30/2004	9:51:59 AM	11.67	9.18	7.3	4.670689	Run 2 - 1
03/30/2004	9:52:29 AM	11.73	9.13	7.14	4.59493	Run 2 - 1
03/30/2004	9:52:59 AM	11.67	9.13	7.06	4.514577	Run 2 - 1
03/30/2004	9:53:29 AM	11.73	9.13	7.28	4.682934	Run 2 - 1
03/30/2004	9:53:59 AM	11.73	9.13	7.22	4.645218	Run 2 - 1
03/30/2004	9:54:29 AM	11.67	9.08	7.36	4.708156	Run 2 - 1
03/30/2004	9:54:59 AM	11.67	9.13	7.41	4.739378	Run 2 - 1
03/30/2004	9:55:29 AM	11.67	9.13	7.27	4.645711	Run 2 - 1
03/30/2004	9:55:59 AM	11.73	9.13	7.29	4.689221	Run 2 - 1
03/30/2004	9:56:29 AM	11.67	9.13	6.96	4.452132	Run 2 - 1
03/30/2004	9:56:59 AM	11.73	9.18	7.06	4.544641	Run 2 - 1
03/30/2004	9:57:29 AM	11.73	9.08	7.17	4.613788	Run 2 - 1
03/30/2004	9:57:59 AM	11.73	9.08	7.2	4.632646	Run 2 - 1
03/30/2004	9:58:29 AM	11.67	9.13	7.19	4.595755	Run 2 - 1
03/30/2004	9:58:59 AM	11.73	9.13	7.02	4.519497	Run 2 - 1
03/30/2004	9:59:29 AM	11.67	9.13	7.16	4.577022	Run 2 - 1
03/30/2004	9:59:59 AM	11.67	9.08	7.32	4.683178	Run 2 - 1
03/30/2004	10:00:29 AM	11.73	9.13	7.31	4.708078	Run 2 - 1
03/30/2004	10:00:59 AM	11.73	9.13	7.2	4.632646	Run 2 - 1
03/30/2004	10:01:29 AM	11.73	9.13	7.24	4.65779	Run 2 - 1

03/30/2004	10:01:59 AM	11.73	9.13	7.37	4.745795	Run 2 - 1
03/30/2004	10:02:29 AM	11.73	9.13	7.29	4.695507	Run 2 - 1
03/30/2004	10:02:59 AM	11.73	9.13	7.22	4.645218	Run 2 - 1
03/30/2004	10:03:29 AM	11.73	9.13	7.29	4.689221	Run 2 - 1
03/30/2004	10:03:59 AM	11.67	9.13	7.1	4.539555	Run 2 - 1
03/30/2004	10:04:29 AM	11.67	9.13	7.29	4.6582	Run 2 - 1
03/30/2004	10:04:59 AM	11.67	9.13	7.48	4.78309	Run 2 - 1
03/30/2004	10:05:29 AM	11.67	9.13	7.27	4.645711	Run 2 - 2
03/30/2004	10:05:59 AM	11.67	9.13	7.27	4.645711	
03/30/2004	10:06:29 AM	9.11	9.52	7.25	3.625806	
03/30/2004	10:06:59 AM	12.34	11.13	3.12	2.148126	
03/30/2004	10:07:29 AM	12.28	11.18	0.09	0.059989	
03/30/2004	10:07:59 AM	12.34	11.18	-0.06	-0.040601	
03/30/2004	10:08:29 AM	12.28	11.18	-0.05	-0.033627	
03/30/2004	10:08:59 AM	12.28	11.18	-0.05	-0.033627	
03/30/2004	10:09:29 AM	12.28	11.18	-0.05	-0.033627	Run 2 Span - Span
03/30/2004	10:09:59 AM	12.04	11.18	-0.03	-0.019695	Run 2 Span - Span
03/30/2004	10:10:29 AM	0.01	0.14	1.94	0.548907	Run 2 Span - Span
03/30/2004	10:10:59 AM	0.01	0.09	5.65	1.597222	Run 2 Span - Span
03/30/2004	10:11:29 AM	0.01	0.09	6.09	1.721365	Run 2 Span - Span
03/30/2004	10:11:59 AM	0.01	0.09	6.11	1.726882	Run 2 Span - Span
03/30/2004	10:12:29 AM	0.01	0.09	6.12	1.729641	Run 2 Span - Span
03/30/2004	10:12:59 AM	0.01	0.09	6.12	1.729641	Run 2 Span - Span
03/30/2004	10:13:29 AM	0.01	0.09	6.11	1.726882	Run 2 Span - Span
03/30/2004	10:13:59 AM	11.55	8.98	6.21	3.919451	Run 2 Span - Span
03/30/2004	10:14:29 AM	11.73	9.08	7.26	4.670362	Run 2 Span - Span
03/30/2004	10:14:59 AM	11.73	9.08	7.6	4.890374	Run 2 Span - Span
03/30/2004	10:15:29 AM	11.73	9.13	7.34	4.726937	Run 3 - 1
03/30/2004	10:15:59 AM	11.73	9.08	7.32	4.714365	Run 3 - 1
03/30/2004	10:16:29 AM	11.67	9.13	7.12	4.552044	Run 3 - 1
03/30/2004	10:16:59 AM	11.73	9.13	7.5	4.827514	Run 3 - 1
03/30/2004	10:17:29 AM	11.73	9.13	7.32	4.714365	Run 3 - 1
03/30/2004	10:17:59 AM	11.73	9.13	7.36	4.739509	Run 3 - 1
03/30/2004	10:18:29 AM	11.73	9.18	7.26	4.670362	Run 3 - 1
03/30/2004	10:18:59 AM	11.73	9.08	6.93	4.462922	Run 3 - 1
03/30/2004	10:19:29 AM	11.73	9.13	6.88	4.431492	Run 3 - 1
03/30/2004	10:19:59 AM	11.73	9.18	7.04	4.532069	Run 3 - 1
03/30/2004	10:20:29 AM	11.73	9.18	7.15	4.601216	Run 3 - 1
03/30/2004	10:20:59 AM	11.73	9.18	7.12	4.582357	Run 3 - 1
03/30/2004	10:21:29 AM	11.73	9.18	7.23	4.651504	Run 3 - 1
03/30/2004	10:21:59 AM	11.73	9.13	7.08	4.557213	Run 3 - 1
03/30/2004	10:22:29 AM	11.79	9.13	6.88	4.461201	Run 3 - 1
03/30/2004	10:22:59 AM	11.73	9.13	6.74	4.337201	Run 3 - 1
03/30/2004	10:23:29 AM	11.73	9.13	6.96	4.48178	Run 3 - 1
03/30/2004	10:23:59 AM	11.73	9.18	7.22	4.645218	Run 3 - 1
03/30/2004	10:24:29 AM	11.73	9.18	7.3	4.701792	Run 3 - 1
03/30/2004	10:24:59 AM	11.73	9.18	7.18	4.620074	Run 3 - 1
03/30/2004	10:25:29 AM	11.73	9.18	7.2	4.632646	Run 3 - 1
03/30/2004	10:25:59 AM	11.73	9.18	7.08	4.557213	Run 3 - 1
03/30/2004	10:26:29 AM	11.73	9.18	7.21	4.638932	Run 3 - 1
03/30/2004	10:26:59 AM	11.73	9.13	7.18	4.620074	Run 3 - 1
03/30/2004	10:27:29 AM	11.73	9.18	7.23	4.651504	Run 3 - 1
03/30/2004	10:27:59 AM	11.67	9.18	7.36	4.708156	Run 3 - 1
03/30/2004	10:28:29 AM	11.73	9.18	7.21	4.638932	Run 3 - 1
03/30/2004	10:28:59 AM	11.67	9.18	7.1	4.539555	Run 3 - 1
03/30/2004	10:29:29 AM	11.73	9.18	7.15	4.601216	Run 3 - 1

03/30/2004	10:29:59 AM	11.73	9.18	7.06	4.544641 Run 3 - 1
03/30/2004	10:30:29 AM	11.73	9.13	7.08	4.557213 Run 3 - 1
03/30/2004	10:30:59 AM	11.73	9.18	7.19	4.62636 Run 3 - 1
03/30/2004	10:31:29 AM	11.73	9.13	7.16	4.607502 Run 3 - 1
03/30/2004	10:31:59 AM	11.73	9.13	7.06	4.544641 Run 3 - 1
03/30/2004	10:32:29 AM	11.73	9.18	6.96	4.48178 Run 3 - 1
03/30/2004	10:32:59 AM	11.73	9.13	7.06	4.544641 Run 3 - 1
03/30/2004	10:33:29 AM	11.79	9.13	6.83	4.423232 Run 3 - 1
03/30/2004	10:33:59 AM	11.73	9.13	6.8	4.374917 Run 3 - 1
03/30/2004	10:34:29 AM	11.79	9.13	6.9	4.473857 Run 3 - 1
03/30/2004	10:34:59 AM	11.73	9.13	7	4.506925 Run 3 - 1
03/30/2004	10:35:29 AM	11.73	9.13	7.16	4.607502 Run 3 - 1
03/30/2004	10:35:59 AM	11.73	9.18	7.14	4.59493 Run 3 - 1
03/30/2004	10:36:29 AM	11.73	9.18	7.15	4.601216 Run 3 - 1
03/30/2004	10:36:59 AM	11.79	9.23	7	4.537139 Run 3 - 1
03/30/2004	10:37:29 AM	11.73	9.18	6.94	4.469208 Run 3 - 1
03/30/2004	10:37:59 AM	11.73	9.13	7.04	4.532069 Run 3 - 1
03/30/2004	10:38:29 AM	11.73	9.18	6.94	4.469208 Run 3 - 1
03/30/2004	10:38:59 AM	11.73	9.13	7	4.506925 Run 3 - 1
03/30/2004	10:39:29 AM	11.73	9.13	7.14	4.59493 Run 3 - 1
03/30/2004	10:39:59 AM	11.73	9.13	7.24	4.65779 Run 3 - 1
03/30/2004	10:40:29 AM	11.73	9.18	7.14	4.59493 Run 3 - 1
03/30/2004	10:40:59 AM	11.73	9.18	7.04	4.532069 Run 3 - 1
03/30/2004	10:41:29 AM	11.73	9.18	7.06	4.544641 Run 3 - 1
03/30/2004	10:41:59 AM	11.73	9.13	7.16	4.607502 Run 3 - 1
03/30/2004	10:42:29 AM	11.73	9.18	6.98	4.494352 Run 3 - 1
03/30/2004	10:42:59 AM	11.73	9.13	6.86	4.412634 Run 3 - 1
03/30/2004	10:43:29 AM	11.73	9.18	6.78	4.362345 Run 3 - 1
03/30/2004	10:43:59 AM	11.67	9.18	6.98	4.464621 Run 3 - 1
03/30/2004	10:44:29 AM	11.73	9.13	7.17	4.613788 Run 3 - 1
03/30/2004	10:44:59 AM	11.67	9.18	7.16	4.577022 Run 3 - 1
03/30/2004	10:45:29 AM	11.73	9.13	7.28	4.682934 Run 3 - 1
03/30/2004	10:45:59 AM	11.73	9.13	7.22	4.645218 Run 3 - 1
03/30/2004	10:46:29 AM	11.73	9.13	6.96	4.48178 Run 3 - 1
03/30/2004	10:46:59 AM	11.79	9.18	6.84	4.429559 Run 3 - 1
03/30/2004	10:47:29 AM	11.73	9.13	7.12	4.582357 Run 3 - 1
03/30/2004	10:47:59 AM	11.73	9.13	7.38	4.752081 Run 3 - 1
03/30/2004	10:48:29 AM	11.73	9.13	7.2	4.632646 Run 3 - 1
03/30/2004	10:48:59 AM	11.73	9.13	7.4	4.764653 Run 3 - 1
03/30/2004	10:49:29 AM	11.73	9.13	7.08	4.557213 Run 3 - 1
03/30/2004	10:49:59 AM	11.73	9.13	6.9	4.444064 Run 3 - 1
03/30/2004	10:50:29 AM	11.73	9.13	6.84	4.400061 Run 3 - 1
03/30/2004	10:50:59 AM	11.73	9.13	7	4.506925 Run 3 - 1
03/30/2004	10:51:29 AM	11.73	9.13	7.06	4.544641 Run 3 - 1
03/30/2004	10:51:59 AM	11.73	9.13	7.02	4.519497 Run 3 - 1
03/30/2004	10:52:29 AM	11.73	9.13	7.16	4.607502 Run 3 - 1
03/30/2004	10:52:59 AM	11.73	9.18	6.94	4.469208 Run 3 - 1
03/30/2004	10:53:29 AM	11.67	9.13	7.04	4.502088 Run 3 - 1
03/30/2004	10:53:59 AM	11.73	9.08	7.29	4.689221 Run 3 - 1
03/30/2004	10:54:29 AM	11.73	9.18	7.14	4.59493 Run 3 - 1
03/30/2004	10:54:59 AM	11.67	9.13	7.21	4.608244 Run 3 - 1
03/30/2004	10:55:29 AM	11.73	9.18	7.32	4.714365 Run 3 - 1
03/30/2004	10:55:59 AM	11.67	9.13	7.29	4.6582 Run 3 - 1
03/30/2004	10:56:29 AM	11.73	9.13	7.52	4.840086 Run 3 - 1
03/30/2004	10:56:59 AM	11.73	9.13	7.29	4.695507 Run 3 - 1
03/30/2004	10:57:29 AM	11.73	9.13	7.38	4.752081 Run 3 - 1

03/30/2004	10:57:59 AM	11.73	9.13	7.22	4.645218	Run 3 - 1
03/30/2004	10:58:29 AM	11.73	9.13	7.08	4.557213	Run 3 - 1
03/30/2004	10:58:59 AM	11.73	9.13	7.28	4.682934	Run 3 - 1
03/30/2004	10:59:29 AM	11.67	9.18	7.37	4.714401	Run 3 - 1
03/30/2004	10:59:59 AM	11.67	9.18	7.23	4.620733	Run 3 - 1
03/30/2004	11:00:29 AM	11.73	9.13	7.24	4.65779	Run 3 - 1
03/30/2004	11:00:59 AM	11.73	9.13	7.19	4.62636	Run 3 - 1
03/30/2004	11:01:29 AM	11.73	9.13	7.08	4.557213	Run 3 - 1
03/30/2004	11:01:59 AM	11.73	9.13	7.06	4.544641	Run 3 - 1
03/30/2004	11:02:29 AM	11.73	9.08	7.02	4.519497	Run 3 - 1
03/30/2004	11:02:59 AM	11.73	9.13	7	4.506925	Run 3 - 1
03/30/2004	11:03:29 AM	11.73	9.18	6.88	4.431492	Run 3 - 1
03/30/2004	11:03:59 AM	11.73	9.13	7.04	4.532069	Run 3 - 1
03/30/2004	11:04:29 AM	11.67	9.13	7.27	4.645711	Run 3 - 1
03/30/2004	11:04:59 AM	11.67	9.13	7.3	4.670689	Run 3 - 1
03/30/2004	11:05:29 AM	11.67	9.08	7.37	4.714401	Run 3 - 1
03/30/2004	11:05:59 AM	11.73	9.13	7.22	4.645218	Run 3 - 1
03/30/2004	11:06:29 AM	11.67	9.13	7.33	4.689422	Run 3 - 1
03/30/2004	11:06:59 AM	11.67	9.13	7.3	4.670689	Run 3 - 1
03/30/2004	11:07:29 AM	11.73	9.13	7.22	4.645218	Run 3 - 1
03/30/2004	11:07:59 AM	11.67	9.13	7.18	4.58951	Run 3 - 1
03/30/2004	11:08:29 AM	11.73	9.13	7.23	4.651504	Run 3 - 1
03/30/2004	11:08:59 AM	11.67	9.13	7.37	4.714401	Run 3 - 1
03/30/2004	11:09:29 AM	11.67	9.13	7.39	4.726889	Run 3 - 1
03/30/2004	11:09:59 AM	11.73	9.13	7.54	4.852658	Run 3 - 1
03/30/2004	11:10:29 AM	11.67	9.13	7.36	4.708156	Run 3 - 1
03/30/2004	11:10:59 AM	11.73	9.13	7.6	4.890374	Run 3 - 1
03/30/2004	11:11:29 AM	11.67	9.13	7.5	4.795579	Run 3 - 1
03/30/2004	11:11:59 AM	11.73	9.13	7.38	4.752081	Run 3 - 1
03/30/2004	11:12:29 AM	11.67	9.13	7.21	4.608244	Run 3 - 1
03/30/2004	11:12:59 AM	11.73	9.13	7.2	4.632646	Run 3 - 1
03/30/2004	11:13:29 AM	11.73	9.13	6.94	4.469208	Run 3 - 1
03/30/2004	11:13:59 AM	11.73	9.13	6.43	4.136047	Run 3 - 1
03/30/2004	11:14:29 AM	11.73	9.13	6.54	4.21148	Run 3 - 1
03/30/2004	11:14:59 AM	11.73	9.18	7.18	4.620074	Run 3 - 1
03/30/2004	11:15:29 AM	11.73	9.18	7.34	4.726937	
03/30/2004	11:15:59 AM	11.92	10.94	6.1	4.008692	
03/30/2004	11:16:29 AM	12.28	11.13	0.88	0.601623	
03/30/2004	11:16:59 AM	12.28	11.18	-0.03	-0.020253	
03/30/2004	11:17:29 AM	12.34	11.18	-0.03	-0.020398	
03/30/2004	11:17:59 AM	12.34	11.18	-0.03	-0.020398	
03/30/2004	11:18:29 AM	12.28	11.18	-0.06	-0.040314	
03/30/2004	11:18:59 AM	12.28	11.18	-0.06	-0.040314	Run 3 Span - Span
03/30/2004	11:19:29 AM	9.9	10.06	-0.06	-0.031587	Run 3 Span - Span
03/30/2004	11:19:59 AM	0.08	0.19	3.36	0.951703	Run 3 Span - Span
03/30/2004	11:20:29 AM	0.01	0.14	5.94	1.677225	Run 3 Span - Span
03/30/2004	11:20:59 AM	0.01	0.09	6.09	1.721365	Run 3 Span - Span
03/30/2004	11:21:29 AM	0.01	0.09	6.14	1.735159	Run 3 Span - Span
03/30/2004	11:21:59 AM	11.37	8.98	6.28	3.886464	Run 3 Span - Span
03/30/2004	11:23:21 AM	11.73	9.08	7.38	4.752081	Run 3 Span - Span
03/30/2004	11:23:22 AM	11.79	9.08	7.38	4.783939	Run 3 Span - Span
03/30/2004	11:23:52 AM	11.67	9.13	7.44	4.758111	Run 3 Span - Span
03/30/2004	11:24:22 AM	11.67	9.13	7.54	4.820556	Run 3 Span - Span
03/30/2004	11:24:52 AM	11.67	9.13	7.49	4.789334	Run 3 Span - Span
03/30/2004	11:25:23 AM	11.67	9.13	7.57	4.839289	Run 3 Span - Span
03/30/2004	11:25:52 AM	11.73	9.13	7.44	4.789797	Run 3 Span - Span

03/30/2004	11:26:23 AM	11.73	9.13	7.32	4.714365	Run 3 Span - Span
03/30/2004	11:26:52 AM	11.73	9.13	7.1	4.569785	Run 3 Span - Span
03/30/2004	11:27:23 AM	11.73	9.13	7.24	4.65779	Run 3 Span - Span
03/30/2004	11:27:52 AM	11.73	9.13	7.54	4.852658	Run 3 Span - Span
03/30/2004	11:28:22 AM	11.73	9.13	7.38	4.752081	Run 3 Span - Span
03/30/2004	11:28:52 AM	11.67	9.18	7.49	4.789334	Run 3 Span - Span

