Progress Energy

March 3, 2006

Mr. Jeff Koerner
DEP/DARM
North Permitting Section
Division of Air Resource Management
2600 Blair Stone Road MS 5500
Tallahassee, Florida 32399-2400

Re: Crystal River Facility – Title V Permit 0170004-009-AV
Proposed Powder River Basin (PRB) Coal Test Burn
Air Construction Permit Application

Dear Mr. Koerner:

Attached is an application for an air construction permit for a proposed trial burn of PRB coal at Crystal River, as discussed during our visit to your offices on February 10, 2006. Specifically, Progress Energy Florida proposes to fire a coal blend of up to 30 percent PRB coal and 70 percent bituminous coal.

Enclosed please find an original and three copies of the application package. We would very much appreciate your expedited processing of the application.

Thank you for your help in this matter. Please contact me at (727) 820 5295 or Scott Osbourn, P.E. at (813) 287-1717 if you have any questions.

Sincerely,

for

Dave Meyer
Senior Environmental Specialist

cc: Ms. Mara Nasca, FDEP SW District (Cover Letter)
B. Worley, EPA

P.O. Box 14042, CX1B • St. Petersburg • Florida 33733-4042 • (727) 820-5151
A Progress Energy Company

MINOR SOURCE AIR CONSTRUCTION PERMIT APPLICATION
COMBUSTION OF POWDER RIVER BASIN (PRB) COAL
CRYSTAL RIVER ENERGY COMPLEX
CRYSTAL RIVER, CITRUS COUNTY, FLORIDA

Submitted to:

Progress Energy Florida
100 Central Avenue
St. Petersburg, Florida 33701

Submitted by:

Golder Associates Inc.
5100 West Lemon Street
Suite 114
Tampa, Florida 33609

Distribution:

4 Copies Department of Environmental Protection
2 Copies Progress Energy Florida
2 Copies Golder Associates Inc.

March 2006 053-9583

0170004-012-AC

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PART I

FDEP APPLICATION FOR AIR PERMIT

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit for a proposed project:

- subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

Air Operation Permit – Use this form to apply for:

- an initial federally enforceable state air operation permit (FESOP); or
- an initial/revised/renewal Title V air operation permit.

Air Construction Permit & Revised/Renewal Title V Air Operation Permit (Concurrent Processing Option) – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: **PROGRESS ENERGY FLORIDA, INC.**	
2. Site Name: **CRYSTAL RIVER POWER PLANT**	
3. Facility Identification Number:	
4. Facility Location...: Street Address or Other Locator: **NORTH OF CRYSTAL RIVER, WEST OF U.S. 19** City: **CRYSTAL RIVER** County: **CITRUS** Zip Code: **34428**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **DAVE MEYER, SENIOR ENVIRONMENTAL SPECIALIST**
2. Application Contact Mailing Address... Organization/Firm: **PROGRESS ENERGY FLORIDA** Street Address: **100 CENTRAL AVE CX1B** City: **ST. PETERSBURG** State: **FL** Zip Code: **33701**
3. Application Contact Telephone Numbers... Telephone: **(727) 820-5295** ext. Fax: **(727) 820-5229**
4. Application Contact Email Address: **DAVE.MEYER@PGNMAIL.COM**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	3/6/06
2. Project Number(s):	0170004 - 012 - AC
3. PSD Number (if applicable):	
4. Siting Number (if applicable):	

APPLICATION INFORMATION

Purpose of Application

This application for air permit is submitted to obtain: (Check one)

Air Construction Permit

☒ Air construction permit.

Air Operation Permit

☐ Initial Title V air operation permit.
☐ Title V air operation permit revision.
☐ Title V air operation permit renewal.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
☐ Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)

☐ Air construction permit and Title V permit revision, incorporating the proposed project.
☐ Air construction permit and Title V permit renewal, incorporating the proposed project.

Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:

☐ I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

Application Comment

Progress Energy is proposing to conduct a trial burn of a bituminous and subbituminous blend. Specifically, a trial burn will be conducted for a blend of as much as 30% powder river basin (PRB) coal with the existing bituminous coal supply. See Part II for details of the proposed trial burn.

The trial burn is proposed to begin on around May 1, 2006 and is expected to last about 60 days. The blend will be fired in Units 4 and/or 5, depending on circumstances at the time of the test burn. It's proposed to burn approximately 64,000 short tons (approximately 4 barges) of the blended fuel. This translates into roughly 226 total full load operating hours of burn time for one unit, or about 113 hours total (approximately 5 days), if both units are operating concurrently.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
004	FFSG, Unit 4		NA
003	FFSG, Unit 5		NA

Application Processing Fee

Check one: ☐ Attached - Amount: $_____ ☒ Not Applicable

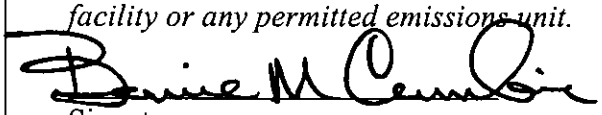
APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name :
   BERNIE CUMBIE, PLANT MANAGER
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **PROGRESS ENERGY**
   Street Address: **100 CENTRAL AVE CN77**
   City: **ST PETERSBURG** State: **FLORIDA** Zip Code: **33701**
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(352) 563-4484** ext. Fax: **(352) 563-4496**
4. Owner/Authorized Representative Email Address: **BERNE.CUMBIE@PGNMAIL.COM**
5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.



Signature

3/1/06

Date

APPLICATION INFORMATION

Application Responsible Official Certification

Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."

1. Application Responsible Official Name:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):
   - ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
   - ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
   - ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
   - ☐ The designated representative at an Acid Rain source.

3. Application Responsible Official Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
   Telephone: ( ) - ext. Fax: ( ) -

5. Application Responsible Official Email Address:

6. Application Responsible Official Certification:

   I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.

