Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

October 30, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. W. Jeffrey Pardue, Director
Environmental Services Department
Florida Power Corporation
Post Office Box 14042, MAC BB1A
St. Petersburg, Florida 33733-4042

Re: DEP File No. 01740004-004-AV
Crystal River Units 1, 2, 4, and 5
Coal Fines Briquettes

Dear Mr. Pardue:

Following receipt of your letter of September 28, 1998, we verbally requested additional information related to the briquettes that FPC intends to burn at the Crystal River coal-fired units. This information includes P.E. certification that there will not be an increase in emissions, the binder (oil) analysis, and a statement that there will be no equipment or operational changes.

On October 20, the matter was discussed at greater length. Following are our additional comments:

1. Our information on the sulfur content of 'Bunker C' indicates that the maximum specification for international maritime use is 5 percent (%). A typical maximum content per the Combustion Engineering book is 2.8%.
2. A simple calculation indicates that the typical sulfur concentration of the briquettes will be 1.176% compared with 1.09% (per your letter) for the typical bulk coal used in Crystal River Units 1 and 2. When burning 20% briquettes, the bulk sulfur concentration of the fuel burned will be approximately 1.107%. This assumes that the briquettes include 5% of Bunker C (at 2.8% sulfur).
3. The small increase in sulfur concentration is equal to an annual increase of approximately 650 tons of sulfur dioxide (SO_2) per year from Crystal River Units 1 and 2 combined. This assumes that the plants actually burn roughly 2,000,000 tons per year of coal combined.
4. A similar estimate for Units 4 and 5, assuming they burn 4,000,000 tons per year of coal (combined) indicates an increase of about 1,600 tons per year of SO_2 when burning a stream of 20% briquettes.

5. Please obtain from the supplier a more accurate estimate of the average sulfur content of the Bunker C to be used in making the briquettes as well as a better estimate of the amount of Bunker C actually required to bind the fines.
6. It is possible that by using less Bunker C of a somewhat lower sulfur concentration, that emissions increases can be minimized.
7. In the case of Crystal River 1 and 2, it would appear to be simple, and fairly inexpensive, to add enough of the lower sulfur (Unit 4 and 5) coal to compensate for the increases from the briquettes. It may also be possible to burn enough of the Unit 4 and 5 coal in Units 1 and 2 to compensate for all of the increase in SO_2 from the briquettes used in all units.
8. It may be possible to inject a small amount of lime into the ducts to offset the increase.
9. There could be other potential binders locally available, such as coal tar or pitch, which may (or may not) have a lower sulfur concentration than the available Bunker C. Obviously, the quantities would need to be small and the leaching characteristics (compared to the coal) known.

Attached is a list of recent awards by the Department of Energy for projects similar to the one planned by FPC. The use of the fines can help ameliorate a water pollution problem in coal mining areas. We expect to receive various papers from DOE shortly and will share them with you. We believe that the increase in emissions can be minimized by obtaining more detailed information from the briquette supplier and by considering a few available options that are probably cost-effective. The above information will allow us to determine if any applications are required.

If you have any questions regarding this matter, please call me, Scott Sheplak, or Al Linero at (850)488-0114.

Sincerely,

, P.E. P/S 0

for C. H. Fancy, P.E., Chief
Bureau of Air Regulation

CHF/aal

Enclosures

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Mr. W. Jeffrey Pardue, Director
Environmental Services Dept.
Florida Power Corporation
P. O. Box 14042, MAC BBIA
Saint Petersburg, FL 33733-4042

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Environmental Services Dept.
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PS Form **3800**, April 1995

U.S. Department of Energy

DOE Fossil Energy TECHLINE

Issued on August 12, 1998

DOE Selects R&D Projects to Study Advanced Concepts For Producing Clean Fuels and Feedstocks from Coal

Discarded Coal, Biomass/Solid Wastes Offer Future Fuel Sources; Research Also Focusing on Air Toxics Removal

For decades the brackish impoundments at many of the nation's coal cleaning plants have been treated as their name implies — as coal *waste* ponds. Similarly, most of the 20 million tons of plastics, 250 million rubber tires, and 33 million barrels of waste oil Americans discard each year are left to degrade in landfills or other disposal sites.

But to the Department of Energy's Office of Fossil Energy and several of the nine winning proposers selected this week in the department's *"Solid Fuels and Feedstocks Grand Challenges* " competition, these discarded wastes offer potentially huge, largely untapped sources of clean, affordable energy.