A-3 RM 10/3A BIOMASS DATA REPORT

Polk Unit 1 Biomass - Report			
RUN 1			
04/01/2004			
8:01			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	0.009
Low Level Observed	6.24	4.978	6.123
Mid Level Observed	12.41	11.18	12.43
High Level Observed	20.89	18.36	-
% Difference from Zero to Target	0.06	0.47	0.04
% Difference from Low to Target	-0.12	-0.21	0.52
% Difference from Mid to Target	0.42	0.9	-0.84
% Difference from High to Target	-0.04	1.8	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	0.009
Actual Span From Linearity	12.41	11.18	6.123
Initial Readings			
Zero	0.014	0.095	0.097
Span	12.41	11.28	6.201
Final Readings			
Zero	0.014	0.144	0.088
Span	12.41	11.28	6.123
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.44
Span Bias	0	0.49	0.39
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0.24	0.4
Span Bias	0	0.49	0
Calculated Drift			
Zero Drift (Run-Run)	0	0.24	-0.05
Span Drift	0	0	-0.39
Run Results			
Raw Results	11.78	9.2	7.36
Corrected Results (ppmv)	11.68	8.95	7.21

Polk Unit 1 Biomass - Report			
RUN 2			
04/01/2004			
9:07			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	0.009
Low Level Observed	6.24	4.978	6.123
Mid Level Observed	12.41	11.18	12.43
High Level Observed	20.89	18.36	-
% Difference from Zero to Target	0.06	0.47	0.04
% Difference from Low to Target	-0.12	-0.21	0.52
% Difference from Mid to Target	0.42	0.9	-0.84
% Difference from High to Target	-0.04	1.8	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	0.009
Actual Span From Linearity	12.41	11.18	6.123
Initial Readings			
Zero	0.014	0.144	0.088
Span	12.41	11.28	6.123
Final Readings			
Zero	0.014	0.144	0.068
Span	12.34	11.28	6.162
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0.24	0.4
Span Bias	0	0.49	0
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0.24	0.3
Span Bias	-0.24	0.49	0.19
Calculated Drift			
Zero Drift (Run-Run)	0	0	-0.1
Span Drift	-0.24	0	0.19
Run Results			
Raw Results	11.79	9.18	7.14
Corrected Results (ppmv)	11.72	8.93	7.01

Polk Unit 1 Biomass - Report			
RUN 3			
04/01/2004			
10:14			
Linearity Check - Calibration Error	O2	CO2	CO
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Low Level Certified Value (PPM or %)	6.27	5.02	6.02
Mid Level Certified Value (PPM or %)	12.3	11	12.6
High Level Certified Value (PPM or %	20.9	18	
Zero Level Observed	0.014	0.095	0.009
Low Level Observed	6.24	4.978	6.123
Mid Level Observed	12.41	11.18	12.43
High Level Observed	20.89	18.36	-
% Difference from Zero to Target	0.06	0.47	0.04
% Difference from Low to Target	-0.12	-0.21	0.52
% Difference from Mid to Target	0.42	0.9	-0.84
% Difference from High to Target	-0.04	1.8	0
Analyzer Range	25	20	20
Units	PPM	PPM	PPM
Actual Zero From Linearity	0.014	0.095	0.009
Actual Span From Linearity	12.41	11.18	6.123
Initial Readings			
Zero	0.014	0.144	0.068
Span	12.34	11.28	6.162
Final Readings			
Zero	0.014	0.095	0.127
Span	12.41	11.28	6.23
Initial Sampling System Bias			
Zero Bias (Run-System Cal)	0	0.24	0.3
Span Bias	-0.24	0.49	0.19
Final Sampling System Bias			
Zero Bias (Run-System Cal)	0	0	0.59
Span Bias	0	0.49	0.54
Calculated Drift			
Zero Drift (Run-Run)	0	-0.24	0.29
Span Drift	0.24	0	0.34
Run Results			
Raw Results	11.77	9.19	7.29
Corrected Results (ppmv)	11.7	8.94	7.1

A-4 RM 10/3A BIOMASS DATA LOG

Date	Time	O2 (PPM)	CO2 (PPM)	CO (PPM)	CO (PPM) @ 15% O2	Status
04/01/2004	7:32:46 AM	9.9	8.49	-0.03	-0.015869	Linearity Check
04/01/2004	7:33:15 AM	12.34	11.13	-0.11	-0.074274	Linearity Check
04/01/2004	7:33:46 AM	12.34	11.18	0.01	0.00654	Linearity Check
04/01/2004	7:34:15 AM	20.89	4.98	-0.03	-17.539283	Linearity Check
04/01/2004	7:34:46 AM	20.89	4.98	-0.07	-40.702511	Linearity Check
04/01/2004	7:35:15 AM	0.26	0.14	0.4	0.114365	Linearity Check
04/01/2004	7:35:46 AM	0.01	0.09	5.16	1.456528	Linearity Check
04/01/2004	7:36:15 AM	0.01	0.09	6.22	1.757229	Linearity Check
04/01/2004	7:36:45 AM	0.01	0.09	6.12	1.729641	Linearity Check
04/01/2004	7:37:16 AM	15.15	0.09	6.13	6.295077	Linearity Check
04/01/2004	7:37:45 AM	21.26	0.09	10.45	-173.028802	Linearity Check
04/01/2004	7:38:16 AM	21.32	0.09	12.33	-174.36752	Linearity Check
04/01/2004	7:38:45 AM	21.32	0.09	12.29	-173.815323	Linearity Check
04/01/2004	7:39:16 AM	21.38	0.14	12.43	-153.323164	Linearity Check
04/01/2004	7:39:45 AM	10.39	0.24	12.46	6.995884	Linearity Check
04/01/2004	7:40:16 AM	0.08	0.09	9.35	2.647759	Linearity Check
04/01/2004	7:40:45 AM	11.67	8.79	6.34	4.052486	Linearity Check
04/01/2004	7:41:15 AM	11.79	9.23	6.84	4.429559	Linearity Check
04/01/2004	7:41:46 AM	0.08	0.19	6.48	1.837083	Linearity Check
04/01/2004	7:42:15 AM	0.01	0.14	5.29	1.495149	Initial Span - Zero
04/01/2004	7:42:46 AM	0.08	0.09	6.2	1.756846	Initial Span - Span
04/01/2004	7:43:15 AM	0.01	0.14	6.24	1.762746	Initial Span - Span
04/01/2004	7:43:46 AM	12.1	10.89	6.04	4.046278	Initial Span - Span
04/01/2004	7:44:15 AM	12.34	11.18	1.49	1.030191	Initial Span - Span
04/01/2004	7:44:46 AM	12.41	11.28	0.13	0.087983	Initial Span - Span
04/01/2004	7:45:15 AM	12.41	11.28	0.11	0.074417	Initial Span - Zero
04/01/2004	7:45:46 AM	12.41	11.23	0.1	0.067634	Initial Span - Zero
04/01/2004	7:46:15 AM	0.08	0.19	0.61	0.171463	Initial Span - Zero
04/01/2004	7:46:46 AM	0.08	0.14	4.96	1.405461	Initial Span - Zero
04/01/2004	7:47:15 AM	0.08	0.09	6.22	1.762379	Initial Span - Zero
04/01/2004	7:47:46 AM	0.01	0.09	6.25	1.765505	Initial Span - Zero
04/01/2004	7:48:15 AM	0.01	0.09	6.22	1.757229	Initial Span - Zero
04/01/2004	7:48:45 AM	0.01	0.09	6.24	1.762746	Initial Span - Span
04/01/2004	7:49:16 AM	0.01	0.14	6.22	1.757229	Initial Span - Span
04/01/2004	7:49:45 AM	0.01	0.14	6.22	1.757229	Initial Span - Span
04/01/2004	7:50:16 AM	0.01	0.09	6.22	1.757229	Initial Span - Span
04/01/2004	7:50:45 AM	11.73	9.08	6.57	4.230338	Initial Span - Span
04/01/2004	7:51:16 AM	11.73	9.18	7.7	4.953235	
04/01/2004	7:51:45 AM	11.73	9.23	7.5	4.827514	
04/01/2004	7:52:16 AM	11.73	9.18	7.5	4.827514	
04/01/2004	7:52:45 AM	11.73	9.23	7.61	4.896661	
04/01/2004	7:53:16 AM	11.73	9.23	7.92	5.097815	
04/01/2004	7:53:45 AM	11.73	9.18	7.89	5.078956	
04/01/2004	7:54:15 AM	11.73	9.23	7.67	4.934377	
04/01/2004	7:54:46 AM	11.73	9.18	7.71	4.965807	
04/01/2004	7:55:15 AM	11.73	9.23	7.71	4.965807	
04/01/2004	7:55:46 AM	11.73	9.18	7.7	4.953235	
04/01/2004	7:56:15 AM	11.73	9.23	7.74	4.984665	
04/01/2004	7:56:46 AM	11.73	9.23	7.72	4.972093	
04/01/2004	7:57:15 AM	11.73	9.18	7.86	5.060098	
04/01/2004	7:57:46 AM	11.67	9.23	7.92	5.064091	
04/01/2004	7:58:16 AM	11.73	9.23	7.76	4.997238	
04/01/2004	7:58:46 AM	11.73	9.23	7.69	4.946949	
04/01/2004	7:59:15 AM	11.73	9.28	7.76	4.997238	
04/01/2004	7:59:46 AM	11.73	9.23	7.76	4.997238	
04/01/2004	8:00:15 AM	11.73	9.28	7.72	4.972093	

04/01/2004	8:00:46 AM	11.73	9.28	7.65	4.921805	
04/01/2004	8:01:16 AM	11.79	9.23	7.54	4.88519	
04/01/2004	8:01:46 AM	11.73	9.23	7.54	4.852658	Run 1 - 1
04/01/2004	8:02:15 AM	11.79	9.23	7.75	5.024411	Run 1 - 1
04/01/2004	8:02:45 AM	11.73	9.23	7.61	4.896661	Run 1 - 1
04/01/2004	8:03:16 AM	11.73	9.28	7.72	4.972093	Run 1 - 1
04/01/2004	8:03:45 AM	11.73	9.28	7.96	5.122958	Run 1 - 1
04/01/2004	8:04:16 AM	11.73	9.18	8	5.148103	Run 1 - 1
04/01/2004	8:04:45 AM	11.73	9.23	7.69	4.946949	Run 1 - 1
04/01/2004	8:05:16 AM	11.79	9.23	7.67	4.967457	Run 1 - 1
04/01/2004	8:05:45 AM	11.79	9.23	7.55	4.891518	Run 1 - 1
04/01/2004	8:06:16 AM	11.73	9.23	7.38	4.752081	Run 1 - 1
04/01/2004	8:06:45 AM	11.73	9.23	7.3	4.701792	Run 1 - 1
04/01/2004	8:07:16 AM	11.73	9.23	7.52	4.840086	Run 1 - 1
04/01/2004	8:07:45 AM	11.79	9.23	8.03	5.2016	Run 1 - 1
04/01/2004	8:08:15 AM	11.79	9.18	7.66	4.961128	Run 1 - 1
04/01/2004	8:08:46 AM	11.79	9.23	7.54	4.88519	Run 1 - 1
04/01/2004	8:09:15 AM	11.79	9.18	7.34	4.758626	Run 1 - 1
04/01/2004	8:09:46 AM	11.79	9.18	7.29	4.726985	Run 1 - 1
04/01/2004	8:10:15 AM	11.73	9.18	7.42	4.777226	Run 1 - 1
04/01/2004	8:10:46 AM	11.79	9.18	7.54	4.88519	Run 1 - 1
04/01/2004	8:11:15 AM	11.79	9.23	7.42	4.809252	Run 1 - 1
04/01/2004	8:11:46 AM	11.79	9.23	7.58	4.910503	Run 1 - 1
04/01/2004	8:12:15 AM	11.79	9.23	7.3	4.733313	Run 1 - 1
04/01/2004	8:12:46 AM	11.79	9.18	7.08	4.587765	Run 1 - 1
04/01/2004	8:13:15 AM	11.73	9.18	7.24	4.65779	Run 1 - 1
04/01/2004	8:13:46 AM	11.73	9.18	7.46	4.802369	Run 1 - 1
04/01/2004	8:14:15 AM	11.79	9.18	7.54	4.88519	Run 1 - 1
04/01/2004	8:14:46 AM	11.79	9.23	7.54	4.88519	Run 1 - 1
04/01/2004	8:15:15 AM	11.73	9.23	7.5	4.827514	Run 1 - 1
04/01/2004	8:15:45 AM	11.79	9.18	7.34	4.758626	Run 1 - 1
04/01/2004	8:16:15 AM	11.73	9.18	7.29	4.689221	Run 1 - 1
04/01/2004	8:16:45 AM	11.79	9.23	7.23	4.682687	Run 1 - 1
04/01/2004	8:17:16 AM	11.79	9.23	7.22	4.67636	Run 1 - 1
04/01/2004	8:17:45 AM	11.79	9.18	7.22	4.67636	Run 1 - 1
04/01/2004	8:18:16 AM	11.79	9.23	7.2	4.663703	Run 1 - 1
04/01/2004	8:18:45 AM	11.73	9.23	7.47	4.808656	Run 1 - 1
04/01/2004	8:19:16 AM	11.73	9.23	7.45	4.796083	Run 1 - 1
04/01/2004	8:19:45 AM	11.79	9.23	7.46	4.834564	Run 1 - 1
04/01/2004	8:20:16 AM	11.79	9.18	7.54	4.88519	Run 1 - 1
04/01/2004	8:20:45 AM	11.73	9.23	7.38	4.752081	Run 1 - 1
04/01/2004	8:21:16 AM	11.79	9.23	7.42	4.809252	Run 1 - 1
04/01/2004	8:21:45 AM	11.73	9.23	7.36	4.739509	Run 1 - 1
04/01/2004	8:22:15 AM	11.79	9.23	7.42	4.809252	Run 1 - 1
04/01/2004	8:22:45 AM	11.73	9.23	7.22	4.645218	Run 1 - 1
04/01/2004	8:23:16 AM	11.73	9.18	7.44	4.789797	Run 1 - 1
04/01/2004	8:23:45 AM	11.79	9.18	7.5	4.859878	Run 1 - 1
04/01/2004	8:24:16 AM	11.79	9.23	7.59	4.916831	Run 1 - 1
04/01/2004	8:24:45 AM	11.79	9.18	7.7	4.99277	Run 1 - 1
04/01/2004	8:25:16 AM	11.79	9.18	7.51	4.866205	Run 1 - 1
04/01/2004	8:25:45 AM	11.79	9.18	7.46	4.834564	Run 1 - 1
04/01/2004	8:26:15 AM	11.73	9.18	7.44	4.789797	Run 1 - 1
04/01/2004	8:26:46 AM	11.79	9.18	7.5	4.859878	Run 1 - 1
04/01/2004	8:27:15 AM	11.79	9.18	7.53	4.878862	Run 1 - 1
04/01/2004	8:27:46 AM	11.73	9.18	7.58	4.877803	Run 1 - 1
04/01/2004	8:28:15 AM	11.73	9.18	7.49	4.821228	Run 1 - 1
04/01/2004	8:28:46 AM	11.79	9.18	7.6	4.923159	Run 1 - 1

04/01/2004	8:29:15 AM	11.73	9.18	7.51	4.8338 Run 1 - 1
04/01/2004	8:29:46 AM	11.79	9.23	7.7	4.986441 Run 1 - 1
04/01/2004	8:30:15 AM	11.73	9.18	7.77	5.003523 Run 1 - 1
04/01/2004	8:30:46 AM	11.73	9.18	7.73	4.978379 Run 1 - 1
04/01/2004	8:31:15 AM	11.73	9.18	7.74	4.984665 Run 1 - 1
04/01/2004	8:31:46 AM	11.73	9.13	7.7	4.959521 Run 1 - 1
04/01/2004	8:32:15 AM	11.73	9.18	7.56	4.86523 Run 1 - 1
04/01/2004	8:32:45 AM	11.73	9.13	7.52	4.840086 Run 1 - 1
04/01/2004	8:33:16 AM	11.79	9.23	7.38	4.783939 Run 1 - 1
04/01/2004	8:33:45 AM	11.79	9.18	7.43	4.81558 Run 1 - 1
04/01/2004	8:34:16 AM	11.79	9.18	7.31	4.739641 Run 1 - 1
04/01/2004	8:34:45 AM	11.79	9.18	7.35	4.764954 Run 1 - 1
04/01/2004	8:35:16 AM	11.73	9.23	7.5	4.827514 Run 1 - 1
04/01/2004	8:35:45 AM	11.79	9.23	7.56	4.897847 Run 1 - 1
04/01/2004	8:36:16 AM	11.79	9.18	6.18	4.00557 Run 1 - 1
04/01/2004	8:36:45 AM	11.79	9.18	6.59	4.271354 Run 1 - 1
04/01/2004	8:37:15 AM	11.79	9.23	7.19	4.657375 Run 1 - 1
04/01/2004	8:37:46 AM	11.79	9.18	7.3	4.733313 Run 1 - 1
04/01/2004	8:38:15 AM	11.79	9.23	7.15	4.632062 Run 1 - 1
04/01/2004	8:38:46 AM	11.73	9.18	7.17	4.613788 Run 1 - 1
04/01/2004	8:39:15 AM	11.79	9.13	7.17	4.644719 Run 1 - 1
04/01/2004	8:39:46 AM	11.79	9.13	6.88	4.461201 Run 1 - 1
04/01/2004	8:40:15 AM	11.79	9.18	7.19	4.657375 Run 1 - 1
04/01/2004	8:40:46 AM	11.79	9.23	7.34	4.758626 Run 1 - 1
04/01/2004	8:41:15 AM	11.79	9.18	7.31	4.739641 Run 1 - 1
04/01/2004	8:41:46 AM	11.79	9.18	7.17	4.644719 Run 1 - 1
04/01/2004	8:42:15 AM	11.79	9.18	7.11	4.60675 Run 1 - 1
04/01/2004	8:42:45 AM	11.79	9.18	7.17	4.644719 Run 1 - 1
04/01/2004	8:43:16 AM	11.79	9.23	7.19	4.657375 Run 1 - 1
04/01/2004	8:43:45 AM	11.79	9.18	7.07	4.581436 Run 1 - 1
04/01/2004	8:44:16 AM	11.79	9.18	7.04	4.562452 Run 1 - 1
04/01/2004	8:44:45 AM	11.73	9.23	7.25	4.664076 Run 1 - 1
04/01/2004	8:45:16 AM	11.73	9.18	7.5	4.827514 Run 1 - 1
04/01/2004	8:45:45 AM	11.79	9.18	7.5	4.859878 Run 1 - 1
04/01/2004	8:46:15 AM	11.79	9.23	7.58	4.910503 Run 1 - 1
04/01/2004	8:46:46 AM	11.86	9.18	7.54	4.918161 Run 1 - 1
04/01/2004	8:47:15 AM	11.86	9.23	7.13	4.650583 Run 1 - 1
04/01/2004	8:47:46 AM	11.86	9.23	7.02	4.580503 Run 1 - 1
04/01/2004	8:48:15 AM	11.86	9.18	7.06	4.605987 Run 1 - 1
04/01/2004	8:48:46 AM	11.79	9.23	7.2	4.663703 Run 1 - 1
04/01/2004	8:49:15 AM	11.79	9.18	7.37	4.777611 Run 1 - 1
04/01/2004	8:49:46 AM	11.79	9.23	7.26	4.701672 Run 1 - 1
04/01/2004	8:50:15 AM	11.86	9.23	7	4.567761 Run 1 - 1
04/01/2004	8:50:45 AM	11.79	9.23	7.13	4.619406 Run 1 - 1
04/01/2004	8:51:16 AM	11.79	9.23	7.19	4.657375 Run 1 - 1
04/01/2004	8:51:45 AM	11.79	9.23	7.1	4.600421 Run 1 - 1
04/01/2004	8:52:16 AM	11.79	9.18	7.08	4.587765 Run 1 - 1
04/01/2004	8:52:45 AM	11.79	9.23	7.23	4.682687 Run 1 - 1
04/01/2004	8:53:16 AM	11.79	9.18	7.17	4.644719 Run 1 - 1
04/01/2004	8:53:45 AM	11.79	9.18	7	4.537139 Run 1 - 1
04/01/2004	8:54:16 AM	11.79	9.23	7	4.537139 Run 1 - 1
04/01/2004	8:54:45 AM	11.79	9.18	7.22	4.67636 Run 1 - 1
04/01/2004	8:55:16 AM	11.79	9.18	7.22	4.67636 Run 1 - 1
04/01/2004	8:55:45 AM	11.79	9.18	7.29	4.726985 Run 1 - 1
04/01/2004	8:56:15 AM	11.79	9.18	7.27	4.708 Run 1 - 1
04/01/2004	8:56:46 AM	11.79	9.18	7.24	4.689016 Run 1 - 1
04/01/2004	8:57:15 AM	11.79	9.18	7.06	4.575108 Run 1 - 1