   Signature Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **SCOTT OSBOURN**
   Registration Number: **57557**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **5100 West Lemon St., Suite 114**
   City: **Tampa** State: **FL** Zip Code: **33609**
3. Professional Engineer Telephone Numbers...
   Telephone: **(813) 287-1717** ext.**211** Fax: **(813) 287-1716**
4. Professional Engineer Email Address: **SOSBOURN@GOLDER.COM**
5. Professional Engineer Statement:

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

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

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

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

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

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

Signature: S. OSBOURN Date: 3/3/06

(Seal) LICENSE NO. 57557 STATE OF FLORIDA PROFESSIONAL ENGINEER

* Attach any exception to certification statement.

** Board of Professional Engineers Certificate of Authorization #00001670

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **334.3** North (km) **3204.5**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **28/57/34** Longitude (DD/MM/SS) **82/42/01**	
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s):
7. Facility Comment :			

Facility Contact

1. Facility Contact Name: **DAVE MEYER, SENIOR ENVIRONMENTAL SPECIALIST**
2. Facility Contact Mailing Address... Organization/Firm: **PROGRESS ENERGY** Street Address: **100 CENTRAL AVE CX1B** City: **ST PETERSBURG** State: **FLORIDA** Zip Code: **33701**
3. Facility Contact Telephone Numbers: Telephone: **(727) 820-5295** ext. Fax: **(727) 820-5229**
4. Facility Contact Email Address: **DAVE.MEYER@PGNMAIL.COM**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I. that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official Email Address:

FACILITY INFORMATION

Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a "major source" and a "synthetic minor source."

1. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☐ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
PM	A	N
PM10	A	N
SO2	A	N
CO	A	N
NOx	A	N
VOC	A	N

FACILITY INFORMATION

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____
3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: ☐ Attached, Document ID:____ ☒ Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification: ☒ Attached, Document ID:PART II
3. Rule Applicability Analysis: ☒ Attached, Document ID:PART II
4. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable

Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):
   ☐ Attached, Document ID:____ ☐ Not Applicable (no exempt units at facility)

Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities (Required for initial/renewal applications only):
   ☐ Attached, Document ID:____ ☐ Not Applicable (revision application)

2. Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought):
   ☐ Attached, Document ID:____
   ☐ Not Applicable (revision application with no change in applicable requirements)

3. Compliance Report and Plan (Required for all initial/revision/renewal applications):
   ☐ Attached, Document ID:____
   Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.

4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only):
   ☐ Attached, Document ID:____
   ☐ Equipment/Activities On site but Not Required to be Individually Listed
   ☐ Not Applicable

5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) :
   ☐ Attached, Document ID:____ ☐ Not Applicable

6. Requested Changes to Current Title V Air Operation Permit:
   ☐ Attached, Document ID:____ ☐ Not Applicable

Additional Requirements Comment

PART II

APPLICATION REPORT

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The proposed Project involves evaluating the firing of various blend ratios (up to 30 percent) of Powder River Basin (PRB) and Eastern Bituminous (Central App) coal at Crystal River Units 4 and 5. This application for a minor source construction permit will allow for a trial burn as a high-level assessment that will assist Progress Energy Florida (PEF) in the performance of a first-cut evaluation to determine if PRB coal will meet expected performance and environmental criteria.

As discussed in a meeting with the Department on February 7, 2006, Crystal River Units 4 and 5 were originally designed to burn a 50/50 percent blend of Eastern bituminous (Illinois Basin) and Western sub-bituminous coal (PRB). The design specifications, provided by Babcock & Wilcox, are included in Appendix A of this application. The original Site Certification language (attached as Appendix B) allowed for a 50 percent blend of PRB coal. The Site Certification for Units 4 and 5 was issued prior to the effective date of the PSD program and, therefore, no construction permit was originally issued. Permit language that specified the burning of "only bituminous coal" originated in the initial Title V air operation permit, issued on January 1, 2000. Finally, as will be presented, the fuel blend, up to a maximum blend of 30 percent PRB, will have characteristics that closely match those of the bituminous coal types that are currently being burned.

The above factors, in addition to the fact that no plant changes to existing process equipment are necessary to test burn the proposed blend, were presented to the Department as PEF's position that Units 4 and 5 are "capable of accommodating" this fuel blend, and that no air permit changes are necessary. In spite of these factors, and at the Department's direction, PEF is submitting this application to obtain a minor source construction permit to allow for the burning of this fuel blend.

The following sections provide the Project Description (Section 2.0) and the Proposed Project Approach (Section 3.0).

2.0 PROJECT DESCRIPTION

The Crystal River Energy Complex consists of four coal-fired fossil fuel steam generating (FFSG) units with electrostatic precipitators; two natural draft cooling towers for FFSG Units 4 and 5; helper mechanical cooling towers for FFSG Units 1, 2 and Nuclear Unit 3; coal, fly ash, and bottom ash handling facilities, and relocatable diesel fired generator(s). This proposed PRB/CAPP fuel blend firing is only desired for Units 4 and 5. The PRB/CAPP fuel blend will contain up to as much as 30 percent PRB coal, the remainder consisting of the currently fired bituminous coal. The PRB and CAPP coal will be blended off-site and shipped to the Crystal River facility. This will minimize any issues associated with a perceived dust issue should PRB coal be transported and conveyed in a "non-blended" form. Typical characteristics of a 20 percent PRB blend are summarized below.

Coal Classifications

Babcock & Wilcox

Table 3
Classification of Coals by Rank[a] (ASTM D 388)

Class	Group	Fixed Carbon Limits, % (Dry, Mineral-Matter-Free Basis) Equal or Greater Than	Fixed Carbon Limits, % (Dry, Mineral-Matter-Free Basis) Less Than	Volatile Matter Limits, % (Dry, Mineral-Matter-Free Basis) Greater Than	Volatile Matter Limits, % (Dry, Mineral-Matter-Free Basis) Equal or Less Than	Calorific Value Limits, Btu/lb (Moist,[b] Mineral-Matter-Free Basis) Equal or Greater Than	Calorific Value Limits, Btu/lb (Moist,[b] Mineral-Matter-Free Basis) Less Than	Agglomerating Character
I. Anthracitic	1. Meta-anthracite	98	—	—	2	—	—	Nonagglomerating
	2. Anthracite	92	98	2	8	—	—	
	3. Semianthracite[c]	86	92	8	14	—	—	
II. Bituminous	1. Low volatile bituminous coal	78	86	14	22	—	—	Commonly agglomerating
	2. Medium volatile bituminous coal	69	78	22	31	—	—	
	3. High volatile A bituminous coal	—	69	31	—	14,000[d]	—	
	4. High volatile B bituminous coal	—	—	—	—	13,000[d]	14,000	
	5. High volatile C bituminous coal	—	—	—	—	11,500	13,000	Agglomerating
		—	—	—	—	10,500[e]	11,500	
III. Subbituminous	1. Subbituminous A coal	—	—	—	—	10,500	11,500	Nonagglomerating
	2. Subbituminous B coal	—	—	—	—	9,500	10,500	
	3. Subbituminous C coal	—	—	—	—	8,300	9,500	
IV. Lignitic	1. Lignite A	—	—	—	—	6,300	8,300	
	2. Lignite B	—	—	—	—	—	6,300	