04/01/2004	8:57:46 AM	11.79	9.18	7.14	4.625734	Run 1 - 1
04/01/2004	8:58:15 AM	11.79	9.18	7.16	4.63839	Run 1 - 1
04/01/2004	8:58:46 AM	11.79	9.23	7.1	4.600421	Run 1 - 1
04/01/2004	8:59:15 AM	11.79	9.28	7.25	4.695344	Run 1 - 1
04/01/2004	8:59:46 AM	11.86	9.23	7.22	4.707921	Run 1 - 1
04/01/2004	9:00:16 AM	11.79	9.18	7.29	4.720657	Run 1 - 1
04/01/2004	9:00:45 AM	11.79	9.23	7.3	4.733313	Run 1 - 1
04/01/2004	9:01:16 AM	11.79	9.18	7.22	4.67636	Run 1 - 1
04/01/2004	9:01:45 AM	11.86	9.18	7.02	4.580503	Run 1 - 1
04/01/2004	9:02:16 AM	5.75	3.27	6.85	2.666273	
04/01/2004	9:02:45 AM	12.34	11.18	4.28	2.949537	
04/01/2004	9:03:16 AM	12.34	11.23	0.3	0.208577	Run 1 Span - Span
04/01/2004	9:03:45 AM	12.41	11.28	0.02	0.01337	Run 1 Span - Zero
04/01/2004	9:04:16 AM	0.56	0.34	0.3	0.087749	Run 1 Span - Zero
04/01/2004	9:04:45 AM	0.01	0.14	4.56	1.288245	Run 1 Span - Zero
04/01/2004	9:05:15 AM	0.08	0.14	6.08	1.723644	Run 1 Span - Zero
04/01/2004	9:05:46 AM	0.08	0.14	6.12	1.734711	Run 1 Span - Span
04/01/2004	9:06:15 AM	2.33	0.58	6.14	1.951937	Run 1 Span - Zero
04/01/2004	9:06:46 AM	11.73	9.13	6.74	4.337201	Run 1 Span - Zero
04/01/2004	9:07:15 AM	11.79	9.13	7.28	4.714329	Run 1 Span - Zero
04/01/2004	9:07:45 AM	11.79	9.23	6.96	4.511826	Run 2 - 1
04/01/2004	9:08:16 AM	11.79	9.23	7.13	4.619406	Run 2 - 1
04/01/2004	9:08:45 AM	11.79	9.23	7.13	4.619406	Run 2 - 1
04/01/2004	9:09:15 AM	11.79	9.18	7.14	4.625734	Run 2 - 1
04/01/2004	9:09:46 AM	11.79	9.18	7.07	4.581436	Run 2 - 1
04/01/2004	9:10:15 AM	11.86	9.18	7.08	4.618729	Run 2 - 1
04/01/2004	9:10:46 AM	11.79	9.18	7.03	4.556124	Run 2 - 1
04/01/2004	9:11:15 AM	11.79	9.18	7.24	4.689016	Run 2 - 1
04/01/2004	9:11:46 AM	11.79	9.18	7.34	4.758626	Run 2 - 1
04/01/2004	9:12:15 AM	11.79	9.18	7.22	4.67636	Run 2 - 1
04/01/2004	9:12:46 AM	11.79	9.18	7.1	4.600421	Run 2 - 1
04/01/2004	9:13:15 AM	11.79	9.18	6.98	4.524482	Run 2 - 1
04/01/2004	9:13:45 AM	11.79	9.18	6.96	4.511826	Run 2 - 1
04/01/2004	9:14:16 AM	11.79	9.23	7.07	4.581436	Run 2 - 1
04/01/2004	9:14:45 AM	11.79	9.23	7.3	4.733313	Run 2 - 1
04/01/2004	9:15:16 AM	11.79	9.18	7.33	4.752298	Run 2 - 1
04/01/2004	9:15:45 AM	11.79	9.18	7.12	4.613077	Run 2 - 1
04/01/2004	9:16:16 AM	11.79	9.23	7.1	4.600421	Run 2 - 1
04/01/2004	9:16:45 AM	11.79	9.23	7.02	4.549796	Run 2 - 1
04/01/2004	9:17:16 AM	11.86	9.18	7.1	4.63147	Run 2 - 1
04/01/2004	9:17:45 AM	11.86	9.23	6.79	4.427601	Run 2 - 1
04/01/2004	9:18:15 AM	11.79	9.23	6.94	4.49917	Run 2 - 1
04/01/2004	9:18:46 AM	11.79	9.23	7.3	4.733313	Run 2 - 1
04/01/2004	9:19:15 AM	11.73	9.18	7.3	4.701792	Run 2 - 1
04/01/2004	9:19:46 AM	11.86	9.23	7.22	4.707921	Run 2 - 1
04/01/2004	9:20:15 AM	11.73	9.23	7.15	4.601216	Run 2 - 1
04/01/2004	9:20:46 AM	11.86	9.23	7.15	4.663325	Run 2 - 1
04/01/2004	9:21:15 AM	11.86	9.18	6.87	4.484939	Run 2 - 1
04/01/2004	9:21:46 AM	11.79	9.23	6.94	4.49917	Run 2 - 1
04/01/2004	9:22:15 AM	11.79	9.23	6.95	4.505498	Run 2 - 1
04/01/2004	9:22:45 AM	11.73	9.18	7.07	4.550927	Run 2 - 1
04/01/2004	9:23:16 AM	11.79	9.18	7.04	4.562452	Run 2 - 1
04/01/2004	9:23:45 AM	11.79	9.18	7.22	4.67636	Run 2 - 1
04/01/2004	9:24:16 AM	11.79	9.18	7.14	4.625734	Run 2 - 1
04/01/2004	9:24:45 AM	11.79	9.23	7.11	4.60675	Run 2 - 1
04/01/2004	9:25:16 AM	11.79	9.18	7.29	4.726985	Run 2 - 1
04/01/2004	9:25:45 AM	11.86	9.18	7.24	4.720663	Run 2 - 1

04/01/2004	9:26:16 AM	11.79	9.18	7.18	4.651046 Run 2 - 1
04/01/2004	9:26:45 AM	11.73	9.18	7.36	4.739509 Run 2 - 1
04/01/2004	9:27:16 AM	11.73	9.18	7.36	4.739509 Run 2 - 1
04/01/2004	9:27:45 AM	11.73	9.23	7.34	4.726937 Run 2 - 1
04/01/2004	9:28:16 AM	11.73	9.23	7.47	4.808656 Run 2 - 1
04/01/2004	9:28:45 AM	11.79	9.23	7.4	4.796595 Run 2 - 1
04/01/2004	9:29:16 AM	11.79	9.18	7.06	4.575108 Run 2 - 1
04/01/2004	9:29:45 AM	11.79	9.23	6.77	4.385262 Run 2 - 1
04/01/2004	9:30:16 AM	11.79	9.23	6.79	4.397918 Run 2 - 1
04/01/2004	9:30:46 AM	11.79	9.18	6.98	4.524482 Run 2 - 1
04/01/2004	9:31:15 AM	11.73	9.18	7.15	4.601216 Run 2 - 1
04/01/2004	9:31:46 AM	11.79	9.18	7.26	4.701672 Run 2 - 1
04/01/2004	9:32:15 AM	11.79	9.18	7.32	4.74597 Run 2 - 1
04/01/2004	9:32:46 AM	11.86	9.18	7.16	4.669696 Run 2 - 1
04/01/2004	9:33:15 AM	11.86	9.18	7.14	4.656954 Run 2 - 1
04/01/2004	9:33:46 AM	11.86	9.23	6.87	4.484939 Run 2 - 1
04/01/2004	9:34:15 AM	11.79	9.18	6.92	4.486513 Run 2 - 1
04/01/2004	9:34:46 AM	11.79	9.23	6.74	4.366278 Run 2 - 1
04/01/2004	9:35:15 AM	11.86	9.18	6.87	4.478568 Run 2 - 1
04/01/2004	9:35:46 AM	11.73	9.23	6.94	4.469208 Run 2 - 1
04/01/2004	9:36:15 AM	11.79	9.23	6.84	4.429559 Run 2 - 1
04/01/2004	9:36:45 AM	11.86	9.18	5.96	3.886074 Run 2 - 1
04/01/2004	9:37:16 AM	11.79	9.18	6.94	4.49917 Run 2 - 1
04/01/2004	9:37:45 AM	11.79	9.18	7.1	4.600421 Run 2 - 1
04/01/2004	9:38:16 AM	11.86	9.18	6.91	4.510423 Run 2 - 1
04/01/2004	9:38:45 AM	11.79	9.23	6.96	4.511826 Run 2 - 1
04/01/2004	9:39:16 AM	11.79	9.23	6.89	4.467529 Run 2 - 1
04/01/2004	9:39:45 AM	11.79	9.18	7.17	4.644719 Run 2 - 1
04/01/2004	9:40:16 AM	11.79	9.18	7.17	4.644719 Run 2 - 1
04/01/2004	9:40:45 AM	11.79	9.18	7.17	4.644719 Run 2 - 1
04/01/2004	9:41:15 AM	11.79	9.18	7.13	4.619406 Run 2 - 1
04/01/2004	9:41:46 AM	11.79	9.23	7.09	4.594093 Run 2 - 1
04/01/2004	9:42:15 AM	11.79	9.13	6.98	4.524482 Run 2 - 1
04/01/2004	9:42:46 AM	11.79	9.13	7.02	4.549796 Run 2 - 1
04/01/2004	9:43:15 AM	11.79	9.13	7.08	4.587765 Run 2 - 1
04/01/2004	9:43:46 AM	11.86	9.13	7.17	4.676067 Run 2 - 1
04/01/2004	9:44:15 AM	11.86	9.13	6.98	4.555019 Run 2 - 1
04/01/2004	9:44:46 AM	11.86	9.13	6.94	4.529536 Run 2 - 1
04/01/2004	9:45:15 AM	11.79	9.13	6.84	4.429559 Run 2 - 1
04/01/2004	9:45:46 AM	11.79	9.18	6.96	4.511826 Run 2 - 1
04/01/2004	9:46:15 AM	11.79	9.13	7.22	4.67636 Run 2 - 1
04/01/2004	9:46:45 AM	11.79	9.08	7.16	4.63839 Run 2 - 1
04/01/2004	9:47:16 AM	11.73	9.18	7.13	4.588643 Run 2 - 1
04/01/2004	9:47:45 AM	11.79	9.18	7.29	4.720657 Run 2 - 1
04/01/2004	9:48:16 AM	11.73	9.13	7.4	4.764653 Run 2 - 1
04/01/2004	9:48:45 AM	11.79	9.13	7.4	4.796595 Run 2 - 1
04/01/2004	9:49:16 AM	11.79	9.18	7.3	4.733313 Run 2 - 1
04/01/2004	9:49:45 AM	11.79	9.18	7.32	4.74597 Run 2 - 1
04/01/2004	9:50:16 AM	11.73	9.13	7.38	4.752081 Run 2 - 1
04/01/2004	9:50:45 AM	11.79	9.13	7.49	4.853549 Run 2 - 1
04/01/2004	9:51:15 AM	11.79	9.13	7.42	4.809252 Run 2 - 1
04/01/2004	9:51:46 AM	11.79	9.13	7.48	4.847221 Run 2 - 1
04/01/2004	9:52:15 AM	11.79	9.18	7.34	4.758626 Run 2 - 1
04/01/2004	9:52:46 AM	11.79	9.18	7.3	4.733313 Run 2 - 1
04/01/2004	9:53:15 AM	11.79	9.18	7.3	4.733313 Run 2 - 1
04/01/2004	9:53:46 AM	11.79	9.13	7.34	4.758626 Run 2 - 1
04/01/2004	9:54:15 AM	11.79	9.18	7.36	4.771283 Run 2 - 1

04/01/2004	9:54:46 AM	11.79	9.13	7.32	4.74597	Run 2 - 1
04/01/2004	9:55:15 AM	11.79	9.18	7.22	4.67636	Run 2 - 1
04/01/2004	9:55:45 AM	11.73	9.18	7.18	4.620074	Run 2 - 1
04/01/2004	9:56:16 AM	11.73	9.18	7.32	4.714365	Run 2 - 1
04/01/2004	9:56:45 AM	11.73	9.18	7.29	4.695507	Run 2 - 1
04/01/2004	9:57:16 AM	11.79	9.18	7.29	4.720657	Run 2 - 1
04/01/2004	9:57:45 AM	11.73	9.13	7.12	4.582357	Run 2 - 1
04/01/2004	9:58:16 AM	11.79	9.13	7.14	4.625734	Run 2 - 1
04/01/2004	9:58:45 AM	11.79	9.13	7.15	4.632062	Run 2 - 1
04/01/2004	9:59:16 AM	11.73	9.18	7.17	4.613788	Run 2 - 1
04/01/2004	9:59:46 AM	11.79	9.13	7.2	4.663703	Run 2 - 1
04/01/2004	10:00:15 AM	11.73	9.13	7.19	4.62636	Run 2 - 1
04/01/2004	10:00:46 AM	11.73	9.18	7.13	4.588643	Run 2 - 1
04/01/2004	10:01:15 AM	11.73	9.18	7.11	4.576072	Run 2 - 1
04/01/2004	10:01:46 AM	11.73	9.13	7.04	4.532069	Run 2 - 1
04/01/2004	10:02:15 AM	11.79	9.18	7.11	4.60675	Run 2 - 1
04/01/2004	10:02:46 AM	11.79	9.13	7.2	4.663703	Run 2 - 1
04/01/2004	10:03:15 AM	11.79	9.13	7.14	4.625734	Run 2 - 1
04/01/2004	10:03:45 AM	11.79	9.18	7.09	4.594093	Run 2 - 1
04/01/2004	10:04:16 AM	11.79	9.08	7.08	4.587765	Run 2 - 1
04/01/2004	10:04:45 AM	11.79	9.13	7.22	4.67636	Run 2 - 1
04/01/2004	10:05:16 AM	11.79	9.18	7.27	4.708	Run 2 - 1
04/01/2004	10:05:45 AM	11.79	9.18	7.12	4.613077	Run 2 - 1
04/01/2004	10:06:16 AM	11.79	9.23	7.23	4.682687	Run 2 - 1
04/01/2004	10:06:45 AM	11.73	9.13	7.38	4.752081	Run 2 - 1
04/01/2004	10:07:16 AM	11.79	9.18	7.2	4.663703	Run 2 - 1
04/01/2004	10:07:45 AM	11.79	9.13	7.4	4.796595	Run 2 - 2
04/01/2004	10:08:15 AM	1.42	0.58	7.3	2.212146	
04/01/2004	10:08:46 AM	12.34	11.23	3.94	2.713827	
04/01/2004	10:09:15 AM	12.41	11.23	0.28	0.19651	Run 2 Span - Span
04/01/2004	10:09:46 AM	12.34	11.23	0.05	0.033479	Run 2 Span - Span
04/01/2004	10:10:15 AM	12.34	11.23	0.07	0.046948	Run 2 Span - Zero
04/01/2004	10:10:46 AM	5.08	3.27	0.05	0.018106	Run 2 Span - Zero
04/01/2004	10:11:15 AM	0.08	0.14	3.13	0.888067	Run 2 Span - Zero
04/01/2004	10:11:46 AM	0.08	0.14	5.96	1.687675	Run 2 Span - Zero
04/01/2004	10:12:15 AM	0.01	0.09	6.16	1.740676	Run 2 Span - Zero
04/01/2004	10:12:46 AM	8.32	7.18	6.21	2.911845	Run 2 Span - Span
04/01/2004	10:13:15 AM	11.73	9.13	6.87	4.425206	Run 2 Span - Span
04/01/2004	10:13:46 AM	11.79	9.18	7.4	4.796595	Run 2 Span - Span
04/01/2004	10:14:15 AM	11.79	9.18	7.47	4.840893	Run 3 - 1
04/01/2004	10:14:46 AM	11.73	9.18	7.34	4.726937	Run 3 - 1
04/01/2004	10:15:15 AM	11.73	9.23	7.52	4.840086	Run 3 - 1
04/01/2004	10:15:46 AM	11.73	9.18	7.68	4.940663	Run 3 - 1
04/01/2004	10:16:15 AM	11.73	9.18	7.45	4.796083	Run 3 - 1
04/01/2004	10:16:46 AM	11.73	9.18	7.49	4.821228	Run 3 - 1
04/01/2004	10:17:15 AM	11.73	9.23	7.27	4.676648	Run 3 - 1
04/01/2004	10:17:46 AM	11.79	9.18	7.25	4.695344	Run 3 - 1
04/01/2004	10:18:16 AM	11.79	9.18	7.26	4.701672	Run 3 - 1
04/01/2004	10:18:45 AM	11.79	9.18	7.24	4.689016	Run 3 - 1
04/01/2004	10:19:16 AM	11.73	9.13	7.24	4.65779	Run 3 - 1
04/01/2004	10:19:45 AM	11.73	9.13	7.28	4.682934	Run 3 - 1
04/01/2004	10:20:16 AM	11.79	9.18	7.26	4.701672	Run 3 - 1
04/01/2004	10:20:45 AM	11.79	9.18	7.3	4.733313	Run 3 - 1
04/01/2004	10:21:16 AM	11.79	9.13	7.18	4.651046	Run 3 - 1
04/01/2004	10:21:45 AM	11.79	9.18	7.14	4.625734	Run 3 - 1
04/01/2004	10:22:16 AM	11.73	9.18	7.04	4.532069	Run 3 - 1
04/01/2004	10:22:45 AM	11.73	9.18	7.17	4.613788	Run 3 - 1

04/01/2004	10:23:15 AM	11.79	9.23	7.23	4.682687	Run 3 - 1
04/01/2004	10:23:46 AM	11.79	9.18	7.21	4.670031	Run 3 - 1
04/01/2004	10:24:15 AM	11.79	9.18	7.03	4.556124	Run 3 - 1
04/01/2004	10:24:46 AM	11.73	9.13	7.15	4.601216	Run 3 - 1
04/01/2004	10:25:15 AM	11.79	9.13	7.26	4.701672	Run 3 - 1
04/01/2004	10:25:46 AM	11.79	9.13	7.12	4.613077	Run 3 - 1
04/01/2004	10:26:15 AM	11.79	9.18	7.04	4.562452	Run 3 - 1
04/01/2004	10:26:46 AM	11.73	9.18	7.17	4.613788	Run 3 - 1
04/01/2004	10:27:15 AM	11.79	9.18	7.29	4.720657	Run 3 - 1
04/01/2004	10:27:46 AM	11.73	9.18	7.15	4.601216	Run 3 - 1
04/01/2004	10:28:16 AM	11.73	9.23	7.25	4.664076	Run 3 - 1
04/01/2004	10:28:45 AM	11.73	9.23	7.24	4.65779	Run 3 - 1
04/01/2004	10:29:16 AM	11.73	9.18	7.47	4.808656	Run 3 - 1
04/01/2004	10:29:45 AM	11.73	9.18	7.56	4.86523	Run 3 - 1
04/01/2004	10:30:16 AM	11.79	9.18	7.4	4.796595	Run 3 - 1
04/01/2004	10:30:45 AM	11.79	9.18	7.25	4.695344	Run 3 - 1
04/01/2004	10:31:16 AM	11.79	9.13	7.2	4.663703	Run 3 - 1
04/01/2004	10:31:45 AM	11.79	9.18	7.25	4.695344	Run 3 - 1
04/01/2004	10:32:16 AM	11.79	9.18	7.14	4.625734	Run 3 - 1
04/01/2004	10:32:45 AM	11.79	9.23	7.18	4.651046	Run 3 - 1
04/01/2004	10:33:16 AM	11.73	9.23	7.16	4.607502	Run 3 - 1
04/01/2004	10:33:45 AM	11.73	9.23	7.29	4.689221	Run 3 - 1
04/01/2004	10:34:16 AM	11.73	9.18	7.4	4.764653	Run 3 - 1
04/01/2004	10:34:45 AM	11.79	9.18	7.44	4.821908	Run 3 - 1
04/01/2004	10:35:16 AM	11.79	9.13	7.29	4.720657	Run 3 - 1
04/01/2004	10:35:45 AM	11.86	9.18	7.16	4.669696	Run 3 - 1
04/01/2004	10:36:15 AM	11.79	9.18	7.24	4.689016	Run 3 - 1
04/01/2004	10:36:46 AM	11.73	9.23	7.13	4.588643	Run 3 - 1
04/01/2004	10:37:15 AM	11.73	9.23	6.22	4.00404	Run 3 - 1
04/01/2004	10:37:46 AM	11.73	9.18	6.78	4.362345	Run 3 - 1
04/01/2004	10:38:15 AM	11.79	9.23	7.29	4.726985	Run 3 - 1
04/01/2004	10:38:46 AM	11.73	9.18	7.4	4.764653	Run 3 - 1
04/01/2004	10:39:15 AM	11.79	9.23	7.2	4.663703	Run 3 - 1
04/01/2004	10:39:46 AM	11.79	9.23	7.36	4.771283	Run 3 - 1
04/01/2004	10:40:15 AM	11.73	9.28	7.3	4.701792	Run 3 - 1
04/01/2004	10:40:46 AM	11.73	9.23	7.2	4.632646	Run 3 - 1
04/01/2004	10:41:15 AM	11.79	9.28	7.14	4.625734	Run 3 - 1
04/01/2004	10:41:45 AM	11.73	9.23	7.06	4.544641	Run 3 - 1
04/01/2004	10:42:16 AM	11.79	9.23	7.11	4.60675	Run 3 - 1
04/01/2004	10:42:45 AM	11.79	9.23	7.26	4.701672	Run 3 - 1
04/01/2004	10:43:16 AM	11.79	9.18	7.32	4.74597	Run 3 - 1
04/01/2004	10:43:45 AM	11.79	9.23	7.04	4.562452	Run 3 - 1
04/01/2004	10:44:16 AM	11.79	9.23	7.09	4.594093	Run 3 - 1
04/01/2004	10:44:45 AM	11.79	9.18	7.1	4.600421	Run 3 - 1
04/01/2004	10:45:16 AM	11.79	9.18	7.2	4.663703	Run 3 - 1
04/01/2004	10:45:46 AM	11.79	9.23	7.18	4.651046	Run 3 - 1
04/01/2004	10:46:15 AM	11.79	9.23	7.29	4.720657	Run 3 - 1
04/01/2004	10:46:46 AM	11.73	9.23	7.25	4.664076	Run 3 - 1
04/01/2004	10:47:15 AM	11.73	9.23	7.06	4.544641	Run 3 - 1
04/01/2004	10:47:46 AM	11.79	9.23	7.2	4.663703	Run 3 - 1
04/01/2004	10:48:15 AM	11.79	9.28	7.38	4.783939	Run 3 - 1
04/01/2004	10:48:46 AM	11.79	9.23	7.34	4.758626	Run 3 - 1
04/01/2004	10:49:15 AM	11.79	9.23	7.13	4.619406	Run 3 - 1
04/01/2004	10:49:46 AM	11.79	9.18	7.02	4.549796	Run 3 - 1
04/01/2004	10:50:15 AM	11.79	9.18	7.19	4.657375	Run 3 - 1
04/01/2004	10:50:45 AM	11.79	9.18	7.19	4.657375	Run 3 - 1
04/01/2004	10:51:16 AM	11.79	9.18	6.98	4.524482	Run 3 - 1

04/01/2004	10:51:45 AM	11.79	9.18	7.09	4.594093	Run 3 - 1
04/01/2004	10:52:16 AM	11.79	9.18	7.18	4.651046	Run 3 - 1
04/01/2004	10:52:45 AM	11.79	9.18	7.38	4.783939	Run 3 - 1
04/01/2004	10:53:16 AM	11.79	9.18	7.29	4.720657	Run 3 - 1
04/01/2004	10:53:45 AM	11.79	9.23	7.32	4.74597	Run 3 - 1
04/01/2004	10:54:16 AM	11.73	9.18	7.21	4.638932	Run 3 - 1
04/01/2004	10:54:45 AM	11.73	9.18	7.25	4.664076	Run 3 - 1
04/01/2004	10:55:16 AM	11.86	9.18	7.2	4.695179	Run 3 - 1
04/01/2004	10:55:46 AM	11.79	9.23	7.16	4.63839	Run 3 - 1
04/01/2004	10:56:15 AM	11.79	9.18	7.29	4.720657	Run 3 - 1
04/01/2004	10:56:46 AM	11.79	9.23	7.21	4.670031	Run 3 - 1
04/01/2004	10:57:15 AM	11.79	9.23	7.26	4.701672	Run 3 - 1
04/01/2004	10:57:46 AM	11.79	9.23	7.41	4.802924	Run 3 - 1
04/01/2004	10:58:15 AM	11.73	9.18	7.46	4.802369	Run 3 - 1
04/01/2004	10:58:46 AM	11.79	9.23	7.38	4.783939	Run 3 - 1
04/01/2004	10:59:15 AM	11.73	9.18	7.4	4.764653	Run 3 - 1
04/01/2004	10:59:46 AM	11.79	9.18	7.34	4.758626	Run 3 - 1
04/01/2004	11:00:15 AM	11.79	9.18	7.29	4.720657	Run 3 - 1
04/01/2004	11:00:46 AM	11.79	9.18	7.12	4.613077	Run 3 - 1
04/01/2004	11:01:15 AM	11.79	9.18	7.27	4.708	Run 3 - 1
04/01/2004	11:01:45 AM	11.79	9.23	7.44	4.821908	Run 3 - 1
04/01/2004	11:02:16 AM	11.73	9.18	7.41	4.770939	Run 3 - 1
04/01/2004	11:02:45 AM	11.79	9.23	7.38	4.783939	Run 3 - 1
04/01/2004	11:03:16 AM	11.73	9.18	7.44	4.789797	Run 3 - 1
04/01/2004	11:03:45 AM	11.73	9.18	7.6	4.890374	Run 3 - 1
04/01/2004	11:04:16 AM	11.79	9.18	7.53	4.878862	Run 3 - 1
04/01/2004	11:04:45 AM	11.73	9.23	7.25	4.664076	Run 3 - 1
04/01/2004	11:05:16 AM	11.79	9.18	7.26	4.701672	Run 3 - 1
04/01/2004	11:05:45 AM	11.79	9.18	7.18	4.651046	Run 3 - 1
04/01/2004	11:06:16 AM	11.73	9.18	7.24	4.65779	Run 3 - 1
04/01/2004	11:06:45 AM	11.79	9.18	7.34	4.758626	Run 3 - 1
04/01/2004	11:07:15 AM	11.79	9.23	7.44	4.821908	Run 3 - 1
04/01/2004	11:07:46 AM	11.79	9.18	7.4	4.796595	Run 3 - 1
04/01/2004	11:08:15 AM	11.79	9.18	7.44	4.821908	Run 3 - 1
04/01/2004	11:08:46 AM	11.73	9.18	7.53	4.846372	Run 3 - 1
04/01/2004	11:09:15 AM	11.73	9.18	7.69	4.946949	Run 3 - 1
04/01/2004	11:09:46 AM	11.73	9.18	7.69	4.946949	Run 3 - 1
04/01/2004	11:10:15 AM	11.79	9.18	7.78	5.043395	Run 3 - 1
04/01/2004	11:10:46 AM	11.73	9.13	7.61	4.896661	Run 3 - 1
04/01/2004	11:11:15 AM	11.73	9.18	7.6	4.890374	Run 3 - 1
04/01/2004	11:11:46 AM	11.73	9.18	7.82	5.034954	Run 3 - 1
04/01/2004	11:12:16 AM	11.73	9.23	7.63	4.909233	Run 3 - 1
04/01/2004	11:12:45 AM	11.67	9.18	7.65	4.889245	Run 3 - 1
04/01/2004	11:13:16 AM	11.73	9.18	7.9	5.085243	Run 3 - 1
04/01/2004	11:13:45 AM	11.73	9.18	7.81	5.028668	Run 3 - 1
04/01/2004	11:14:16 AM	11.73	9.18	7.76	4.997238	Run 3 - 2
04/01/2004	11:14:45 AM	1.72	0.68	7.62	2.3435	
04/01/2004	11:15:16 AM	12.34	11.18	4.88	3.367078	
04/01/2004	11:15:45 AM	12.41	11.28	0.47	0.325386	Run 3 Span - Span
04/01/2004	11:16:16 AM	12.34	11.23	0.13	0.087355	Run 3 Span - Span
04/01/2004	11:16:45 AM	12.34	11.23	0.14	0.09409	Run 3 Span - Span
04/01/2004	11:17:15 AM	12.34	11.28	0.11	0.073886	Run 3 Span - Zero
04/01/2004	11:17:46 AM	0.81	0.39	0.12	0.03433	Run 3 Span - Zero
04/01/2004	11:18:15 AM	0.08	0.19	3.63	1.029174	Run 3 Span - Zero
04/01/2004	11:18:46 AM	0.01	0.09	6.08	1.718606	Run 3 Span - Zero
04/01/2004	11:19:15 AM	0.01	0.09	6.22	1.757229	Run 3 Span - Span
04/01/2004	11:19:46 AM	11.31	8.98	6.25	3.843717	Run 3 Span - Span

04/01/2004	11:20:15 AM		11.73	9.13	6.96	4.48178	Run 3 Span - Span
04/01/2004	12:01:59 PM	CO*(5.9/(20.9-O2))		NaN			
04/01/2004	12:02:00 PM		92.48	73.98	7.4	-0.610219	

A-5 CALIBRATION GAS CERTIFICATIONS

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

Scott Specialty Gases
6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: E-N06925
Project No.: 01-04230-003

Customer
TAMPA ELECTRIC COMPANY

CHARLES DUFENY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: AAL8100 **Certification Date:** 09Feb2004 **Exp. Date:** 02Aug2004
Cylinder Pressure*:** 1960 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	6.02	PPM	+/- 2%	NIST and NMi
NITRIC OXIDE	8.24	PPM	+/- 2%	NIST and NMi
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	8.31	PPM		Reference Value Only

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2635	01May2007	ALM016889	25.78 PPM	CARBON MONOXIDE
NTRM 2628	02Apr2005	AAL069685	10.35 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
SIEMENS/6E/KN-240	15Jan2004	NDIR
HORIBA/CLA220/5708850810	26Jan2004	CHEMILUMINESCENCE

APPROVED BY: _____
KIMBERLY NILES

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RDD04

Scott Specialty Gases

www.scottgas.com

RATA CLASS

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: EN75516
Project No.: 01-73884-002

Customer
TAMPA ELECTRIC COMPANY
Michael Skirvin
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certifi
of Gaseous Calibration Standards; Procedure G-1; September, 1997.
Cylinder Number: ALM027916 Certification Date: 16Jul2002 Exp. Date: 15Jul2005
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON MONOXIDE	12.6	PPM	+/- 1%	Direct NIST and NMi
PROPANE	13.0	PPM	+/- 1%	Direct NIST and NMi
AIR		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI stand

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1678	01Jun2006	ALM024607	49.16PM	CARBON MONOXIDE
NTRM 1666	01May2004	ALM014096	9.470PM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
SIEMENS/6E/KN-240	01Jul2002	NDIR
VARIAN/3300/7945	16Jul2002	GC/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis	Second Triad Analysis	Calibration Curve
CARBON MONOXIDE		
Date: 09Jul2002Resp Unit:VOLTS	Date: 16Jul2002Resp Unit: VOLTS	Concentration=A+Bx+Cx2+Dx3+
Z1=-0.00780=2.48780T1=1.23620	Z1=-0.01100=4.849001=1.22970	r=0.99999 1678
R2=2.486202=-0.006302=1.23510	R2=4.848202=-0.01490=1.22030	Constants: A=1.2346E-0
Z3=-0.00580=1.23380R3=2.48580	Z3=-0.01260=1.218903=4.84890	B=1.0133E+01 C=
Avg. Conc: 12.50 PPM	Avg. Conc: 12.60 PPM	D= E=
PROPANE		
Date: 16Jul2002Resp Unit:AREA		Concentration=A+Bx+Cx2+Dx3+
Z1=0.000001=45905.001=63594.00		r=0.99999 1666
R2=45962.00=0.00000T2=63482.00		Constants: A=5.0257E-0
Z3=0.000003=63485.003=46013.00		B=2.0337E-04 C=4.6567E-1
Avg. Conc: 13.00 PPM		D= E=

APPROVED BY: (signature on file)
B. LEWIS, JR.

BLU04

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: E-N06925
Project No.: 01-00520-002

Customer

TAMPA ELECTRIC COMPANY
Charles Dufeny
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM006274 **Certification Date:** 20Nov2003 **Exp. Date:** 19Nov2006
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	18.0 %	+/- 1%	Direct NIST and NMi
OXYGEN	6.27 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997. Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1800	01Jan2004	HI049491	18.05 %	CARBON DIOXIDE
NTRM 2658	02Oct2006	ALM065189	9.930 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI/M200/170927	11Nov2003	GC-TCD
MTI/M200/170927	11Nov2003	GC-TCD

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

CARBON DIOXIDE

Date: 20Nov2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 823429.0	T1 = 823280.0
R2 = 823861.0	Z2 = 0.00000	T2 = 823408.0
Z3 = 0.00000	T3 = 823205.0	R3 = 823980.0
Avg. Concentration:	18.00 %	

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = .999998 1800
Constants: A = 7.7960E-03
B = 2.1765E-05 C =
D = E =

OXYGEN

Date: 20Nov2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 323031.0	T1 = 204444.0
R2 = 323018.0	Z2 = 0.00000	T2 = 204073.0
Z3 = 0.00000	T3 = 203961.0	R3 = 322371.0
Avg. Concentration:	6.270 %	

Concentration = A + 8x + Cx2 + Dx3 + Ex4
r = .999998 2658
Constants: A = -2.2257E-02
B = 3.0739E-05 C =
D = E =

APPROVED BY: Bradley C Millman

BRADLEY C. MILLMAN

BL003

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: E-N06925
Project No.: 01-01676-001

Customer

TAMPA ELECTRIC COMPANY
CHARLES DUFENY
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM040741 **Certification Date:** 15Dec2003 **Exp. Date:** 14Dec2006
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	11.0 %	+/- 1%	Direct NIST and NMi
OXYGEN	12.6 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997. Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1675	01Jun2004	K001509	13.93 %	CARBON DIOXIDE
NTRM 2658	02Oct2006	ALM065189	9.930 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI/M200/170927	12Dec2003	GC-TCD
MTI/M200/170927	12Dec2003	GC-TCD

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

CARBON DIOXIDE

Date: 12Dec2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 636210.0	T1 = 503192.0
R2 = 636484.0	Z2 = 0.00000	T2 = 503158.0
Z3 = 0.00000	T3 = 503152.0	R3 = 636384.0
Avg. Concentration:	11.00	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999998	1675
Constants:	A = 2.1891E-05
B = 9.5568E-03	C =
D =	E =

OXYGEN

Date: 12Dec2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 323325.0	T1 = 408839.0
R2 = 323240.0	Z2 = 0.00000	T2 = 409029.0
Z3 = 0.00000	T3 = 408900.0	R3 = 323094.0
Avg. Concentration:	12.60	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999997	265B
Constants:	A = -1.5960E-02
B = 3.0872E-05	C =
D =	E =

APPROVED BY: Bradley C Millman

BRADLEY C. MILLMAN

DC1002

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

6141 EASTON ROAD, BLDG 1,PLUMSTEADVILLE,PA 18949-0310 Phone: 800-331-4953 Fax: 215-766-7226

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
6141 EASTON ROAD, BLDG 1
PLUMSTEADVILLE,PA 18949-0310

P.O. No.: E-N06925
Project No.: 01-00520-001

Customer

TAMPA ELECTRIC COMPANY
Charles Dufeny
5010 CAUSEWAY BLVD
TAMPA FL 33619

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM006593 **Certification Date:** 21Nov2003 **Exp. Date:** 20Nov2006
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	5.02 %	+/- 1%	Direct NIST and NMi
OXYGEN	20.9 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2000	01Jun2005	K026511	5.006 %	CARBON DIOXIDE
NTRM 2659	01Jun2004	K012946	20.85 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI/M200/170927	11Nov2003	GC-TCD
MTI/M200/170927	11Nov2003	GC-TCD

ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis **Second Triad Analysis** **Calibration Curve**

CARBON DIOXIDE

Date: 20Nov2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 228179.0	T1 = 228800.0
R2 = 228167.0	Z2 = 0.00000	T2 = 228776.0
Z3 = 0.00000	T3 = 228802.0	R3 = 228087.0
Avg. Concentration:	5.020	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999998	2000
Constants:	A = 7.7960E-03
B = 2.1765E-05	C =
D =	E =

OXYGEN

Date: 20Nov2003	Response Unit:VOLTS	
Z1 = 0.00000	R1 = 676019.0	T1 = 678740.0
R2 = 676160.0	Z2 = 0.00000	T2 = 678810.0
Z3 = 0.00000	T3 = 678820.0	R3 = 675892.0
Avg. Concentration:	20.90	%

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999998	2659
Constants:	A = -2.2257E-02
B = 3.0739E-05	C =
D =	E =

APPROVED BY: _____

BRADLEY C. MILLMAN

APPENDIX B
NITROGEN OXIDES / SULFUR DIOXIDE FROM CEMS

B-1 BASELINE DATA

DATE	TIME	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
03/30/2004	075800	39.291	18.907	185.289	13.172	10.968	8.333
03/30/2004	075900	38.804	19.102	185.360	13.306	10.967	8.359
03/30/2004	080000	38.658	18.980	183.810	13.255	10.989	8.351
03/30/2004	080100	38.996	18.760	184.386	13.091	10.982	8.347
03/30/2004	080200	39.485	19.061	184.696	13.293	10.977	8.363
03/30/2004	080300	39.246	18.802	184.278	13.089	10.962	8.379
03/30/2004	080400	38.302	18.700	184.529	13.049	10.982	8.368
03/30/2004	080500	38.302	19.030	184.481	13.284	10.985	8.384
03/30/2004	080600	39.812	19.198	184.154	13.400	10.984	8.395
03/30/2004	080700	39.812	19.293	184.217	13.460	10.980	8.395
03/30/2004	080800	39.398	19.222	184.676	13.397	10.972	8.387
03/30/2004	080900	39.406	19.224	184.459	13.391	10.967	8.398
03/30/2004	081000	39.118	19.168	184.537	13.354	10.968	8.391
03/30/2004	081100	38.732	18.994	185.734	13.243	10.975	8.375
03/30/2004	081200	38.159	19.309	185.285	13.452	10.968	8.402
03/30/2004	081300	37.618	19.371	184.471	13.503	10.973	8.390
03/30/2004	081400	37.737	19.423	184.733	13.526	10.965	8.392
03/30/2004	081500	37.608	19.113	184.507	13.340	10.984	8.384
03/30/2004	081600	37.608	19.361	184.222	13.480	10.963	8.400
03/30/2004	081700	38.671	19.176	184.419	13.343	10.958	8.395
03/30/2004	081800	38.671	19.066	185.384	13.248	10.946	8.396
03/30/2004	081900	39.404	18.822	184.817	13.095	10.957	8.397
03/30/2004	082000	40.254	19.060	183.681	13.283	10.971	8.388
03/30/2004	082100	40.581	18.982	183.771	13.226	10.969	8.384
03/30/2004	082200	40.587	19.395	184.038	13.529	10.979	8.404
03/30/2004	082300	41.108	19.669	184.212	13.737	10.989	8.403
03/30/2004	082400	40.327	19.637	184.590	13.682	10.969	8.403
03/30/2004	082500	39.663	19.516	184.000	13.630	10.989	8.388
03/30/2004	082600	38.166	19.849	184.150	13.599	10.992	8.387
03/30/2004	082700	38.166	19.849	185.530	13.859	10.987	8.397
03/30/2004	082800	37.365	19.703	185.134	13.757	10.987	8.395
03/30/2004	082900	37.365	19.534	184.808	13.617	10.973	8.390
03/30/2004	083000	36.915	19.251	183.814	13.434	10.982	8.392
03/30/2004	083100	36.406	19.503	183.719	13.626	10.992	8.391
03/30/2004	083200	37.018	19.571	184.310	13.663	10.986	8.389
03/30/2004	083300	38.445	19.375	184.311	13.490	10.963	8.393
03/30/2004	083400	36.810	19.394	185.142	13.543	10.988	8.395
03/30/2004	083500	36.362	19.630	184.682	13.701	10.984	8.391
03/30/2004	083600	36.211	19.472	182.822	13.638	11.013	8.393
03/30/2004	083700	36.297	19.728	184.939	13.812	11.010	8.400