[a] This classification does not include a few coals, principally nonbanded varieties, which have unusual physical and chemical properties and which come within the limits of fixed carbon or calorific value of the high volatile bituminous and subbituminous ranks. All of these coals either contain less than 48% dry, mineral-matter-free Btu/lb.

[b] Moist refers to coal containing its natural inherent moisture but not including visible water on the surface of the coal.

[c] If agglomerating, classify in low volatile group of the bituminous class.

[d] Coals having 69% or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of calorific value.

[e] It is recognized that there may be nonagglomerating varieties in these groups of the bituminous class, and there are notable exceptions in high volatile C bituminous group.

Product will be pre-blended prior to site delivery.

80%CAPP/20%PRB
11,300-11,800 Btu/lb

*From Babcock & Wilcox, "Steam Book", 40th edition; pg 8-5.

Progress Energy

3.0 PROPOSED PROJECT APPROACH

PEF anticipates conducting the test burn over an extended period of time to allow the impact of PRB coal to accumulate in the boiler and other components, so that the effects of PRB coal can be determined. Ash deposits on the furnace water walls will take some time to accumulate. A short-term test burn may not show any adverse effects that will become evident later when the blend is fired on a longer duration.

PEF, therefore, proposes a test burn of four barge loads of the blended fuel. Each barge is approximately 16,000 tons of blended coal, or a total of 64,000 tons. Assuming a fuel heating value of 11,800 Btu/lb (approximate for an 80/20 percent bituminous and PRB blend) and the current heat input limit for Units 4 and 5 of 6,665 MMBtu/hr each, it would take approximately 226 total full load operating hours to combust all four barge loads. With both units operating simultaneously, it would take half the time, or roughly 113 hours of full load operation from each unit (approximately 5 days) to complete the trial burn. To accomplish this, PEF proposes a 60 day trial burn period, commencing on May 1, 2006. This 60 day window will allow for flexibility in the testing schedule, given the uncertainties in barge deliveries and PEF's reliance on an off-site third party blending facility.

PEF anticipates the following effects on pollutants of concern:

- SO_2 should be comparable or reduced;
- NOx should be comparable or reduced;
- PM/PM_{10} should be comparable (fugitive dust addressed by off-site blending); and
- CO/VOCs should be comparable.

All conditions of the existing permit related to air pollution emission limits and control equipment will remain in force during the trial burn. CEMS data will be recorded and analyzed for the duration of the trial burn for SO_2, NOx and opacity. An emission test will also be conducted and results reported for PM/PM_{10} (EPA Method 5 or 17). Daily records (i.e., mass fuel feed rates and heat input) of the boiler operations when firing the fuel blend will be maintained and reported. Performance testing will cease as soon as possible if the test boiler operations are not in accordance with current

permit conditions or this protocol. Performance testing with this coal blend will not resume until appropriate measures to correct the problem have been implemented. A test report will be submitted to the Department within 45 days of completion of the trial burn.

The exhibit below summarizes some of the predicted modeled characteristics of a 20 percent PRB blend, including the anticipated effects on NOx, SO_2 and fly ash LOI (loss on ignition). In addition, certificates of analysis are presented in Appendix C for a currently-fired Central Appalachian (CAPP) coal, PRB coal and a proposed 70/30 percent CAPP/PRB blend. As discussed previously, the characteristics of the proposed blend are similar to the Central Appalachian (CAPP) bituminous coal currently burned.

CR 5 Performance Comparison Ranges of 4 coals

Item	Low	CAPP/PRB Blend	High	Comment (CAPP/PRB)
Higher Heating Value (Btu/lb)	11,733	11,743	12,498	OK
Moisture (%)	7	10	12	OK
Volatile Matter (%)	30.2	30.7	36.3	OK
Fixed Carbon (%)	47	50	51	OK
Ash (%)	4.8	9.4	11.5	OK
Sulfur (%)	0.61	0.61	0.74	Benefit
Hardgrove Grindability (HGI)	48	54	55	Benefit
Auxiliary Power (MW)	33	35	35	Marginal
Calculated Derate (MWg)	0	0	0	OK
Boiler Efficiency, HHV Basis (%)	88.1	88.1	89.4	Marginal
Adjusted Mill Capacity (tph)	48	54	55	OK
Required Throughput Per Mill (tph)	45	49	49	OK
Mill Power Required (kW)	1,458.44	1,490.30	1,572.29	Benefit
Opacity Actual (%) - predicted	3.1	6.6	7.0	OK
SO2 Production (lb/mmBtu)	1.04	1.04	1.10	Benefit
NOx Production (lb/mmBtu)	0.54	0.54	0.54	OK
Total Forced Outage Hours	545	573	637	OK
Total Maintenance/Availability Cost ($MM)	1.276	1.291	1.348	Benefit
Fly Ash LOI (%)	4.5	6.0	10.5	Marginal
Fly Ash Production Rate (tons/hr)	12	23	27	OK
Period Fly Ash Production (tons/yr)	84,211	172,463	194,619	OK
Annual Coal Burn Rate ('000's tons/yr)	2,051	2,291	2,291	Marginal

**The coals modeled include normal domestic calibration coal, Drummond Colombian coal, 60% CAPP/40% Venez coal and 80%CAPP/20%PRB. (See Appendix for further modeling details.)*

Progress Energy

APPENDIX A

UNITS 4 AND 5 DESIGN SPECIFICATIONS

Instructions

for the

Care and Operation

of

Babcock & Wilcox Equipment

furnished on Contract

RB-588

for

Florida Power Corporation

Crystal River Plant
Unit 4

Progress Energy

UNIT DESCRIPTION

PLANT

This unit is installed as Unit No. 4 at the Crystal River Plant located near Crystal River, Florida. Plant elevation is 11 feet above sea level.

The unit supplies steam to a GE turbine rated at 665 MW. The consulting engineer is Black & Veatch, Kansas City, Missouri.

BOILER

This is a semi-indoor, balanced draft Carolina Type Radiant Boiler designed for pulverized coal firing. The unit has 54 Dual-Register burners arranged in three rows of nine burners each on both the front and rear walls. Furnace dimensions are 79 feet wide, 57 feet deep, and 201 feet from the centerline of the lower wall headers to the drum centerline. The steam drum is 72 inches ID.

The maximum continuous rating is 5,239,600 lb/hr of main steam flow at 2640 psig and 1005° F at the superheater outlet with a reheat flow of 4,344,700 lb/hr at 493 psig and 1005° F with a normal feedwater temperature of 546° F. This is a 5% overpressure condition. The full load rating is 4,737,900 lb/hr of main steam flow at 2500 psig and 1005° F with a reheat flow of 3,959,800 lb/hr at 449 psig and 1005° F with a normal feedwater temperature of 535° F. Main steam and reheat steam temperatures are controlled to 1005° F from MCR load down to half load (2,368,900 lb/hr) by a combination of gas recirculation and spray attemperation.

The unit is designed for cycling service and is provided with a full boiler by-pass system. The unit can be operated with either constant or variable turbine throttle pressure from 63% of full load on down.

The design pressures of the boiler, economizer, and reheater are 2975, 3050, and 750 psig respectively.

Steam for boiler soot blowing is taken off the primary superheater outlet header. Steam for air heater soot blowing is taken off the secondary superheater outlet.

SCOPE OF SUPPLY

The major items of equipment supplied by B&W include:

- RBC unit pressure parts including boiler, primary and secondary superheater, economizer, and reheater.
- Fifty-four Dual-Register burners and lighters.
- Six MPS-89GR pulverizers and piping to burners.
- By-pass system including valves and piping.
- Two stages of superheat attemperators (first stage tandem) and one stage of reheat attemperation (2 nozzles); nozzles only, no block or control valves or spray water piping.
- Three Rothemuhle air heaters (one primary and two secondary).
- Ducts from secondary air heaters to windbox.

RB-588 Sept. 81

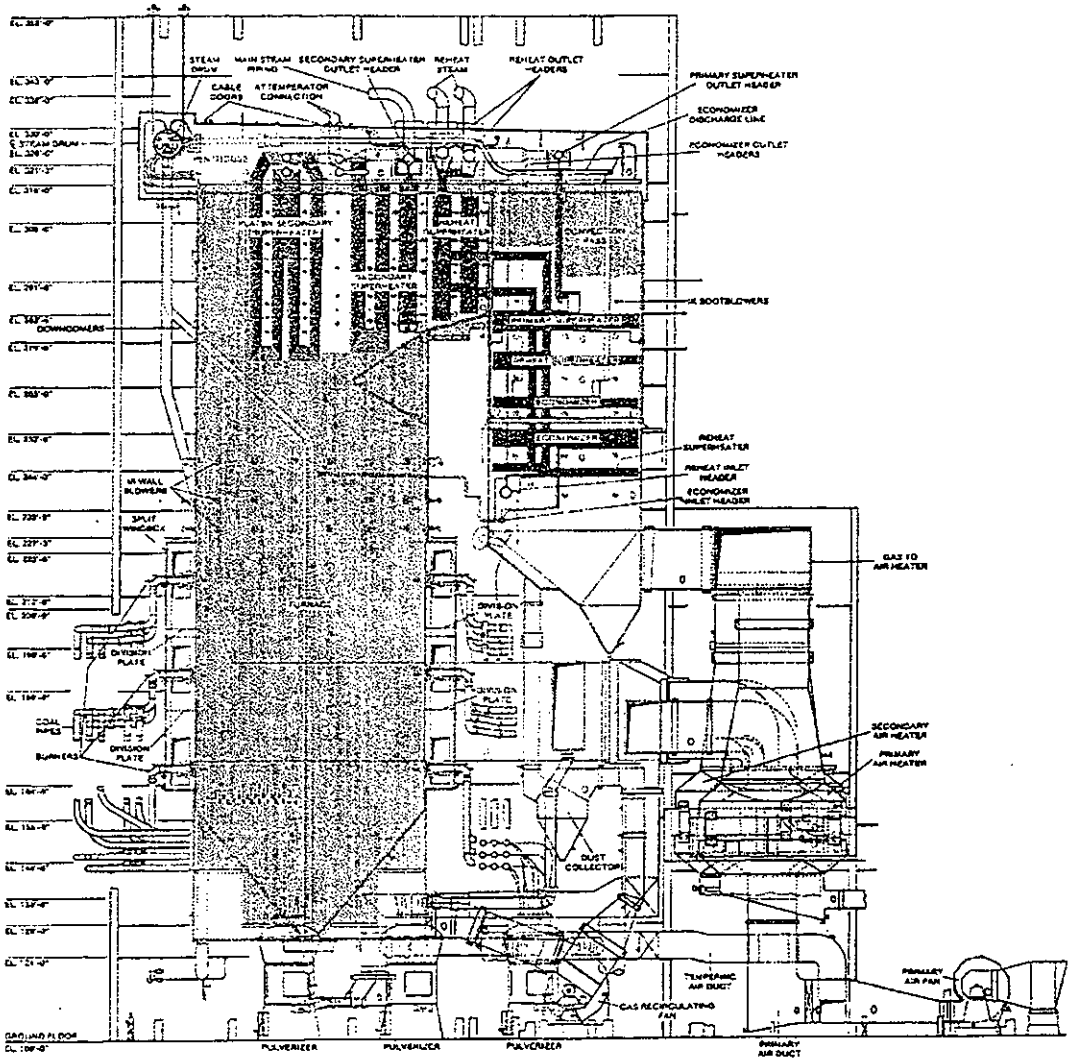
- Primary air system: two TLT centrifugal PA fans and ducts from fans to pulverizers.
- Gas recirculation system: one TLT centrifugal GR fan, one dust collector and flues.
- Six Stock gravimetric coal feeders and drives.
- Bailey burner controls.
- Safety valves and ERV.
- Brickwork, refractory, insulation and lagging (BRIL).
- Seal air piping and fans.
- Erection.
- Recommended spare parts.