03/30/2004 083800	36.310	19.848	184.769	13.881	11.001	8.398
03/30/2004 083900	35.944	19.726	184.785	13.768	10.984	8.387
03/30/2004 084000	34.965	19.365	184.334	13.516	10.984	8.387
03/30/2004 084100	34.495	19.779	185.513	13.818	10.992	8.383
03/30/2004 084200	35.121	19.687	184.584	13.739	10.983	8.382
03/30/2004 084300	35.842	19.716	184.322	13.774	10.992	8.390
03/30/2004 084400	36.370	19.489	184.875	13.625	10.998	8.378
03/30/2004 084500	28.871	16.768	184.361	11.694	10.977	6.245
03/30/2004 084600	23.632	11.036	183.893	7.707	10.988	5.761
03/30/2004 084700	35.536	18.659	184.407	13.048	11.000	8.020
03/30/2004 084800	36.411	18.904	183.822	13.191	10.982	8.102
03/30/2004 084900	36.262	18.810	184.519	13.152	10.999	8.147
03/30/2004 085000	34.977	19.273	185.076	13.470	10.995	8.179
03/30/2004 085100	35.202	19.112	184.978	13.362	10.998	8.202
03/30/2004 085200	36.801	19.361	184.139	13.546	11.004	8.238
03/30/2004 085300	36.739	19.447	183.373	13.575	10.985	8.248
03/30/2004 085400	36.524	19.270	183.214	13.493	11.011	8.259
03/30/2004 085500	36.358	19.602	184.641	13.742	11.021	8.286
03/30/2004 085600	36.912	19.625	184.775	13.743	11.012	8.288
03/30/2004 085700	36.671	19.495	183.780	13.664	11.019	8.300
03/30/2004 085800	37.485	19.565	183.966	13.713	11.019	8.320
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
	37.349	19.143	184.463	13.358	10.984	8.275

DATE	TIME	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
03/30/2004	090500	37.347	19.349	184.517	13.563	11.020	8.344
03/30/2004	090600	39.047	19.484	184.531	13.658	11.020	8.349
03/30/2004	090700	39.201	19.608	185.155	13.699	10.992	8.371
03/30/2004	090800	39.891	19.329	185.070	13.518	11.001	8.383
03/30/2004	090900	41.412	19.496	184.620	13.647	11.008	8.391
03/30/2004	091000	41.753	19.654	184.202	13.721	10.986	8.397
03/30/2004	091100	41.853	19.254	184.637	13.479	11.009	8.393
03/30/2004	091200	41.809	19.659	184.927	13.792	11.027	8.398
03/30/2004	091300	41.809	19.649	185.069	13.801	11.037	8.395
03/30/2004	091400	41.501	19.854	185.148	13.894	11.006	8.399
03/30/2004	091500	40.709	19.606	184.547	13.779	11.042	8.391
03/30/2004	091600	41.109	19.782	184.628	13.891	11.035	8.380
03/30/2004	091700	40.936	19.564	184.116	13.735	11.033	8.377
03/30/2004	091800	41.102	19.354	184.465	13.537	11.002	8.368
03/30/2004	091900	40.301	19.129	184.211	13.423	11.029	8.360
03/30/2004	092000	39.664	19.558	183.982	13.739	11.038	8.371
03/30/2004	092100	39.292	19.574	184.778	13.727	11.024	8.360
03/30/2004	092200	39.292	19.236	183.454	13.487	11.022	8.362
03/30/2004	092300	40.399	19.641	184.090	13.809	11.045	8.374
03/30/2004	092400	40.399	19.869	184.716	13.964	11.042	8.373
03/30/2004	092500	40.261	19.682	184.687	13.795	11.019	8.375
03/30/2004	092600	40.566	19.386	184.295	13.620	11.039	8.375
03/30/2004	092700	39.955	19.366	184.043	13.568	11.016	8.367
03/30/2004	092800	39.555	19.307	184.930	13.548	11.029	8.374
03/30/2004	092900	39.844	19.620	184.945	13.728	11.005	8.382
03/30/2004	093000	40.877	19.243	183.485	13.506	11.031	8.372
03/30/2004	093100	41.942	19.330	183.809	13.588	11.044	8.363
03/30/2004	093200	41.945	19.562	184.272	13.745	11.040	8.363
03/30/2004	093300	42.354	19.755	184.468	13.808	10.996	8.376
03/30/2004	093400	42.111	19.298	184.497	13.526	11.019	8.379
03/30/2004	093500	39.150	19.528	184.746	13.710	11.033	8.370
03/30/2004	093600	38.615	19.627	184.374	13.756	11.019	8.366
03/30/2004	093700	39.546	19.330	184.297	13.522	11.003	8.374
03/30/2004	093800	39.143	19.423	183.907	13.587	11.003	8.376
03/30/2004	093900	38.732	19.414	184.554	13.581	11.003	8.364
03/30/2004	094000	40.055	19.241	184.787	13.427	10.982	8.353
03/30/2004	094100	40.593	19.087	183.562	13.387	11.025	8.360
03/30/2004	094200	41.593	19.623	184.440	13.803	11.049	8.399
03/30/2004	094300	42.379	19.789	184.634	13.921	11.050	8.386
03/30/2004	094400	42.080	19.621	183.757	13.803	11.050	8.374

03/30/2004 094500	34.018	16.729	183.098	11.796	11.070	6.336
03/30/2004 094600	26.898	11.029	183.661	7.766	11.058	5.690
03/30/2004 094700	39.605	18.893	183.918	13.289	11.049	8.021
03/30/2004 094800	40.154	18.793	184.416	13.200	11.037	8.100
03/30/2004 094900	40.857	18.819	184.368	13.242	11.052	8.135
03/30/2004 095000	40.800	19.139	184.299	13.416	11.020	8.147
03/30/2004 095100	40.988	19.050	184.745	13.388	11.042	8.187
03/30/2004 095200	41.739	19.209	184.939	13.516	11.052	8.218
03/30/2004 095300	41.836	19.576	185.270	13.761	11.044	8.254
03/30/2004 095400	42.767	19.557	185.049	13.710	11.021	8.279
03/30/2004 095500	44.262	19.210	184.272	13.475	11.026	8.287
03/30/2004 095600	43.195	19.236	184.162	13.530	11.049	8.296
03/30/2004 095700	43.897	19.377	184.014	13.605	11.034	8.303
03/30/2004 095800	43.424	19.433	183.102	13.630	11.025	8.313
03/30/2004 095900	43.099	19.115	183.388	13.413	11.029	8.308
03/30/2004 100000	44.153	19.368	184.888	13.609	11.040	8.334
03/30/2004 100100	44.896	19.434	184.662	13.616	11.016	8.348
03/30/2004 100200	45.165	19.077	184.332	13.417	11.048	8.358
03/30/2004 100300	43.524	19.257	184.181	13.495	11.018	8.372
03/30/2004 100400	40.212	19.122	184.347	13.407	11.022	8.379
03/30/2004 100500	38.582	18.912	184.046	13.287	11.039	8.367
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
	40.724	19.217	184.369	13.481	11.027	8.263

DATE	TIME	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
03/30/2004	101500	42.911	18.938	185.034	13.270	11.017	8.370
03/30/2004	101600	43.186	19.074	184.203	13.400	11.039	8.392
03/30/2004	101700	43.186	19.171	183.586	13.400	10.996	8.391
03/30/2004	101800	44.545	18.904	183.055	13.264	11.028	8.384
03/30/2004	101900	43.482	18.958	184.027	13.314	11.036	8.381
03/30/2004	102000	43.476	19.173	183.885	13.459	11.032	8.382
03/30/2004	102100	44.611	19.021	184.429	13.360	11.037	8.387
03/30/2004	102200	43.559	19.131	183.423	13.448	11.044	8.395
03/30/2004	102300	41.591	19.407	184.491	13.646	11.046	8.403
03/30/2004	102400	41.591	19.575	184.503	13.734	11.028	8.408
03/30/2004	102500	42.038	19.391	184.714	13.641	11.050	8.413
03/30/2004	102600	42.038	19.604	184.511	13.816	11.065	8.418
03/30/2004	102700	44.020	19.635	184.748	13.801	11.043	8.424
03/30/2004	102800	44.870	19.079	184.520	13.394	11.033	8.416
03/30/2004	102900	46.092	19.011	183.873	13.372	11.049	8.421
03/30/2004	103000	46.093	18.982	184.231	13.344	11.044	8.429
03/30/2004	103100	45.937	19.100	184.079	13.414	11.036	8.429
03/30/2004	103200	44.813	19.174	184.259	13.456	11.042	8.431
03/30/2004	103300	44.813	19.174	184.097	13.484	11.047	8.428
03/30/2004	103400	45.054	18.929	183.412	13.299	11.039	8.415
03/30/2004	103500	43.320	18.945	183.603	13.321	11.046	8.409
03/30/2004	103600	41.944	19.103	183.803	13.442	11.052	8.411
03/30/2004	103700	41.830	19.264	183.390	13.576	11.065	8.410
03/30/2004	103800	41.744	19.383	183.845	13.619	11.040	8.408
03/30/2004	103900	41.220	19.264	183.589	13.539	11.042	8.395
03/30/2004	104000	41.421	19.231	183.721	13.527	11.049	8.415
03/30/2004	104100	40.652	19.374	184.616	13.640	11.057	8.423
03/30/2004	104200	38.861	19.579	185.573	13.767	11.046	8.434
03/30/2004	104300	38.316	19.418	184.319	13.663	11.052	8.427
03/30/2004	104400	38.054	19.427	183.810	13.670	11.052	8.423
03/30/2004	104500	30.270	16.615	183.962	11.694	11.054	6.334
03/30/2004	104600	25.130	10.805	184.764	7.617	11.068	5.744
03/30/2004	104700	38.346	18.618	184.922	13.107	11.056	8.044
03/30/2004	104800	38.553	18.463	184.531	12.979	11.044	8.133
03/30/2004	104900	39.978	18.193	184.750	12.791	11.045	8.155
03/30/2004	105000	40.406	18.622	184.751	13.133	11.071	8.187
03/30/2004	105100	41.642	19.044	184.620	13.411	11.059	8.226
03/30/2004	105200	43.075	18.824	184.578	13.245	11.052	8.258
03/30/2004	105300	43.527	19.101	184.227	13.476	11.074	8.262
03/30/2004	105400	44.645	19.390	183.752	13.673	11.070	8.274

03/30/2004 105500	44.730	19.148	183.476	13.489	11.062	8.280
03/30/2004 105600	44.626	19.192	183.871	13.530	11.068	8.297
03/30/2004 105700	44.377	19.304	183.879	13.594	11.059	8.322
03/30/2004 105800	42.898	19.345	183.676	13.618	11.056	8.331
03/30/2004 105900	42.898	19.273	183.418	13.535	11.036	8.341
03/30/2004 110000	41.196	19.096	183.704	13.403	11.031	8.342
03/30/2004 110100	40.904	18.957	183.191	13.325	11.043	8.348
03/30/2004 110200	41.221	19.137	183.162	13.449	11.042	8.346
03/30/2004 110300	40.396	19.149	184.281	13.450	11.037	8.359
03/30/2004 110400	39.534	19.177	185.911	13.468	11.036	8.374
03/30/2004 110500	39.155	19.332	185.949	13.614	11.059	8.365
03/30/2004 110600	39.252	19.495	185.413	13.742	11.067	8.361
03/30/2004 110700	38.431	19.555	185.365	13.779	11.064	8.353
03/30/2004 110800	38.391	19.523	185.164	13.696	11.027	8.365
03/30/2004 110900	37.519	18.972	185.182	13.310	11.027	8.371
03/30/2004 111000	37.904	19.256	185.116	13.543	11.048	8.382
03/30/2004 111100	39.665	19.525	184.144	13.747	11.057	8.396
03/30/2004 111200	39.988	19.567	185.398	13.748	11.040	8.395
03/30/2004 111300	40.264	19.376	184.339	13.613	11.039	8.378
03/30/2004 111400	41.986	19.182	183.420	13.488	11.046	8.378
03/30/2004 111500	42.227	19.131	182.971	13.448	11.044	8.384
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1OXY15	PC1CO211
	41.449	18.996	184.250	13.357	11.046	8.285

B-2 BIOMASS DATA

DATE	TIME	PC1SO216	PC1NOX13	PC1GEN12	PC1NOXC15	PC1CO211
04/01/2004	080100	45.326	19.010	183.695	13.400	8.340
04/01/2004	080200	45.994	18.751	184.736	13.195	8.347
04/01/2004	080300	47.048	18.578	185.336	13.074	8.351
04/01/2004	080400	48.472	18.919	185.171	13.334	8.366
04/01/2004	080500	49.140	19.087	184.403	13.448	8.365
04/01/2004	080600	46.837	18.658	184.468	13.147	8.370
04/01/2004	080700	46.837	18.578	184.326	13.066	8.359
04/01/2004	080800	46.360	18.795	185.022	13.228	8.367
04/01/2004	080900	45.288	18.875	185.495	13.307	8.362
04/01/2004	081000	44.286	19.079	184.958	13.460	8.355
04/01/2004	081100	43.226	18.958	184.887	13.336	8.356
04/01/2004	081200	38.956	18.681	184.830	13.181	8.368
04/01/2004	081300	37.796	18.992	184.614	13.387	8.359
04/01/2004	081400	39.348	18.923	183.272	13.348	8.354
04/01/2004	081500	40.166	18.756	183.825	13.232	8.356
04/01/2004	081600	39.951	19.167	184.309	13.542	8.367
04/01/2004	081700	38.838	19.184	184.604	13.534	8.359
04/01/2004	081800	38.838	19.086	185.024	13.459	8.376
04/01/2004	081900	39.052	19.302	185.423	13.614	8.387
04/01/2004	082000	37.959	19.162	185.237	13.527	8.379
04/01/2004	082100	36.135	19.412	184.699	13.720	8.366
04/01/2004	082200	35.456	19.519	184.506	13.779	8.356
04/01/2004	082300	34.359	19.306	184.939	13.612	8.354
04/01/2004	082400	33.984	19.361	184.975	13.657	8.369
04/01/2004	082500	32.026	19.290	184.094	13.609	8.374
04/01/2004	082600	35.570	19.203	184.040	13.572	8.360
04/01/2004	082700	35.570	19.309	184.661	13.609	8.350
04/01/2004	082800	36.911	19.234	183.895	13.556	8.350
04/01/2004	082900	36.911	18.982	182.959	13.388	8.363
04/01/2004	083000	35.901	19.288	184.187	13.603	8.367
04/01/2004	083100	37.325	19.450	184.497	13.712	8.355
04/01/2004	083200	38.314	19.334	184.499	13.630	8.360
04/01/2004	083300	37.842	19.492	184.515	13.748	8.376
04/01/2004	083400	38.164	19.406	184.330	13.665	8.387
04/01/2004	083500	38.238	18.806	183.724	13.244	8.376
04/01/2004	083600	39.286	19.168	183.900	13.520	8.363
04/01/2004	083700	40.943	19.243	184.957	13.602	8.363
04/01/2004	083800	42.176	19.743	184.386	13.952	8.378
04/01/2004	083900	41.252	19.669	184.583	13.876	8.371
04/01/2004	084000	40.924	19.558	183.964	13.811	8.362

04/01/2004 084100	40.810	19.488	184.573	13.780	8.353
04/01/2004 084200	40.149	19.758	184.851	13.998	8.353
04/01/2004 084300	38.989	19.997	185.174	14.210	8.360
04/01/2004 084400	38.168	20.054	183.492	14.219	8.341
04/01/2004 084500	33.086	18.329	184.392	12.993	7.025
04/01/2004 084600	21.937	9.811	184.946	6.951	5.037
04/01/2004 084700	37.636	19.090	184.484	13.559	7.949
04/01/2004 084800	38.409	19.529	183.677	13.824	8.090
04/01/2004 084900	37.185	19.034	183.230	13.441	8.132
04/01/2004 085000	35.585	19.004	183.632	13.425	8.163
04/01/2004 085100	34.299	19.461	183.395	13.817	8.181
04/01/2004 085200	36.085	20.025	184.732	14.178	8.195
04/01/2004 085300	37.938	19.878	184.544	14.081	8.223
04/01/2004 085400	38.836	20.098	184.357	14.247	8.263
04/01/2004 085500	38.298	19.946	185.486	14.143	8.274
04/01/2004 085600	38.304	20.021	184.107	14.181	8.276
04/01/2004 085700	39.191	19.882	184.046	14.091	8.287
04/01/2004 085800	40.008	20.093	183.777	14.226	8.301
04/01/2004 085900	40.118	19.669	183.704	13.905	8.290
04/01/2004 090000	41.453	19.470	184.714	13.792	8.281
04/01/2004 090100	42.612	19.861	184.957	14.082	8.303
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1CO211
	39.280	19.144	184.430	13.522	8.250

DATE	TIME	PC1SO216	PC1NOX13	PC1GEN12	PC1NOXC15	PC1CO211
04/01/2004	090700	39.616	20.268	184.334	14.347	8.315
04/01/2004	090800	39.562	19.845	183.939	14.022	8.341
04/01/2004	090900	37.833	19.765	184.146	14.026	8.344
04/01/2004	091000	36.880	19.889	184.694	14.094	8.333
04/01/2004	091100	36.465	20.061	185.099	14.223	8.354
04/01/2004	091200	36.620	20.184	185.076	14.320	8.355
04/01/2004	091300	39.337	20.215	184.489	14.349	8.342
04/01/2004	091400	40.111	19.905	183.866	14.132	8.338
04/01/2004	091500	40.000	20.026	184.461	14.181	8.345
04/01/2004	091600	39.415	20.088	185.007	14.249	8.356
04/01/2004	091700	40.029	20.148	184.361	14.308	8.362
04/01/2004	091800	40.068	20.202	184.079	14.307	8.351
04/01/2004	091900	39.635	20.028	184.534	14.189	8.370
04/01/2004	092000	38.494	20.045	184.688	14.189	8.377
04/01/2004	092100	38.410	20.001	184.261	14.195	8.371
04/01/2004	092200	38.911	20.281	183.607	14.377	8.371
04/01/2004	092300	37.773	19.880	183.612	14.055	8.364
04/01/2004	092400	37.932	19.577	184.959	13.838	8.361
04/01/2004	092500	38.648	19.805	185.677	14.014	8.363
04/01/2004	092600	39.585	19.887	185.079	14.059	8.371
04/01/2004	092700	40.349	19.674	184.673	13.876	8.370
04/01/2004	092800	41.418	19.416	184.338	13.708	8.377
04/01/2004	092900	41.631	19.292	183.978	13.620	8.363
04/01/2004	093000	42.700	19.485	182.968	13.753	8.357
04/01/2004	093100	43.124	19.351	183.787	13.649	8.342
04/01/2004	093200	41.212	19.050	184.362	13.438	8.356
04/01/2004	093300	41.212	19.340	185.831	13.693	8.360
04/01/2004	093400	41.320	19.734	185.283	13.964	8.357
04/01/2004	093500	41.719	19.518	184.419	13.768	8.368
04/01/2004	093600	39.637	19.178	183.825	13.556	8.364
04/01/2004	093700	40.613	19.295	184.776	13.658	8.339
04/01/2004	093800	41.353	19.614	184.541	13.906	8.336
04/01/2004	093900	41.849	19.857	184.763	14.059	8.346
04/01/2004	094000	43.122	19.763	184.305	13.974	8.356
04/01/2004	094100	42.494	19.552	183.850	13.817	8.348
04/01/2004	094200	42.857	19.390	184.320	13.732	8.318
04/01/2004	094300	43.020	19.594	184.060	13.847	8.326
04/01/2004	094400	41.944	19.263	183.438	13.614	8.340
04/01/2004	094500	36.891	17.971	184.718	12.718	7.103
04/01/2004	094600	23.486	9.509	184.547	6.742	4.969

04/01/2004 094700	39.267	18.263	183.945	12.998	7.945
04/01/2004 094800	40.171	18.415	183.738	13.125	8.036
04/01/2004 094900	39.756	18.505	183.463	13.132	8.060
04/01/2004 095000	39.270	18.664	183.964	13.232	8.117
04/01/2004 095100	37.704	18.245	184.977	12.907	8.106
04/01/2004 095200	37.465	18.561	185.385	13.118	8.161
04/01/2004 095300	38.035	18.468	184.354	13.071	8.171
04/01/2004 095400	39.070	18.403	184.416	12.991	8.182
04/01/2004 095500	39.638	18.248	184.345	12.883	8.185
04/01/2004 095600	40.599	18.055	183.970	12.741	8.208
04/01/2004 095700	41.218	18.371	183.739	12.964	8.243
04/01/2004 095800	40.793	18.515	184.533	13.065	8.264
04/01/2004 095900	39.082	18.415	185.384	12.999	8.259
04/01/2004 100000	38.179	18.772	185.464	13.240	8.301
04/01/2004 100100	38.516	19.075	184.466	13.498	8.329
04/01/2004 100200	39.040	19.229	183.721	13.651	8.311
04/01/2004 100300	39.915	18.893	183.830	13.390	8.279
04/01/2004 100400	41.202	18.866	184.124	13.358	8.301
04/01/2004 100500	42.409	18.943	184.332	13.415	8.300
04/01/2004 100600	42.629	18.875	184.210	13.367	8.305
04/01/2004 100700	42.499	19.338	183.889	13.726	8.324
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1CO211
	39.733	19.165	184.377	13.565	8.227

DATE	TIME	PC1SO216	PC1NOX13	PC1GEN12	PC1NOXC15	PC1CO211
04/01/2004	101400	40.592	18.811	183.786	13.287	8.318
04/01/2004	101500	40.449	18.848	184.368	13.334	8.297
04/01/2004	101600	41.006	19.070	184.202	13.488	8.286
04/01/2004	101700	40.599	19.237	184.601	13.589	8.319
04/01/2004	101800	39.190	19.012	184.514	13.440	8.334
04/01/2004	101900	37.679	18.809	183.791	13.247	8.338
04/01/2004	102000	38.205	18.888	184.186	13.311	8.364
04/01/2004	102100	39.276	18.877	184.012	13.321	8.354
04/01/2004	102200	39.276	19.361	185.293	13.657	8.345
04/01/2004	102300	40.134	19.416	184.634	13.696	8.354
04/01/2004	102400	40.484	19.047	183.856	13.460	8.353
04/01/2004	102500	40.710	18.879	183.872	13.368	8.315
04/01/2004	102600	40.157	18.860	185.119	13.321	8.329
04/01/2004	102700	37.328	19.010	184.486	13.416	8.344
04/01/2004	102800	37.684	19.219	184.285	13.554	8.310
04/01/2004	102900	38.464	18.937	184.062	13.377	8.296
04/01/2004	103000	39.280	18.762	184.066	13.282	8.296
04/01/2004	103100	39.280	19.044	184.480	13.443	8.335
04/01/2004	103200	38.979	19.200	184.279	13.563	8.352
04/01/2004	103300	38.979	19.357	184.948	13.661	8.362
04/01/2004	103400	38.444	19.151	183.897	13.530	8.339
04/01/2004	103500	37.379	19.029	183.862	13.460	8.326
04/01/2004	103600	35.717	19.064	183.873	13.490	8.334
04/01/2004	103700	34.870	19.353	186.176	13.648	8.369
04/01/2004	103800	32.153	19.218	184.055	13.574	8.385
04/01/2004	103900	32.598	18.939	183.446	13.419	8.332
04/01/2004	104000	35.115	18.792	184.205	13.300	8.313
04/01/2004	104100	34.449	19.223	184.742	13.544	8.377
04/01/2004	104200	35.750	19.246	184.172	13.566	8.391
04/01/2004	104300	38.308	19.147	184.428	13.503	8.384
04/01/2004	104400	38.165	19.196	185.746	13.541	8.405
04/01/2004	104500	33.230	18.239	185.538	12.878	7.138
04/01/2004	104600	22.426	9.446	184.213	6.670	5.007
04/01/2004	104700	38.636	18.084	183.712	12.802	7.970
04/01/2004	104800	40.045	18.147	183.680	12.842	8.068
04/01/2004	104900	39.452	18.348	184.450	12.997	8.118
04/01/2004	105000	39.467	18.708	184.924	13.227	8.186
04/01/2004	105100	40.108	19.002	184.384	13.428	8.227
04/01/2004	105200	38.774	18.948	184.235	13.390	8.231
04/01/2004	105300	38.464	19.358	183.886	13.685	8.245

04/01/2004 105400	39.757	19.025	183.535	13.488	8.229
04/01/2004 105500	40.026	19.086	183.923	13.526	8.220
04/01/2004 105600	40.750	19.368	184.074	13.697	8.267
04/01/2004 105700	41.794	19.058	184.676	13.461	8.268
04/01/2004 105800	40.987	19.210	184.741	13.572	8.283
04/01/2004 105900	39.547	19.097	184.255	13.510	8.293
04/01/2004 110000	38.241	19.437	184.514	13.741	8.313
04/01/2004 110100	38.561	19.323	184.626	13.629	8.322
04/01/2004 110200	38.306	19.225	184.347	13.561	8.317
04/01/2004 110300	39.308	19.183	183.809	13.538	8.330
04/01/2004 110400	39.820	19.205	184.249	13.567	8.334
04/01/2004 110500	40.808	19.286	184.920	13.595	8.314
04/01/2004 110600	40.808	18.942	185.396	13.368	8.330
04/01/2004 110700	40.496	18.912	184.964	13.315	8.331
04/01/2004 110800	41.988	18.840	184.828	13.288	8.334
04/01/2004 110900	42.466	19.258	184.634	13.588	8.325
04/01/2004 111000	42.121	19.169	185.070	13.519	8.326
04/01/2004 111100	41.872	18.980	185.202	13.382	8.342
04/01/2004 111200	39.938	18.923	184.489	13.345	8.345
04/01/2004 111300	39.091	18.933	184.480	13.333	8.330
04/01/2004 111400	40.199	18.648	184.233	13.132	8.346
	PC1SO211	PC1NOX12	PC1GEN13	PC1NOXC14	PC1CO211
	38.659	18.859	184.417	13.319	8.234

B-3 BASELINE DAILY CALIBRATION

Daily Calibration Summary
Polk Station
HRSG

Report Period
Day: 03/30/2004

	IRTP	ZERO CAL TIME	ZERO	%CE	%ID	SPAN CAL TIME	SPAN	%CE	%ID
SO2	1	6:42	0.20	0.200P	0.400	6:33	56.20	0.700P	1.100
NOX	1	6:42	-0.30	0.300P	0.100	6:33	55.10	0.700P	1.800
CO2(R-A)	1	6:42	0.00	0.000P	0.000	6:33	7.80	0.000P	0.100
OXY(R-A)	1	6:28	4.10	0.100P	0.200	6:33	21.10	0.200P	0.400
FLOW	1	6:33	25.00	1.667P	2.200	6:43	1066.2	1.413P	2.253
OPACITY									

Today's Date: 05/12/2004
Time: 04:21:08

%CE = Percent Calibration Error: CO2 is R-A
%ID = Percent Integrated Difference
P - Calibration Passed F - Calibration Failed

B-4 BIOMASS DAILY CALIBRATIONS

Daily Calibration Summary
Polk Station
HRSG

Report Period
Day: 04/01/2004

	IRTP	ZERO CAL TIME	ZERO	%CE	%ID	SPAN CAL TIME	SPAN	%CE	%ID
SO2	1	6:43	0.80	0.800P	1.000	6:33	56.60	1.100P	1.700
NOX	1	6:43	-0.20	0.200P	0.100	6:33	55.70	1.300P	3.400
CO2(R-A)	1	6:43	0.00	0.000P	0.000	6:33	7.70	0.100P	0.100
OXY(R-A)	1	6:29	4.10	0.100P	0.200	6:34	21.10	0.200P	0.400
FLOW	1	6:33	1.00	0.067P	0.853	6:43	1055.1	0.673P	1.853
OPACITY									

Today's Date: 05/12/2004
Time: 04:21:50

%CE = Percent Calibration Error: CO2 is R-A
%ID = Percent Integrated Difference
P - Calibration Passed F - Calibration Failed

APPENDIX C

TURBINE OPERATIONS

C-1 BASELINE

		Moisture% (Saturator) 1tsyai202	Fuel Flow (lbs/sec) 1tsyfi910	MW 1pwrji900	Fuel Flow (KSCFH) 1tsyfi100	N2 Flow 1nitfi920a
3/30/04 7:58	3/30/04 7:58	1.76538527	109.3964157	184.7263947	6955.739746	116.2141037
3/30/04 8:58	3/30/04 7:59	1.762609005	109.8530502	184.9797058	6991.661133	116.416069
1 min	3/30/04 8:00	1.759832859	109.9243317	185.2693329	6975.687012	116.7645645
	3/30/04 8:01	1.757056713	109.8150558	184.8553162	6943.228516	116.7131348
	3/30/04 8:02	1.754280448	110.3925552	186.0701141	6970.430664	117.1457214
	3/30/04 8:03	1.751504302	109.9297638	186.6891937	6997.527344	116.9562073
	3/30/04 8:04	1.748728156	110.1875	184.7523346	6949.746094	115.7682571
	3/30/04 8:05	1.745951891	109.6374359	185.4406281	6975.936523	117.859581
	3/30/04 8:06	1.743175745	109.3733139	185.0984192	6972.348633	115.9691849
	3/30/04 8:07	1.740399599	109.7330704	184.9598694	6979.143555	115.7415619
	3/30/04 8:08	1.737623334	109.530014	184.5641937	6977.109863	116.0039749
	3/30/04 8:09	1.734847188	110.6361771	185.8937073	6980.116699	117.1636047
	3/30/04 8:10	1.732071042	110.2673416	185.9105225	6978.828613	117.2403336
	3/30/04 8:11	1.729294777	109.1910248	184.2625275	6953.067871	116.6913605
	3/30/04 8:12	1.726518631	109.0008698	184.8301697	6969.111328	116.6237793
	3/30/04 8:13	1.723742485	109.4174042	184.4722748	6971.256836	115.5866241
	3/30/04 8:14	1.72096622	110.1008453	184.6017914	6999.874512	115.760704
	3/30/04 8:15	1.718190074	109.4816284	184.1831665	7000.552734	116.8991165
	3/30/04 8:16	1.715413928	108.4911652	183.9909058	6896.012695	117.0049133
	3/30/04 8:17	1.712637663	109.5577087	184.454483	6925.945801	116.2807999
	3/30/04 8:18	1.709861517	109.9822159	186.0364532	6934.477051	115.7872238
	3/30/04 8:19	1.707085371	109.9588318	186.3286743	6981.508301	116.7410812
	3/30/04 8:20	1.713505268	109.8736496	185.5142822	6974.205078	116.923996
	3/30/04 8:21	1.720582008	109.507431	184.6425476	6966.901855	117.0596085
	3/30/04 8:22	1.727658749	109.6859589	184.4181671	6959.599121	115.6283264
	3/30/04 8:23	1.734735489	110.0898819	184.6770782	6963.66748	115.846283
	3/30/04 8:24	1.741812229	110.1601791	184.884201	6992.944336	116.8176651
	3/30/04 8:25	1.748888969	109.9499893	185.5506134	6998.23291	116.5549011
	3/30/04 8:26	1.75596571	109.6837692	185.5231323	6992.486328	117.2715912
	3/30/04 8:27	1.76304245	109.7257919	184.0486908	6957.35791	116.0881271
	3/30/04 8:28	1.770119309	109.1240387	184.7467194	6950.415527	115.9252319
	3/30/04 8:29	1.77719605	109.8496399	185.1670837	6979.67627	116.3096085
	3/30/04 8:30	1.78427279	109.7859879	185.1882782	6979.861328	117.4505005
	3/30/04 8:31	1.79134953	109.6699066	185.0453644	6983.480957	117.5829544
	3/30/04 8:32	1.79842627	109.9911499	185.1780853	6999.966309	116.1908875
	3/30/04 8:33	1.805503011	109.6068954	185.5502014	6980.850098	117.2687454
	3/30/04 8:34	1.812579751	109.8898621	185.0162811	6992.320801	117.7469406
	3/30/04 8:35	1.819656491	110.1504593	185.2407684	6987.457031	115.7506943
	3/30/04 8:36	1.826733351	110.2248764	184.3952026	7011.993164	115.7059784
	3/30/04 8:37	1.833810091	109.3958054	184.7246552	6949.658691	116.3743134
	3/30/04 8:38	1.840886831	109.951683	184.9681091	6970.268555	116.0002213
	3/30/04 8:39	1.847963572	110.0307999	184.7589874	6959.117676	116.1894531
	3/30/04 8:40	1.855040312	109.720871	184.5301666	6945.367188	116.3262558
	3/30/04 8:41	1.862117052	109.9266205	185.4401398	6980.955566	116.8601379
	3/30/04 8:42	1.869193792	110.0201416	185.1933746	7024.302734	117.0183334
	3/30/04 8:43	1.876270652	109.8362045	185.1205902	7002.45459	116.332634
	3/30/04 8:44	1.883347392	109.457077	184.2980042	6933.572754	117.4294281
	3/30/04 8:45	1.890424132	109.5471268	183.9546661	6945.006836	116.0095901
	3/30/04 8:46	1.897500873	109.3984833	184.0291901	6960.774414	116.2319489
	3/30/04 8:47	1.904577613	109.3407974	185.6825256	6966.366211	116.4543076
	3/30/04 8:48	1.911654353	109.2621155	184.6406403	6944.573242	116.5137787
	3/30/04 8:49	1.918731093	109.9269714	184.3031921	6943.651367	115.868927
	3/30/04 8:50	1.925807834	108.9558029	184.6905823	6977.470215	116.9951706
	3/30/04 8:51	1.932884693	109.7338791	184.385498	6961.984863	116.2148209
	3/30/04 8:52	1.939961433	109.5276718	184.9124908	7003.608398	118.2399063
	3/30/04 8:53	1.947038174	110.4175797	185.2105408	7019.821289	116.7566605
	3/30/04 8:54	1.954114914	110.7290344	184.4886932	7035.399414	118.1862106
	3/30/04 8:55	1.961191654	109.5824432	184.5224762	6969.825195	117.5701218
	3/30/04 8:56	1.968268394	109.6615448	185.4285736	6985.274414	115.5242081
	3/30/04 8:57	1.975345135	110.1821671	184.7779694	6986.240234	117.0749817
	3/30/04 8:58	1.982421875	110.2129822	185.6124268	6970.65625	117.9578171
	Average	**1.807668123**	**109.764672**	**184.96443**	**6973.558658**	**116.61612**

		Moisture% (Saturator) 1tsyai202	Fuel Flow (lbs/sec) 1tsyfi910	MW 1pwrji900	Fuel Flow (KSCFH) 1tsyfi100	N2 Flow 1nitfi920a
3/30/04 9:05	3/30/04 9:05	2.031959295	110.0579071	186.279953	7006.155273	118.1111832
3/30/04 10:05	3/30/04 9:06	2.039036036	109.8219528	185.7554779	7009.851563	117.3999863
1 min	3/30/04 9:07	2.046112776	109.8879547	185.2316895	7012.968262	117.826149
	3/30/04 9:08	2.053189516	109.967308	184.8297272	6947.45752	117.2484512
	3/30/04 9:09	2.060266256	110.1443558	184.7855988	6987.376465	118.1168747
	3/30/04 9:10	2.067342997	110.3689651	184.8081055	6997.893066	117.2408676
	3/30/04 9:11	2.074419737	109.136261	184.5792084	6988.910645	116.6715469
	3/30/04 9:12	2.081496477	110.2303696	185.6570587	6985.94043	118.4532471
	3/30/04 9:13	2.088573217	109.0709	184.379776	6972.501953	117.3464737
	3/30/04 9:14	2.095649958	109.8938522	184.5502472	6981.28418	116.35215
	3/30/04 9:15	2.102726698	109.9041672	185.2121429	6998.297852	117.3528595
	3/30/04 9:16	2.109803438	109.8623505	185.0518494	6993.481934	119.0173874
	3/30/04 9:17	2.116880178	110.4139023	184.6168518	6999.471191	117.172348
	3/30/04 9:18	2.123957157	110.0237885	184.7590179	7005.459961	119.3824463
	3/30/04 9:19	2.131033897	109.8341217	185.6865845	6951.202637	117.0094833
	3/30/04 9:20	2.138110638	110.1126099	185.609436	6969.140625	117.5929413
	3/30/04 9:21	2.145187378	109.430954	184.5934906	6967.40918	118.0369034
	3/30/04 9:22	2.152264118	109.694458	184.2569427	6975.598145	116.8482056
	3/30/04 9:23	2.159340858	110.0381012	184.7526855	6983.787598	116.9679794
	3/30/04 9:24	2.166417599	110.6173935	184.9164734	7028.237305	118.2610092
	3/30/04 9:25	2.173494339	110.4006042	185.1046753	7000.491699	118.5253983
	3/30/04 9:26	2.180571079	110.8082657	185.4106293	7001.033691	118.3078384
	3/30/04 9:27	2.18764782	109.590332	184.7965546	6988.135254	118.6975021
	3/30/04 9:28	2.19472456	109.5417633	184.8202667	6990.347168	118.4113464
	3/30/04 9:29	2.195682049	110.1125336	184.5635986	6996.580566	116.290062
	3/30/04 9:30	2.196202278	110.4367218	184.7486725	7002.813965	117.4493637
	3/30/04 9:31	2.196722746	110.0500107	185.5113831	6988.524414	118.804657
	3/30/04 9:32	2.197242975	109.7759933	184.7272034	6944.345215	117.7370911
	3/30/04 9:33	2.197763443	110.3573685	184.5230713	7010.562012	117.6245346
	3/30/04 9:34	2.198283672	110.5141754	185.2966461	7002.743652	119.1161652
	3/30/04 9:35	2.19880414	109.6486893	184.8387299	6970.901367	119.1380615
	3/30/04 9:36	2.199324369	109.9878769	183.9609833	6985.684082	117.5678024
	3/30/04 9:37	2.199844837	110.2490311	184.1079407	7015.385254	118.0394974
	3/30/04 9:38	2.200365067	110.0872879	184.6356354	7011.47998	118.2305908
	3/30/04 9:39	2.200885534	110.2333832	184.7189484	7027.266602	118.2396851
	3/30/04 9:40	2.201405764	111.0832367	185.2327118	7006.519043	116.6442413
	3/30/04 9:41	2.201926231	110.082283	184.7777252	6994.099121	118.7229156
	3/30/04 9:42	2.202446461	109.8291092	185.02388	7002.962402	117.9438019
	3/30/04 9:43	2.202966928	109.9278793	185.2700348	6988.682617	117.2348404
	3/30/04 9:44	2.203487158	110.2386856	185.6064301	7012.989258	118.2369766
	3/30/04 9:45	2.204007626	109.9072037	186.047699	7008.803223	119.0590286
	3/30/04 9:46	2.204527855	110.2436218	185.0883484	6987.761719	118.1286697
	3/30/04 9:47	2.205048323	109.9852142	184.759201	6992.528809	118.6914139
	3/30/04 9:48	2.205568552	109.701149	184.732605	6984.871094	117.1315536
	3/30/04 9:49	2.206088781	109.5097198	184.1892853	6959.576172	118.1371689
	3/30/04 9:50	2.206609249	109.6035614	183.1941223	6968.038574	117.8732681
	3/30/04 9:51	2.207129478	110.4418945	185.6619415	7001.433105	117.5041656
	3/30/04 9:52	2.207649946	110.373703	185.3871918	6998.64502	118.7617798
	3/30/04 9:53	2.208170176	109.9394608	184.9917908	7015.568359	118.5118561
	3/30/04 9:54	2.208690643	110.4717331	184.5963898	7050.054688	117.6840057
	3/30/04 9:55	2.209210873	109.9217224	185.0498962	7025.791504	118.1641541
	3/30/04 9:56	2.20973134	109.0977173	184.581604	6960.230469	118.1292419
	3/30/04 9:57	2.21025157	109.6783371	184.6548309	6972.337402	116.923996
	3/30/04 9:58	2.210772038	110.363472	185.8716125	6989.491211	117.0736771
	3/30/04 9:59	2.211292267	110.2490311	185.7136688	7013.741211	118.9646759
	3/30/04 10:00	2.211812735	109.7338562	185.0022888	6992.828125	118.8862457
	3/30/04 10:01	2.212332964	110.0582428	185.3306732	6987.841309	117.9479218
	3/30/04 10:02	2.212853432	110.3425522	185.248764	6996.8125	118.8679733
	3/30/04 10:03	2.213373661	110.4307938	185.8833466	7013.604004	117.7231522
	3/30/04 10:04	2.213894129	110.6605835	185.8744965	7038.106934	119.1161041
	3/30/04 10:05	2.214414358	109.7071762	184.6506042	7012.677246	118.6515427
	Average	**2.168967044**	**110.0309451**	**184.99178**	**6994.667472**	