FUEL

The guarantees for this unit are based on firing a 50/50 blend of Eastern bituminous and Western sub-bituminous coal. The performance coal is classified as high slagging and medium fouling. Performance was also checked on Illinois deep-mined coal which is classified as severe slagging and high fouling. The furnace and convection pass are designed for a severe slagging and severe fouling coal.

Ultimate Analysis: % by Weight

	Performance	Illinois
Ash	7.90	13.00
Sulfur	0.49	4.20
Hydrogen	3.90	4.40
Carbon	58.80	62.00
Chlorine	0.03	0.02
Water	18.50	10.00
Nitrogen	1.10	1.38
Oxygen	9.28	5.00
Total	100.00	100.00
Higher Heating Value	10285 Btu/lb	11000 Btu/lb



FLORIDA POWER CORPORATION
CRYSTAL RIVER PLANT, UNIT NO. 4
CRYSTAL RIVER, FLORIDA

CAPACITY, LB STEAM PER HOUR	5,240,000	SUPERHEATER OUTLET TEMPERATURE, F	1005
SUPERHEATER OUTLET PRESSURE, PSI	2,640	REHEAT OUTLET TEMPERATURE, F	1,005

BABCOCK & WILCOX RADIANT REHEAT BOILER

Progress Energy

FUEL AS FIRED

SAMPLES

ANALYSES: 50/50 BLEND, EASTERN & WESTERN

COAL — KIND		
COAL — RANK — CLASS		
COAL — RANK — GROUP		
COAL — SOURCE — MINE		
COAL — SOURCE — SEAM		
COAL — SOURCE — DISTRICT		
COAL — SOURCE — COUNTY		
COAL — SOURCE — STATE		
COAL — SIZE		
COAL — GRINDABILITY		48
COAL — SURFACE MOISTURE, %		PERF.
ASH SOFT. TEMP., F (REDUCING)		
PROX. ANAL., % — MOISTURE, TOTAL		18.5
PROX. ANAL., % — VOLATILE MATTER		31.0
PROX. ANAL., % — FIXED CARBON		42.6
PROX. ANAL., % — ASH		7.9
PROX. ANAL., % — TOTAL		100.0

ULTIMATE ANALYSIS, % BY WT.	BIT.	SUB-BIT.	WT.
ASH	10.0	5.8	7.90
S	0.5	0.48	0.49
N2	4.4	3.4	3.90
C	69.0	48.5	58.80
H2			
O2			
H2O			
CO			
CO2			
C1	0.05	0.02	0.02
H2O	7.0	10.0	16.50
N2	1.4	0.7	1.10
O2	7.65	11.1	9.28
TOTAL	100.00	100.00	100.00
BTU/LB	12,450	8,125	10,285
BTU/CU FT AT 60F 30 IN. HG			

*EXCLUDING VALVES AND STATIC HEAD.

UTILITY BOILER PERFORMANCE SUMMARY

BY RLG APPD. [illegible] DATE

THE BABCOCK & WILCOX COMPANY

P12-4657-16YO-1SO

PREDICTED PERFORMANCE

STEAM LEAVING SH, M LB/HR	2368.9	4737.9	5239.6
STEAM LEAVING RH1, M LB/HR	2063.8	3959.8	4344.7
STEAM LEAVING RH2, M LB/HR			
TYPE OF FUEL	PC	PC	PC
LOAD CONDITION	CONT.	CONT.	CONT.
EXCESS AIR LEAVING ECON., %	35	20	20
NO. OF BURNERS IN OPERATION	45	54	54
FUEL INPUT, MKB/HR	3348	6053	6581
HEAT AVAIL. MKB/HR (FUEL & HEATED AIR)	3615	6367	6886
QUANTITY, M LB/HR — FUEL (NGFM-NAT. GAS)	325.5	588.6	639.8
QUANTITY, M LB/HR — FLUE GAS ENTERING AIR HEATER	3728	6051	6579
QUANTITY, M LB/HR — AIR TO BURNING EQUIPMENT	3327	5419	5891
QUANTITY, M LB/HR — AIR HEATER LEAKAGE PRI/SEC	107/210	128/272	111/286
PRESSURE, PSIA — STEAM AT SH OUTLET	2425	2500	2640
PRESSURE, PSIA — STEAM AT RH1 INLET	240	474	520
PRESSURE, PSIA — STEAM AT RH2 INLET			
PRESSURE DROP, PSI — REHEATER 1	13	25	27
PRESSURE DROP, PSI — REHEATER 2			
PRESSURE DROP, PSI — ECONOMIZER	5	20	25
PRESSURE DROP, PSI — DRUM TO SH OUTLET	39	155	189
TEMPERATURE, F — STEAM — LEAVING SUPERHEATER	1005	1005	1005
TEMPERATURE, F — STEAM — LEAVING REHEATER 1	1005	1005	1005
TEMPERATURE, F — STEAM — ENTERING REHEATER 1	528	598	604
TEMPERATURE, F — STEAM — LEAVING REHEATER 2			
TEMPERATURE, F — STEAM — ENTERING REHEATER 2			
TEMPERATURE, F — GAS — LEAVING ECONOMIZER	630	689	697
TEMPERATURE, F — GAS — LEAVING AH (EXCL. LKG) PRI/SEC	280/260	280/278	280/279
TEMPERATURE, F — GAS — LEAVING AH (INCL. LKG) PRI/SEC	258/249	261/267	262/269
TEMPERATURE, F — AIR — WATER ENTERING ECONOMIZER	459	535	546
TEMPERATURE, F — AIR — ENTERING UNIT PRI/SEC	85/99	95/82	95/80
TEMPERATURE, F — AIR — LEAVING AIR HEATER PRI/SEC	555/355	575/596	579/601
RESISTANCE, IN. OF WATER — GAS — FURNACE & CONVECTION BANKS	1.7	3.5	3.9
RESISTANCE, IN. OF WATER — GAS — FLUES TO AH OUTLET	0.4	0.9	1.1
RESISTANCE, IN. OF WATER — GAS — AIR HEATER	1.7	3.6	4.1
RESISTANCE, IN. OF WATER — GAS — TOTAL FURN. TO AH OUTLET	3.8	8.0	9.1
RESISTANCE, IN. OF WATER — AIR — FUEL BURNERS & WINDBOX	1.0	2.5	2.9
RESISTANCE, IN. OF WATER — AIR — DUCTS & FLOW METER	1.2	3.3	3.8
RESISTANCE, IN. OF WATER — AIR — AIR HEATER	1.7	4.0	4.6
TOT. FROM AH INLET TO FURN	3.9	9.8	11.3