		Moisture% (Saturator) 1tsyai202	Fuel Flow (lbs/sec) 1tsyfi910	MW 1pwrji900	Fuel Flow (KSCFH) 1tsyfi100	N2 Flow 1nitfi920a
3/30/04 10:15	3/30/04 10:15	2.219617844	110.6244049	185.2441711	7002.569336	119.2770081
3/30/04 11:15	3/30/04 10:16	2.220138073	110.3264389	185.3647614	7010.128418	118.7665024
1 min	3/30/04 10:17	2.220658541	110.6427231	185.0915527	7018.617676	117.8026962
	3/30/04 10:18	2.22117877	110.3354721	184.606308	7013.227539	117.9612961
	3/30/04 10:19	2.221699238	110.9603424	185.0807495	7002.59375	118.5072327
	3/30/04 10:20	2.222219467	109.7726212	184.6259613	7014.679199	118.6929092
	3/30/04 10:21	2.222739935	109.6072845	184.4364777	7015.286621	116.8398514
	3/30/04 10:22	2.223260164	109.7784348	184.7202911	6995.286133	118.0569916
	3/30/04 10:23	2.223780632	110.5633698	184.7554169	7035.753906	118.4259872
	3/30/04 10:24	2.224300861	110.6538239	184.8126831	7008.868652	118.3656006
	3/30/04 10:25	2.224821091	110.4001007	184.6370697	7012.592285	118.1162033
	3/30/04 10:26	2.225341558	109.7144852	184.0628967	6986.450684	119.6010284
	3/30/04 10:27	2.225861788	109.5898285	184.1754761	6977.525391	118.2646103
	3/30/04 10:28	2.226382256	109.6630783	184.4364777	6970.55957	117.4887924
	3/30/04 10:29	2.226902485	109.7561035	184.0740051	6970.362793	118.2031174
	3/30/04 10:30	2.227422953	109.5986176	184.3977509	6960.350098	118.9369812
	3/30/04 10:31	2.227943182	110.2083817	184.2422485	6978.405762	118.1287766
	3/30/04 10:32	2.22846365	110.2558594	184.8073883	7004.292969	117.5894012
	3/30/04 10:33	2.228983879	110.5065765	185.7363434	7015.319336	118.1069183
	3/30/04 10:34	2.229504347	110.3125153	185.5571136	7017.755859	118.6029816
	3/30/04 10:35	2.230024576	110.2753067	184.217041	6993.956543	118.2855835
	3/30/04 10:36	2.230545044	110.1854477	184.6301727	7001.006348	118.1539688
	3/30/04 10:37	2.231065273	110.8119431	184.855835	7008.056641	118.0392456
	3/30/04 10:38	2.231585741	110.8281174	185.7826385	7009.900391	117.2748337
	3/30/04 10:39	2.23210597	111.0026627	185.1234436	7011.228516	118.5289001
	3/30/04 10:40	2.232626438	111.0870667	185.1522369	7095.20166	119.0186691
	3/30/04 10:41	2.233146667	110.4794464	185.545639	7061.564453	117.5465622
	3/30/04 10:42	2.233667135	110.7192307	185.1057129	7029.806641	118.9435577
	3/30/04 10:43	2.234187365	110.1707535	185.2613983	7019.638672	118.8514786
	3/30/04 10:44	2.234707594	110.2909927	184.9229279	7047.893555	117.1307373
	3/30/04 10:45	2.235228062	110.5380325	184.6819153	7031.148438	118.6929855
	3/30/04 10:46	2.235748291	110.3447037	183.7736053	7014.40332	119.0962982
	3/30/04 10:47	2.236268759	110.5626068	184.3961029	7037.335449	118.9475327
	3/30/04 10:48	2.236788988	109.7766037	184.482254	7006.462402	118.6301575
	3/30/04 10:49	2.237309456	109.889679	184.4141541	7015.723633	117.7213211
	3/30/04 10:50	2.237829685	110.2258377	184.3460541	7011.305176	117.8353806
	3/30/04 10:51	2.238350153	110.2675705	184.4453278	7006.577637	119.6513062
	3/30/04 10:52	2.238870382	110.1123581	183.8930511	6991.177734	117.5981903
	3/30/04 10:53	2.23939085	109.921463	183.9121094	7002.704102	117.812851
	3/30/04 10:54	2.239911079	109.9743652	183.9892883	7015.171387	119.2767715
	3/30/04 10:55	2.240431547	111.1783981	186.2959747	7086.258301	118.2907944
	3/30/04 10:56	2.240951777	110.5730286	185.7728729	7045.764648	119.1470718
	3/30/04 10:57	2.241472244	111.0287781	186.0550537	7035.011719	118.1361465
	3/30/04 10:58	2.241992474	111.1682129	185.8282776	7058.274902	117.8429108
	3/30/04 10:59	2.242512941	110.4817123	185.6966095	7065.374512	118.3062515
	3/30/04 11:00	2.243033171	110.8009186	185.0326385	7039.225586	119.1815338
	3/30/04 11:01	2.243553638	110.9631653	185.6289673	7063.304199	117.9628296
	3/30/04 11:02	2.244073868	110.9240799	185.3747406	7085.598145	117.6538773
	3/30/04 11:03	2.244594097	111.1121292	185.6676636	7073.962402	118.3360519
	3/30/04 11:04	2.245114565	110.4901276	185.221756	7031.284668	118.7284393
	3/30/04 11:05	2.245634794	110.148674	184.5103302	7048.95459	118.916687
	3/30/04 11:06	2.246155262	110.1367111	183.2676239	7037.930176	119.2992401
	3/30/04 11:07	2.246675491	110.5999985	183.9151917	7030.66748	117.8761139
	3/30/04 11:08	2.247195959	110.8186417	185.0114441	7036.075684	118.1788101
	3/30/04 11:09	2.247716188	110.8204269	185.1786804	7041.483887	118.8627548
	3/30/04 11:10	2.248236656	111.1720428	184.6158295	7041.987793	118.247757
	3/30/04 11:11	2.248756886	111.1940842	185.2997589	7053.853516	118.0802994
	3/30/04 11:12	2.249277353	110.9536591	185.5827484	7059.273926	118.052124
	3/30/04 11:13	2.249797583	111.0080261	185.6736603	7040.416016	117.4967041
	3/30/04 11:14	2.25031805	110.5845337	185.5442963	7033.553711	118.5101318
	3/30/04 11:15	2.25083828	110.1272583	185.7365723	7055.59668	119.3498306
	Average	**2.23522805**	**110.4429386**	**184.89683**	**7024.34002**	**118.34799**

C-2 BIOMASS

		Moisture% (Saturat 1tsyai202	cuel Flow (lbs/se 1tsyfi910	MW 1pwrji900	uel Flow (KSCFH 1tsyfi100	N2 Flow 1nitfi920a
04/01/2004 8:01	01-Apr-04 08:01:00	2.74811554	111.9244232	185.7603	7108.290039	117.8719
04/01/2004 9:01	01-Apr-04 08:02:00	2.747807026	111.4752655	185.1209	7072.324219	118.586
1 min	01-Apr-04 08:03:00	2.747498512	111.7880783	185.2742	7095.119629	118.4672
	01-Apr-04 08:04:00	2.747189999	111.2373199	185.5632	7055.866211	118.3109
	01-Apr-04 08:05:00	2.746881247	110.9214554	184.2474	7040.135742	119.2814
	01-Apr-04 08:06:00	2.746572733	111.5707397	183.9541	7063.108398	118.4322
	01-Apr-04 08:07:00	2.746264219	111.3976974	184.7225	7069.580566	117.2664
	01-Apr-04 08:08:00	2.745955706	111.0573044	184.8082	7051.080078	118.4783
	01-Apr-04 08:09:00	2.745647192	111.2159882	185.4265	7050.819336	119.215
	01-Apr-04 08:10:00	2.745338678	112.1900101	185.9311	7089.191406	117.8492
	01-Apr-04 08:11:00	2.745029926	111.8054733	186.0875	7086.380371	119.478
	01-Apr-04 08:12:00	2.744721413	111.628067	185.5471	7061.415527	118.3162
	01-Apr-04 08:13:00	2.744412899	111.4392548	185.1598	7067.960938	118.7438
	01-Apr-04 08:14:00	2.744104385	111.6563339	185.1598	7062.260742	119.1267
	01-Apr-04 08:15:00	2.743795872	112.0091858	185.8966	7083.691406	118.4479
	01-Apr-04 08:16:00	2.743487358	111.8152847	184.9397	7066.774902	118.9002
	01-Apr-04 08:17:00	2.743178606	111.4171753	184.4199	7052.401367	117.8599
	01-Apr-04 08:18:00	2.742870092	111.3449478	184.9159	7052.510254	118.1177
	01-Apr-04 08:19:00	2.742561579	111.4642105	185.1457	7062.309082	120.4249
	01-Apr-04 08:20:00	2.742253065	111.9542542	183.1946	7065.941895	119.0127
	01-Apr-04 08:21:00	2.741944551	111.8738251	184.7185	7082.597656	118.881
	01-Apr-04 08:22:00	2.741636038	111.3946991	185.2377	7078.574707	118.2812
	01-Apr-04 08:23:00	2.741327286	111.8947754	185.1598	7072.666504	117.9667
	01-Apr-04 08:24:00	2.741018772	111.7516174	185.1152	7078.404297	118.2605
	01-Apr-04 08:25:00	2.740710258	111.7505417	185.1378	7077.312988	119.065
	01-Apr-04 08:26:00	2.740401745	111.4030838	184.4111	7066.043457	118.3535
	01-Apr-04 08:27:00	2.740093231	110.754303	184.0216	7046.446289	118.5797
	01-Apr-04 08:28:00	2.739784479	110.8915405	185.4985	7063.927246	117.6166
	01-Apr-04 08:29:00	2.739475965	112.1601181	184.3962	7087.876465	118.661
	01-Apr-04 08:30:00	2.739167452	110.8532944	184.7072	7078.615234	119.1496
	01-Apr-04 08:31:00	2.738858938	110.91922	184.4902	7055.875	117.6503
	01-Apr-04 08:32:00	2.738550425	111.4552765	184.5776	7049.137695	118.4986
	01-Apr-04 08:33:00	2.738241911	111.4253616	185.4685	7066.032227	118.7429
	01-Apr-04 08:34:00	2.737933159	111.4549484	185.8828	7083.605957	118.1597
	01-Apr-04 08:35:00	2.737624645	111.0364075	184.2717	7031.925781	118.1615
	01-Apr-04 08:36:00	2.737316132	111.0838928	184.4853	7037.227051	118.5027
	01-Apr-04 08:37:00	2.737007618	111.5596237	185.9046	7061.348145	118.4174
	01-Apr-04 08:38:00	2.736699104	111.6040497	185.987	7066.261719	118.4458
	01-Apr-04 08:39:00	2.736390591	111.1551666	184.5882	7047.732422	117.8689
	01-Apr-04 08:40:00	2.736081839	111.1197205	183.9263	7048.282227	119.2592
	01-Apr-04 08:41:00	2.735773325	111.4144135	184.7838	7058.366211	119.1761
	01-Apr-04 08:42:00	2.735464811	110.9517212	184.1124	7043.57666	117.671
	01-Apr-04 08:43:00	2.735156298	111.3117294	185.2903	7046.6875	118.1581
	01-Apr-04 08:44:00	2.734847784	111.6485977	185.5168	7059.597168	118.7771
	01-Apr-04 08:45:00	2.73453927	111.6432266	185.3021	7094.885254	118.551
	01-Apr-04 08:46:00	2.734230518	111.9833374	185.6132	7082.523926	118.498
	01-Apr-04 08:47:00	2.733922005	111.7995911	185.1917	7075.703613	118.7673
	01-Apr-04 08:48:00	2.733613491	111.4221649	184.7503	6995.489746	117.7027
	01-Apr-04 08:49:00	2.733304977	111.3459778	185.0998	7072.600586	118.2591
	01-Apr-04 08:50:00	2.732996464	111.0583801	184.2945	7059.691406	118.6778
	01-Apr-04 08:51:00	2.73268795	111.2754288	185.0065	7057.754883	118.661
	01-Apr-04 08:52:00	2.732379198	111.4361801	185.6267	7094.527344	117.8307
	01-Apr-04 08:53:00	2.732070684	111.251564	185.0001	7073.962402	118.8634
	01-Apr-04 08:54:00	2.731762171	112.0473099	185.1329	7081.10791	119.2049
	01-Apr-04 08:55:00	2.731453657	111.2334061	185.1326	7049.458008	118.2642
	01-Apr-04 08:56:00	2.731145144	111.5147858	184.2882	7078.190918	118.3785
	01-Apr-04 08:57:00	2.730836391	111.6537323	185.3154	7086.918457	116.7272
	01-Apr-04 08:58:00	2.730527878	111.0479355	185.3154	7071.564453	118.8344
	01-Apr-04 08:59:00	2.730219364	111.1191864	184.5471	7039.927246	119.6669
	01-Apr-04 09:00:00	2.729910851	110.8183975	184.6837	7038.626465	118.6488
	01-Apr-04 09:01:00	2.729602337	110.8628693	185.233	7015.586914	117.4967
	Average	**2.74**	**111.44**	**184.99**	**7064.16**	**118.48**

		Moisture% (Saturat	cuel Flow (lbs/se	MW	uel Flow (KSCFH	N2 Flow
		1tsyai202	1tsyfi910	1pwrji900	1tsyfi100	1nitfi920a
04/01/2004 9:07	01-Apr-04 09:07:00	2.727751017	111.8190155	185.5388	7057.291504	118.5493
04/01/2004 10:07	01-Apr-04 09:08:00	2.727442503	111.9098511	184.931	7048.745605	117.6337
1 min	01-Apr-04 09:09:00	2.727133751	111.2967911	184.5419	7060.023438	117.8337
	01-Apr-04 09:10:00	2.726825237	111.4832993	184.9438	7078.087402	118.2985
	01-Apr-04 09:11:00	2.726516724	111.6791763	185.2458	7064.123047	118.5544
	01-Apr-04 09:12:00	2.727150679	110.9891052	184.9469	7045.450195	118.069
	01-Apr-04 09:13:00	2.755120039	110.739769	184.4642	7019.742676	118.221
	01-Apr-04 09:14:00	2.783089161	110.3500366	183.7388	7005.19043	118.6988
	01-Apr-04 09:15:00	2.811058521	111.3905258	185.2986	7028.485352	118.8084
	01-Apr-04 09:16:00	2.839027643	112.1661987	186.3534	7068.522949	117.7681
	01-Apr-04 09:17:00	2.866997004	111.1004944	185.7241	7097.489746	118.454
	01-Apr-04 09:18:00	2.894966125	111.8500061	185.3491	7095.489746	119.1144
	01-Apr-04 09:19:00	2.921564341	111.7073593	184.9858	7051.861328	118.883
	01-Apr-04 09:20:00	2.922112703	111.7322311	184.9995	7085.714355	119.3001
	01-Apr-04 09:21:00	2.922661304	110.9265442	185.0133	7060.175293	117.6155
	01-Apr-04 09:22:00	2.923209667	110.912941	184.1906	7053.507324	119.0861
	01-Apr-04 09:23:00	2.92375803	111.2945175	184.208	7065.124512	119.0035
	01-Apr-04 09:24:00	2.924306631	112.1322327	186.1876	7136.59082	118.1215
	01-Apr-04 09:25:00	2.924854994	111.9628372	185.9581	7146.858398	117.6118
	01-Apr-04 09:26:00	2.925403357	112.3850174	185.1747	7068.598145	118.9167
	01-Apr-04 09:27:00	2.925951958	111.1165161	184.3417	7044.865723	118.3885
	01-Apr-04 09:28:00	2.92650032	111.1299286	185.4308	7042.470703	118.7147
	01-Apr-04 09:29:00	2.927048683	111.4466858	185.7274	7092.800781	118.0732
	01-Apr-04 09:30:00	2.927597284	111.7579956	186.0295	7101.197754	118.5188
	01-Apr-04 09:31:00	2.928145647	111.9877625	184.9559	7097.037598	118.4661
	01-Apr-04 09:32:00	2.92869401	111.1477051	184.2763	7028.511719	119.349
	01-Apr-04 09:33:00	2.929242611	111.1341858	184.4845	7055.517578	117.6016
	01-Apr-04 09:34:00	2.929790974	111.0916748	184.1013	7032.580078	117.9882
	01-Apr-04 09:35:00	2.930339336	111.2664185	184.7203	7043.209961	118.765
	01-Apr-04 09:36:00	2.930887938	110.9153976	185.2065	7036.762207	119.3672
	01-Apr-04 09:37:00	2.9314363	110.8505478	185.2749	7040.0625	118.2445
	01-Apr-04 09:38:00	2.931984663	110.9208374	185.4376	7041.067871	119.1245
	01-Apr-04 09:39:00	2.932533264	110.5076752	184.7327	7022.24707	119.2514
	01-Apr-04 09:40:00	2.933081627	111.4838867	184.1734	7056.61084	118.098
	01-Apr-04 09:41:00	2.93362999	111.4418869	184.1193	7059.404785	119.7562
	01-Apr-04 09:42:00	2.934178591	111.5426636	185.3333	7058.956543	118.3565
	01-Apr-04 09:43:00	2.934726954	111.2033463	186.1174	7068.755371	118.2495
	01-Apr-04 09:44:00	2.935275316	111.1746445	185.2744	7055.049805	118.2507
	01-Apr-04 09:45:00	2.935823917	110.8532944	184.8759	7055.54248	118.0521
	01-Apr-04 09:46:00	2.93637228	111.078476	185.0562	7022.382324	118.8088
	01-Apr-04 09:47:00	2.936920643	110.8358994	184.8491	7029.887207	117.6425
	01-Apr-04 09:48:00	2.937469244	111.1471939	184.642	7019.427734	118.1885
	01-Apr-04 09:49:00	2.938017607	111.1453781	184.808	7068.651367	118.2313
	01-Apr-04 09:50:00	2.938565969	111.6708069	185.9014	7063.719238	118.3844
	01-Apr-04 09:51:00	2.939114571	111.6856232	186.0576	7113.490234	118.2286
	01-Apr-04 09:52:00	2.939662933	111.6711426	185.4182	7101.587891	116.9815
	01-Apr-04 09:53:00	2.940211296	110.8574448	184.2827	7060.285156	118.4975
	01-Apr-04 09:54:00	2.940759897	110.9483643	184.5605	7035.430664	119.1543
	01-Apr-04 09:55:00	2.94130826	110.8760147	184.5668	7053.098145	119.0878
	01-Apr-04 09:56:00	2.941856623	111.8237915	184.8154	7080.708984	118.1053
	01-Apr-04 09:57:00	2.942405224	111.3969269	184.8471	7115.009766	117.5594
	01-Apr-04 09:58:00	2.942953587	111.2735672	184.6358	7127.710938	119.0453
	01-Apr-04 09:59:00	2.943501949	110.7548752	184.4245	7035.73584	118.757
	01-Apr-04 10:00:00	2.94405055	111.3212509	184.7368	7039.192383	118.0521
	01-Apr-04 10:01:00	2.944598913	111.7549667	185.5213	7068.03418	117.5695
	01-Apr-04 10:02:00	2.945147276	111.168457	185.6243	7078.49707	118.9225
	01-Apr-04 10:03:00	2.945695877	111.4905701	185.3789	7067.331543	119.0735
	01-Apr-04 10:04:00	2.94624424	110.5707932	184.4847	7042.373047	118.8824
	01-Apr-04 10:05:00	2.946792603	110.7777634	184.0884	7036.187012	118.8737
	01-Apr-04 10:06:00	2.947341204	111.098465	185.1636	7079.841309	118.5679
	01-Apr-04 10:07:00	2.947889566	110.7205429	184.78	7093.834961	118.2622
	Average	**2.90**	**111.29**	**185.00**	**7062.33**	