HEAT LOSS, %			
DRY GAS	4.23	4.34	4.43
H2 & H2O IN FUEL	5.80	5.89	5.91
MOISTURE IN AIR	0.11	0.11	0.11
UNBURNED COMBUSTIBLE	0.30	0.30	0.30
RADIATION	0.31	0.17	0.15
UNACC. FOR & MFRS. MARGIN	1.50	1.50	1.50
TOTAL HEAT LOSS	12.25	12.31	12.40
EFFICIENCY OF UNIT, %	87.75	87.69	87.60

PULVERIZERS				
NO. IN USE PER BOILER	5	6	5	6
TOTAL POWER, KW HR/TON MOTOR OUTPUT				
% THRU 200 U.S.S. SIEVE	74	69	65	68

PREDICTED PERFORMANCE IS BASED ON COMBUSTION AIR ENTERING UNIT WITH 0.013 LB MOISTURE/LB DRY AIR, ON 29.92 IN. HG. BAROMETRIC PRESSURE, ON CONDITIONS & EQUIPMENT GIVEN ON THIS SUMMARY SHEET & AN AGREEMENT DATED [illegible] BETWEEN THE PURCHASER AND THE BABCOCK & WILCOX COMPANY.

P12-4657-16YO

EQUIPMENT PER UNIT

TYPE: RADIANT

SIZE: RBC 57 79/HB

DESIGN PRESSURE - 2,975 PSIG

FURNACE — WATER COOLED SCREEN (CIRCUMFERENTIAL)	
FURNACE — WATER COOLED (PROJECTED)	48,736
FURNACE — SUPERHEATER (CIRCUMFERENTIAL)	
FURNACE — SUPERHEATER (PROJECTED)	46,442
TOTAL FURNACE HEATING SURFACE	95,178
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — SATURATED (CIRCUMFERENTIAL)	10,586
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — SUPERHEATER (CIRCUMFERENTIAL)	243,015
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — REHEATER 1 (CIRCUMFERENTIAL	333,919
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — REHEATER 2 (CIRCUMFERENTIAL)	
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — ECONOMIZER	46,519
CONVECTION PRESSURE PART HEATING SURFACE, SQ FT — TOTAL CONVECTION HEATING SURFACE	634,039
TOTAL FURN. & CONV. PRESSURE PART. HTG. SURF.	729,217
FLAT PROJECTED FURNACE HEATING SURFACE — TO FACE OF PLATENS (24" CTR)	73,583
FLAT PROJECTED FURNACE HEATING SURFACE — TO FACE OF CONVECTION SURFACE	101,501
FURNACE VOLUME, CU FT	736,185

AIR HEATER: TYPE ROTHEMUHLE REGENERATIVE NO. 1-PRI. 2-SEC.

TOTAL HEATING SURFACE, SQ FT: PRI.-250,522; SEC.-824,850

PRI. SIZE-10.6 Vu 56

SEC. SIZE-12.5 Vu 68

FUEL BURNER: TYPE DUAL REGISTER; NO. 54

PULVERIZER: TYPE MPS SIZE 89G NO. 6

CAPACITY OF 5 PULV. IS 5239 M LB STEAM/HR BASED ON 68 GRIND 10,285 BTU COAL AT 65 % THRU 200 U.S.S. SIEVE

FOR 1097M LB COAL/PULV.-HR AT 65% THRU 200 U.S.S. SIEVE MIN. GRIND

IS 42 MAXIMUM TOTAL MOISTURE IS 18% REQUIRING 570 F AIR

STEAM TEMP. CONTROL: MAIN STEAM BY SPRAY ATTEMPERATION; REHEAT BY GAS RECIRCULATION

UNIT CONSTRUCTION FEATURES: MEMBRANE WALLS; BALANCE DRAFT

REVISIONS — NO.	DESCRIPTION	BY	DATE

FLORIDA POWER CORP.
CRYSTAL RIVER, UNIT #4

Progress Energy

APPENDIX B

UNITS 4 AND 5 SITE CERTIFICATION LANGUAGE

From Initial CR4/5 Site Certification Application (Dec. 1977) (SCA)

3.2 FUEL

3.2.1 Fuel Types and Quantities

The coal supplies for the Crystal River Plant Units 4 and 5 have not at the present time been committed. Present plans are to utilize coal, or a blend of coals, which will meet the EPA sulfur emission standards without the use of flue gas scrubbers.

The coals which will provide this compliance with the EPA standards are found in two geographical portions of the country; principally in the far western coal fields, and in the Appalachian coal fields. The Appalachian coals are generally a high quality, high BTU, high ash fusion, low sulfur coal. The western coals are generally lower quality, low BTU, high ash, high moisture, but extremely low sulfur coals.

The proposed design coal for the Crystal River Units 4 and 5 is a 50/50 blend of a typical Appalachian and western coal. The fuel and ash analyses for the 50/50 design blend are shown in Tables 3.2-1 and 3.2-2, respectively.