		Moisture% (Saturat	cuel Flow (lbs/se	MW	uel Flow (KSCFH	N2 Flow
		1tsyai202	1tsyfi910	1pwrji900	1tsyfi100	1nitfi920a
04/01/2004 10:14	01-Apr-04 10:14:00	2.951728582	111.4110794	185.2832	7082.575195	118.7121
04/01/2004 11:14	01-Apr-04 10:15:00	2.952276945	111.1725998	183.8914	7061.727539	118.1087
1 min	01-Apr-04 10:16:00	2.952825546	110.5435333	184.834	7041.052734	118.8151
	01-Apr-04 10:17:00	2.953373909	111.7805481	184.6765	7066.903809	118.7584
	01-Apr-04 10:18:00	2.953922272	110.8304062	185.1614	7082.720215	118.2197
	01-Apr-04 10:19:00	2.954470873	111.3036804	184.9707	7061.146973	117.8789
	01-Apr-04 10:20:00	2.955019236	110.8274841	184.8476	7039.349121	119.1017
	01-Apr-04 10:21:00	2.955567598	111.2851028	184.7245	7050.996094	119.2455
	01-Apr-04 10:22:00	2.956116199	111.4618073	185.1065	7053.183594	118.435
	01-Apr-04 10:23:00	2.956664562	110.2151566	184.7949	7075.18457	117.8569
	01-Apr-04 10:24:00	2.957212925	111.3779831	184.9517	7063.450684	119.0335
	01-Apr-04 10:25:00	2.957761526	110.9759216	184.7719	7054.540039	117.551
	01-Apr-04 10:26:00	2.958309889	111.3385391	184.9166	7054.906738	118.6896
	01-Apr-04 10:27:00	2.958858252	111.3097153	184.4511	7085.732422	117.6955
	01-Apr-04 10:28:00	2.959406853	112.3257065	186.1769	7107.40332	118.8245
	01-Apr-04 10:29:00	2.959955215	111.7899094	185.5511	7089.900391	118.9045
	01-Apr-04 10:30:00	2.960503578	110.3440552	183.8771	7061.299316	118.8958
	01-Apr-04 10:31:00	2.961052179	111.7617416	184.5461	7079.26709	117.3686
	01-Apr-04 10:32:00	2.961600542	111.2616348	185.2189	7092.100586	117.9934
	01-Apr-04 10:33:00	2.962148905	111.7928848	184.9767	7080.733398	119.1024
	01-Apr-04 10:34:00	2.962697506	111.4054718	184.9609	7074.866699	118.7451
	01-Apr-04 10:35:00	2.963245869	112.199852	185.4832	7085.40625	117.859
	01-Apr-04 10:36:00	2.963794231	112.0043869	186.324	7087.456055	117.78
	01-Apr-04 10:37:00	2.964342833	111.9180832	185.1773	7102.67627	118.8114
	01-Apr-04 10:38:00	2.964891195	111.0064011	184.5848	7030.453125	118.6768
	01-Apr-04 10:39:00	2.965439558	111.3760757	184.3078	7020.628418	118.5076
	01-Apr-04 10:40:00	2.965988159	111.0830994	184.6852	7045.947754	118.8333
	01-Apr-04 10:41:00	2.966536522	111.8652954	185.4019	7079.500488	117.359
	01-Apr-04 10:42:00	2.967084885	111.7723618	185.2977	7106.213379	117.8476
	01-Apr-04 10:43:00	2.967633486	111.942131	184.8085	7073.229004	118.5476
	01-Apr-04 10:44:00	2.968181849	111.4653473	184.7463	7076.89209	118.3086
	01-Apr-04 10:45:00	2.968730211	110.857338	184.1925	7047.006836	118.6916
	01-Apr-04 10:46:00	2.969278812	111.0947189	184.0094	7055.815918	117.5131
	01-Apr-04 10:47:00	2.969827175	111.1188049	184.7642	7051.154785	118.1667
	01-Apr-04 10:48:00	2.970375538	111.2729492	184.7962	7046.366699	118.6153
	01-Apr-04 10:49:00	2.970924139	111.5165787	185.7324	7065.276367	118.7997
	01-Apr-04 10:50:00	2.971472502	111.4053802	184.7609	7069.45752	117.6976
	01-Apr-04 10:51:00	2.972020864	111.2611771	185.1704	7005.652832	118.6975
	01-Apr-04 10:52:00	2.972569466	111.3419037	185.023	7058.072754	118.9488
	01-Apr-04 10:53:00	2.973117828	111.2378311	185.2405	7067.361816	117.9418
	01-Apr-04 10:54:00	2.973666191	110.9631653	184.3854	7049.736816	118.2971
	01-Apr-04 10:55:00	2.974214792	111.7327423	184.6397	7072.931641	117.7198
	01-Apr-04 10:56:00	2.974763155	111.8564377	185.1255	7074.543945	118.4708
	01-Apr-04 10:57:00	2.975311518	112.7576523	186.2218	7135.838867	118.333
	01-Apr-04 10:58:00	2.975860119	111.9356155	185.4997	7104.250977	119.0375
	01-Apr-04 10:59:00	2.976408482	112.1120605	185.5254	7107.232422	118.6825
	01-Apr-04 11:00:00	2.976956844	111.8935242	184.94	7111.852051	118.4844
	01-Apr-04 11:01:00	2.977505445	111.4733963	185.4008	7100.792969	118.798
	01-Apr-04 11:02:00	2.978053808	111.931778	185.8615	7125.504883	119.0872
	01-Apr-04 11:03:00	2.978602171	111.6071091	185.138	7120.041016	118.1666
	01-Apr-04 11:04:00	2.979150772	111.1924744	184.3299	7053.941406	118.9954
	01-Apr-04 11:05:00	2.979699135	111.2302017	184.8392	7029.740723	117.8771
	01-Apr-04 11:06:00	2.980247498	110.7636108	184.1891	7050.910156	117.7721
	01-Apr-04 11:07:00	2.980796099	111.4506989	185.8007	7120.019531	118.5221
	01-Apr-04 11:08:00	2.981344461	112.0294418	185.2071	7081.615234	118.7168
	01-Apr-04 11:09:00	2.981892824	112.2556229	185.7709	7112.37793	118.8294
	01-Apr-04 11:10:00	2.982441425	111.0899429	184.3687	7037.619629	117.9702
	01-Apr-04 11:11:00	2.982989788	111.2047119	184.4516	7086.435547	118.1336
	01-Apr-04 11:12:00	2.983538151	112.4226532	185.1225	7098.719238	119.4743
	01-Apr-04 11:13:00	2.984086752	111.4131622	185.2177	7071.87207	119.4193
	01-Apr-04 11:14:00	2.984635115	111.6755753	185.7178	7079.03418	118.6839
	Average	**2.97**	**111.46**	**185.00**	**7073.09**	**118.44**

APPENDIX D

FUEL ANALYSIS

D-1 BASELINE

TECO
TAMPA ELECTRIC

Synthetic Gas and Heating Value Calculations

Customer: Tampa Electric Company **Sample ID: Polk Lab**

Facility: Polk Power Station **Analysis Date: 03/30/2004**

Source: Unit #1

CALCULATION OF DENSITY AND HEATING VALUE @ 60°F and 30 in Hg

Component	% Volume	Molecular Wt.	Density * (lb/ft^3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross * Heating Value (Btu/SCF)	Volume Fract. Btu
Hydrogen	35.0800	2.016	0.0053	0.00186	3.2904	61100	2010.41	325.0	114.01
Oxygen	0.9157	32.000	0.0846	0.00077	1.3710	0	0.00	0.0	0
Nitrogen	5.8505	28.016	0.0744	0.00435	7.7032	0	0.00	0.0	0
CO2	15.0529	44.010	0.1170	0.01761	31.1683	0	0.00	0.0	0
CO	43.0562	28.010	0.0740	0.03186	56.3865	4347	2451.12	322.0	138.641
Methane	0.0430	16.041	0.0424	0.00002	0.0323	23879	7.70	1013.0	0.43559
Ethane		30.067	0.0803	0.00000	0.0000	22320	0.00	1792.0	0
Ethylene		28.051	0.0746	0.00000	0.0000	21644	0.00	1614.0	0
Propane		44.092	0.1196	0.00000	0.0000	21661	0.00	2590.0	0
propylene		42.077	0.1110	0.00000	0.0000	21041	0.00	2336.0	0
Isobutane		58.118	0.1582	0.00000	0.0000	21257	0.00	3363.0	0
n-butane		58.118	0.1582	0.00000	0.0000	21308	0.00	3370.0	0
Isobutene		56.102	0.1480	0.00000	0.0000	20730	0.00	3068.0	0
Isopentane		72.144	0.1904	0.00000	0.0000	21052	0.00	4008.0	0
n-pentane		72.144	0.1904	0.00000	0.0000	21091	0.00	4016.0	0
n-hexane		86.169	0.2274	0.00000	0.0000	20940	0.00	4762.0	0
H2S	0.0300	34.076	0.0911	0.00003	0.0484	7100	3.43	647.0	0.1941
Total:	100.03	Average Density	0.05651		100.0000	Gross Heating Value			
		Specific Gravity	0.73864			Btu/lb	4473	Btu/SCF	253.28

* Density (lb/ft^3) and Gross Heating Value (Btu/scf) data from Perry's Chemical Engineering Handbook.

TECO
TAMPA ELECTRIC

Synthetic Gas and Heating Value Calculations

Customer: Tampa Electric Company **Sample ID: Polk Lab**

Facility: Polk Power Station **Analysis Date: 03/30/2004**

Source: Unit #1

CALCULATION OF F FACTORS

						Weight Percents			
Componen	**Mol. Wt.**	**C Factor**	**H Factor**	**% volume**	**Fract. Wt.**	**Carbon**	**Hydrogen**	**Nitrogen**	**Oxygen**
Hydrogen	2.016	0	1	35.080	70.7213		3.3138293		
Oxygen	32.000	0	0	0.916	29.3024				1.3730401
Nitrogen	28.016	0	0	5.851	163.9076			7.680316768	
CO2	44.010	0.272273	0	15.053	662.4781	8.45193487			22.567631
CO	28.010	0.42587	0	43.056	1206.0042	24.0661087			32.47656
Methane	16.041	0.75	0.25	0.043	0.6898	0.02424048	0.0080802		
Ethane	30.067	0.8	0.2	0.000	0.0000	0	0		
Ethylene	28.051	0.85714	0.14286	0.000	0.0000	0	0		
Propane	44.092	0.81818	0.181818	0.000	0.0000	0	0		
Propene	42.077	0.85714	0.14286	0.000	0.0000	0	0		
Isobutane	58.118	0.82759	0.17247	0.000	0.0000	0	0		
n-butane	58.118	0.82759	0.17247	0.000	0.0000	0	0		
Isobutene	56.102	0.85714	0.14286	0.000	0.0000	0	0		
Isopentane	72.144	0.83333	0.16667	0.000	0.0000	0	0		
n-pentane	72.144	0.83333	0.16667	0.000	0.0000	0	0		
n-hexane	86.169	0.83721	0.16279	0.000	0.0000	0	0		
H2S	34.076	0	0.0586923	0.030	1.0223	0	0.0028115		
Totals				100.02830	2134.1256	32.5422841	3.32	7.680316768	56.417231

CALCULATED VALUES		
O2 F Factor (dry), Fd	**8276**	DSCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
O2 F Factor (wet), Fw	**9710**	SCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
Moisture F Factor	**1435**	SCF of Water/MM Btu of Fuel Burned @ 0% excess air
Combust. Moisture	**14.77**	volume % water in flue gas @ 0% excess air
CO2 F Factor, Fc	**2336**	DSCF of CO2/MM Btu of Fuel Burned @ 0% excess air
Carbon Dioxide	**28.22**	volume % CO2 in flue gas @ 0% O2
Predicted Fo Factor	**0.74**	EPA Method 3a Fo value

D-2 BIOMASS

TECO
TAMPA ELECTRIC

Synthetic Gas and Heating Value Calculations

Customer: Tampa Electric Company **Sample ID: Polk Lab**

Facility: Polk Power Station **Analysis Date: 04/01/2004**

Source: Unit #1

CALCULATION OF DENSITY AND HEATING VALUE @ 60°F and 30 in Hg

Component	% Volume	Molecular Wt.	Density * (lb/ft^3)	% volume x Density	weight %	Component Gross Btu/lb	Weight Fract. Btu	Gross * Heating Value (Btu/SCF)	Volume Fract. Btu
Hydrogen	35.4000	2.016	0.0053	0.00188	3.3184	61100	2027.53	325.0	115.05
Oxygen	0.7996	32.000	0.0846	0.00068	1.1964	0	0.00	0.0	0
Nitrogen	5.3210	28.016	0.0744	0.00396	7.0019	0	0.00	0.0	0
CO2	15.7177	44.010	0.1170	0.01839	32.5254	0	0.00	0.0	0
CO	42.7000	28.010	0.0740	0.03160	55.8865	4347	2429.39	322.0	137.494
Methane	0.0373	16.041	0.0424	0.00002	0.0280	23879	6.68	1013.0	0.377849
Ethane		30.067	0.0803	0.00000	0.0000	22320	0.00	1792.0	0
Ethylene		28.051	0.0746	0.00000	0.0000	21644	0.00	1614.0	0
Propane		44.092	0.1196	0.00000	0.0000	21661	0.00	2590.0	0
propylene		42.077	0.1110	0.00000	0.0000	21041	0.00	2336.0	0
Isobutane		58.118	0.1582	0.00000	0.0000	21257	0.00	3363.0	0
n-butane		58.118	0.1582	0.00000	0.0000	21308	0.00	3370.0	0
Isobutene		56.102	0.1480	0.00000	0.0000	20730	0.00	3068.0	0
Isopentane		72.144	0.1904	0.00000	0.0000	21052	0.00	4008.0	0
n-pentane		72.144	0.1904	0.00000	0.0000	21091	0.00	4016.0	0
n-hexane		86.169	0.2274	0.00000	0.0000	20940	0.00	4762.0	0
H2S	0.0270	34.076	0.0911	0.00002	0.0435	7100	3.09	647.0	0.17469
Total:	100.00	Average Density	0.05654		100.0000	**Gross Heating Value**			
		Specific Gravity	0.73908			**Btu/lb**	**4467**	**Btu/SCF**	**253.10**

* Density (lb/ft^3) and Gross Heating Value (Btu/scf) data from Perry's Chemical Engineering Handbook.

TECO
TAMPA ELECTRIC

Synthetic Gas and Heating Value Calculations

Customer: Tampa Electric Company **Sample ID:** Polk Lab
Facility: Polk Power Station **Analysis Date:** 04/01/2004
Source: Unit #1

CALCULATION OF F FACTORS

						Weight Percents		
Componen	**Mol. Wt.**	**C Factor**	**H Factor**	**% volume**	**Fract. Wt.**	**Carbon**	**Hydrogen**	**Nitrogen**	**Oxygen**
Hydrogen	2.016	0	1	35.400	71.3664		3.3422062		
Oxygen	32.000	0	0	0.800	25.5872				1.1982908
Nitrogen	28.016	0	0	5.321	149.0731			6.981340838	
CO2	44.010	0.272273	0	15.718	691.7360	8.82032107			23.551264
CO	28.010	0.42587	0	42.700	1196.0270	23.8537951			32.190049
Methane	16.041	0.75	0.25	0.037	0.5983	0.02101556	0.0070052		
Ethane	30.067	0.8	0.2	0.000	0.0000	0	0		
Ethylene	28.051	0.85714	0.14286	0.000	0.0000	0	0		
Propane	44.092	0.81818	0.181818	0.000	0.0000	0	0		
Propene	42.077	0.85714	0.14286	0.000	0.0000	0	0		
Isobutane	58.118	0.82759	0.17247	0.000	0.0000	0	0		
n-butane	58.118	0.82759	0.17247	0.000	0.0000	0	0		
Isobutene	56.102	0.85714	0.14286	0.000	0.0000	0	0		
Isopentane	72.144	0.83333	0.16667	0.000	0.0000	0	0		
n-pentane	72.144	0.83333	0.16667	0.000	0.0000	0	0		
n-hexane	86.169	0.83721	0.16279	0.000	0.0000	0	0		
H2S	34.076	0	0.0586923	0.027	0.9201	0	0.0025289		
Totals				100.00260	2135.3081	32.6951318	3.35	6.981340838	56.939604

CALCULATED VALUES		
O2 F Factor (dry), Fd	**8286**	DSCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
O2 F Factor (wet), Fw	**9734**	SCF of Exhaust/MM Btu of Fuel Burned @ 0% excess air
Moisture F Factor	**1448**	SCF of Water/MM Btu of Fuel Burned @ 0% excess air
Combust. Moisture	**14.88**	volume % water in flue gas @ 0% excess air
CO2 F Factor, Fc	**2350**	DSCF of CO2/MM Btu of Fuel Burned @ 0% excess air
Carbon Dioxide	**28.36**	volume % CO2 in flue gas @ 0% O2
Predicted Fo Factor	**0.74**	EPA Method 3a Fo value

APPENDIX E

TEST PARTICPANTS

TEST PARTICIPANTS

AIR SERVICES GROUP
ENVIRONMENTAL SERVICES

Juan Ramirez	Environmental Technician
Jorge Varino	Technician

AIR PROGRAMS GROUP
ENVIRONMENTAL HEALTH & SAFETY

Shelly Castro	Engineer

POLK POWER STATION

Michael Perkins	Environmental Coordinator
Brian Hall	Instrument & Controls Specialist

EMISSIONS TEST REPORT

CARBON MONOXIDE, NITROGEN OXIDE, and SULFUR DIOXIDE
MARCH 30, 2004 and APRIL 1, 2004
POLK POWER STATION
BIOMASS TEST BURN
FACILITY ID NUMBER: 1050233
EMISSION UNIT ID NO: -001
UNIT #1

Prepared For:
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Polk Power Station
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Prepared By:
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Environmental, Health & Safety
Environmental Services
Air Services Group

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