At the rated net output (640 MW), and the design blend coal heating value of approximately 23 923 kJ/kg (10,285 BTU/LB), the coal consumption will be approximately 294 000 kg (648,000 LB) per hour for each unit. The average coal consumption per year over the 30-year life of Units 4 and 5 will be approximately 1 700 000 metric

tons (1,870,000 tons) per year for each unit based on a 0.66 annual average capacity factor.

Auxiliary fuel for furnace warm-up and coal ignition during start-up will be fuel oil. Diesel fuel and gasoline will be used to power the emergency fire pumps and mobile coal and ash handling equipment. Average fuel oil consumption will be approximately 10 600 m^3 (2,800,000 GAL) per year for each unit based on 200 starts per year.

3.2.2 Fuel Transportation

In order to maintain a diversity of supply, approximately 50 per cent of the coal will be transported to the Crystal River site by unit trains and 50 per cent will be transported to the site in oceangoing barges.

The Appalachian coal will be transported in 70 to 110 car unit trains of approximately 90.7 metric ton (100 ton) capacity cars. An average of about four to six trains per week will be required to supply 50 per cent of the coal assuming the present projections for plant capacity.

The western coals will be transported from the coal fields by unit rail trains to the Mississippi River, loaded in river barges, and transported down the Mississippi to the New Orleans, Louisiana

Table 3.2-1. Fuel Analysis--Units 4 and 5 Design Basis Coal Blend

	Design Basis Coal Blend	
	Typical	Range
Proximate Analysis, Per Cent		
Moisture	18.5	4.0-32.0
Ash	7.9	4.4-15.4
Volatile Matter	31.0	24.6-32.1
Fixed Carbon	42.6	32.1-53.0
Ultimate Analysis, Per Cent		
Carbon	58.8	
Hydrogen	3.9	
Nitrogen	1.1	
Chlorine	0.03	
Sulfur	0.49	
Ash	7.9	
Oxygen	9.28	
Heating Value, kJ/kg (BTU/LB)		
As received	23 923 (10,285)	17 910-30 237 (7700-13,000)

APPENDIX C
CERTIFICATES OF ANALYSIS

CERTIFICATE OF ANALYSIS

COMPANY REQUESTING ANALYSIS:	SAMPLE CHRONOLOGY	
Kanawha River Terminals	DATE ANALYSED	June 23, 2005
	LAB NUMBER	999865389
	SAMPLE TAKEN BY	CLIENT

Blend Coal; Analysis 70% Appalachian Coal & 30% Powder River Basin Coal

PROXIMATE ANALYSIS	AS RECEIVED	DRY BASIS	M.A.F. BTU
% MOISTURE	13.52	N/A	N/A
%ASH	8.91	10.30	N/A
% VOLATILES	32.89	38.03	N/A
% FIXED CARBON	44.68	51.67	N/A
BTU	11117	12855	14331
% SULFUR	0.56	0.65	N/A
SULFUR FORMS			
% PYRITIC SULFUR	0.08	0.09	
% SULFATE SULFUR	0.24	0.28	
% ORGANIC SULFUR	0.24	0.28	
% TOTAL SULFUR	0.56	0.65	
T-250 TEMP. OF ASH		°F	

ASH FUSION	REDUCING
INITIAL, °F	2440
SOFTENING, °F	2500
HEMMISPHERICAL, °F	2560
FLUID, °F	2640

ULTIMATE ANALYSIS	AS RECEIVED	DRY BASIS
% MOISTURE	13.52	N/A
% CARBON	61.16	70.72
% HYDROGEN	4.40	5.09
% NITROGEN	0.89	1.03
% CHLORINE	0.06	0.07
% SULFUR	0.56	0.65
% ASH	8.91	10.30
% OXYGEN (BY DIFF.)	10.50	12.14

ASH MINERAL ANALYSIS		%WT. IGNITED BASIS
PHOSPHOROUS PENTOXIDE	(P_2O_5)	0.51
SILICON DIOXIDE	(SiO_2)	46.80
FERRIC OXIDE	(Fe_2O_3)	5.43
ALUMINUM TRIOXIDE	(Al_2O_3)	23.79
TITANIUM DIOXIDE	(TiO_2)	1.67
CALCIUM OXIDE	(CaO)	8.97
MAGNESIUM OXIDE	(MgO)	1.74
SULFUR TRIOXIDE	(SO_3)	4.08
POTASSIUM OXIDE	(K_2O)	0.87
SODIUM OXIDE	(Na_2O)	1.17
UNDETERMINED		4.97
HARDGROVE INDEX	48	DIMENSIONLESS

TRACE METALS	PPM AS RECEIVED WHOLE COAL BASIS
ANTIMONY (Sb)	
ARSENIC (As)	2.45
BARIUM (Ba)	
BERYLLIUM (Be)	
CADMIUM (Cd)	
COBALT (Co)	
COPPER (Cu)	
CHROMIUM (Cr)	
GOLD (Au)	
LEAD (Pb)	4.82
LITHIUM (Li)	
MANGANESE (Mn)	
MERCURY (Hg)	0.08
MOLYBDENUM (Mo)	
NICKEL (Ni)	
SELENIUM (Se)	
SILVER (Ag)	
THALLIUM (Tl)	
VANADIUM (V)	
ZINC (Zn)	

ID COMPONENTS	
Manganese Oxide	0.01
Barium Oxide	0.54
Strontium Oxide	0.35

FOULING FACTOR / SLAGGING FACTOR	
CHLORINE	769
FLUORINE	30.41
BROMINE	

CERTIFICATE OF ANALYSIS

COMPANY REQUESTING ANALYSIS:	SAMPLE CHRONOLOGY	
Kanawha River Terminals	DATE ANALYSED	
	LAB NUMBER	
	SAMPLE TAKEN BY	

Appalachian Coal

	AS RECEIVED	DRY BASIS	M.A.F. BTU
PROXIMATE ANALYSIS			
% MOISTURE	7.97	N/A	N/A
%ASH	10.25	11.14	N/A
% VOLATILES	28.83	31.33	N/A
% FIXED CARBON	52.94	57.53	N/A
BTU	12239	13299	14966
% SULFUR	0.73	0.79	N/A
SULFUR FORMS			
% PYRITIC SULFUR	0.16	0.17	
% SULFATE SULFUR	0.07	0.08	
% ORGANIC SULFUR	0.50	0.54	
% TOTAL SULFUR	0.73	0.32	
T-250 TEMP. OF ASH		°F	

ASH FUSION	REDUCING
INITIAL, °F	2700+
SOFTENING, °F	2700+
HEMMISPHERICAL, °F	2700+
FLUID, °F	2700+

	AS RECEIVED	DRY BASIS
ULTIMATE ANALYSIS		
% MOISTURE	7.97	N/A
% CARBON	65.14	70.79
% HYDROGEN	4.66	5.06
% NITROGEN	0.98	1.06
% CHLORINE	0.08	0.09
% SULFUR	0.73	0.79
% ASH	10.25	11.14
% OXYGEN (BY DIFF.)	10.19	11.07

ASH MINERAL ANALYSIS		%WT. IGNITED BASIS
PHOSPHOROUS PENTOXIDE	(P_2O_5)	0.43
SILICON DIOXIDE	(SiO_2)	51.61
FERRIC OXIDE	(Fe_2O_3)	5.31
ALUMINUM TRIOXIDE	(Al_2O_3)	27.04
TITANIUM DIOXIDE	(TiO_2)	1.84
CALCIUM OXIDE	(CaO)	3.99
MAGNESIUM OXIDE	(MgO)	0.83
SULFUR TRIOXIDE	(SO_3)	0.93
POTASSIUM OXIDE	(K_2O)	1.03
SODIUM OXIDE	(Na_2O)	1.26
UNDETERMINED		4.76
HARDGROVE INDEX	46	DIMENSIONLESS

	PPM AS RECEIVED WHOLE COAL BASIS
TRACE METALS	
ANTIMONY (Sb)	
ARSENIC (As)	3.39
BARIUM (Ba)	
BERYLLIUM (Be)	
CADMIUM (Cd)	
COBALT (Co)	
COPPER (Cu)	
CHROMIUM (Cr)	
GOLD (Au)	
LEAD (Pb)	6.41
LITHIUM (Li)	
MANGANESE (Mn)	
MERCURY (Hg)	0.10
MOLYBDENUM (Mo)	
NICKEL (Ni)	
SELENIUM (Se)	
SILVER (Ag)	
THALLIUM (Tl)	
VANADIUM (V)	
ZINC (Zn)	

ID COMPONENTS	
Manganese Oxide	0.01
Barium Oxide	0.57
Strontium Oxide	0.39

FOULING FACTOR	
SLAGGING FACTOR	
CHLORINE	1026
FLUORINE	32.19
BROMINE	

CERTIFICATE OF ANALYSIS

COMPANY REQUESTING ANALYSIS:	SAMPLE CHRONOLOGY	
Kanawha River Terminals	DATE ANALYSED	
	LAB NUMBER	
	SAMPLE TAKEN BY	

Powder River Basin Coal

	AS RECEIVED	DRY BASIS	M.A.F. BTU
PROXIMATE ANALYSIS			
% MOISTURE	26.47	N/A	N/A
%ASH	6.12	8.32	N/A
% VOLATILES	39.47	53.68	N/A
% FIXED CARBON	27.94	38.00	N/A
BTU	8692	11821	12894
% SULFUR	0.24	0.32	N/A
SULFUR FORMS			
% PYRITIC SULFUR	0.01	0.02	
% SULFATE SULFUR	0.17	0.23	
% ORGANIC SULFUR	0.06	0.07	
% TOTAL SULFUR	0.24	0.32	
T-250 TEMP. OF ASH		°F	

ASH FUSION	REDUCING
INITIAL, °F	2060
SOFTENING, °F	2100
HEMMISPHERICAL, °F	2170
FLUID, °F	2220

	AS RECEIVED	DRY BASIS
ULTIMATE ANALYSIS		
% MOISTURE	26.47	N/A
% CARBON	49.97	70.58
% HYDROGEN	3.67	5.18
% NITROGEN	0.69	0.97
% CHLORINE	0.01	0.01
% SULFUR	0.24	0.32
% ASH	6.12	8.32
% OXYGEN (BY DIFF.)	12.83	14.62
		%WT. IGNITED BASIS
ASH MINERAL ANALYSIS		
PHOSPHOROUS PENTOXIDE	(P_2O_5)	0.69
SILICON DIOXIDE	(SiO_2)	35.57
FERRIC OXIDE	(Fe_2O_3)	5.71
ALUMINUM TRIOXIDE	(Al_2O_3)	16.21
TITANIUM DIOXIDE	(TiO_2)	1.28
CALCIUM OXIDE	(CaO)	20.60
MAGNESIUM OXIDE	(MgO)	3.85
SULFUR TRIOXIDE	(SO_3)	11.43
POTASSIUM OXIDE	(K_2O)	0.49
SODIUM OXIDE	(Na_2O)	0.98
UNDETERMINED		2.45
HARDGROVE INDEX	52	DIMENSIONLESS

	PPM AS RECEIVED WHOLE COAL BASIS
TRACE METALS	
ANTIMONY (Sb)	
ARSENIC (As)	0.25
BARIUM (Ba)	
BERYLLIUM (Be)	
CADMIUM (Cd)	
COBALT (Co)	
COPPER (Cu)	
CHROMIUM (Cr)	
GOLD (Au)	
LEAD (Pb)	1.11
LITHIUM (Li)	
MANGANESE (Mn)	
MERCURY (Hg)	0.02
MOLYBDENUM (Mo)	
NICKEL (Ni)	
SELENIUM (Se)	
SILVER (Ag)	
THALLIUM (Tl)	
VANADIUM (V)	
ZINC (Zn)	

ID COMPONENTS	
Manganese Oxide	0.01
Barium Oxide	0.47
Strontium Oxide	0.26

FOULING FACTOR	
SLAGGING FACTOR	
CHLORINE	170
FLUORINE	26.25
BROMINE	