Four of the projects announced today propose innovative methods for recovering useable fuels from materials that otherwise would be discarded at coal cleaning plants or utility power stations. Another four will develop technologies that combine coal and biomass or municipal solid waste into clean-burning fuels. The ninth will study a method for removing mercury from coal before it is burned, preventing the mercury from being released to form a hazardous air pollutant.

The department's Federal Energy Technology Center in Pittsburgh, PA, and Morgantown, WV, ran the competition. The nine projects were selected from 30 that submitted proposals. Once contracts are negotiated and awarded, the winning proposers will begin the initial phase of a two-phase research and development program.

Initially, the proposed concepts will be developed at laboratory scales in projects lasting up to 18 months. The department will provide $300,000 to $500,000 for each initial award, and the selected proposer must match at least 20 percent of the federal funding.

Proposers selected for the second phase will receive federal support to scale up and test their technologies in a "proof-of-concept" integrated facility. Energy Department awards for the second phase could range from $500,000 to $1 million for up to three years, and the private sector cost-sharing must meet or exceed the government's share.

Recovering Carbon from Coal Wastes

An estimated 2 to 3 billion tons of coal "fines" — microscopic coal particles — lie in waste impoundments at coal mines and washing plants around the country. This discarded "waste" contains the energy equivalent of 8 to 12 billion barrels of oil, comparable to a "super giant" oil field. Moreover, each year, mining operations dispose of as much as 30 million tons of coal as waste, and utilities discard millions of tons of unburned carbon along with fly ash in power plant landfills.

Four of the projects announced today by the Department of Energy will develop advanced technologies to recover useable fuels from these waste products:

- **Pennsylvania State University**, University Park, PA
  Ultrasonically-Enhanced Dense-Medium Cycloning for Fine Coal and Coal Refuse Impoundment Materials
  Contact: Dr. Mark S. Klima, Associate Professor of Mineral Processing, (814)863-7942

  This project will investigate the application of ultrasonic energy to scrub clays from the surfaces of particles and increase particle dispersion both for the improved cleaning and recovery of coal from waste ponds using dense-medium (magnetite) cycloning and the improved performance of the dense-medium recovery systems. Magnetite (an iron ore) is used to create a heavy liquid to facilitate density-based separations.

- **Southern Illinois University**, Carbondale, IL
  Development and Demonstration of Integrated Carbon Recovery Systems from Fine Coal Processing Waste
  Program Manager: R.Q. Honaker, Associate Professor
  Contact: John S. Jackson III (618)453-4534

  This project is to develop a suite of new/improved density-based and surface-based fine-coal cleaning devices and fine-coal dewatering techniques to improve the recovery, economics, and marketing of fine coal that is either currently being rejected from continuing operations or was previously wasted to coal impoundments.

- **Virginia Polytechnic Institute and State University**, Blacksburg, VA
  Advanced Carbon Recovery/Dewatering Systems Development
  Project Director: Roe-Hoan Yoon
  Contact: Tom Hurd (540)231-5281

  This project will investigate a number of innovative fine-coal dewatering technologies to improve the ability to handle and market economical fine coal recovery and utilization systems. These technologies under development will be applicable to fines recovered from both coal ponds and existing production.

- **University of Kentucky Research Foundation**, Lexington, KY
  A Technology for the Recovery of High Quality Fuel and Adsorbent Carbons from Coal Burning Utility Ash Ponds and Landfills
  Contact: Penny Allen (606)257-9424

  This project is aimed at developing water-based processes to recover carbon from power plant fly ash for use either as a fuel for refiring at the utility or as a high-quality carbon adsorbent. The technology also produces a high-quality, salable fly ash from previously unmarketable material.

Combining Coal with Biomass/Waste

"Biofuels" — a diverse group of energy sources ranging from wood and agribusiness wastes to fast-growing "energy crops" — have long been used to generate steam and electricity for industrial factories and processing plants. Recently, however, utilities and other power generators have become interested in co-firing these fuels with coal to reduce fuel costs and lower greenhouse gas emissions. (When biomass is burned as fuel, its carbon is recycled back into the atmosphere at roughly the same rate at which the original plant material removed it; thus biomass makes little, if any, net contribution to the pool of carbon dioxide in the air.)

Also, nearly half of all the landfill materials (municipal and animal waste, plastics, rubber, etc.) discarded in the United States potentially have some energy value; yet, only a small portion is recycled. For example only 8 million of the 33 million barrels of waste oil disposed of each year is reused. Likewise, less than half of the 250 million rubber tires Americans discard each year are recycled.

Four of the selected proposers will focus on technologies that mix these biomass or waste products with coal to form low-cost, clean-burning fuels:

- **Altex Technologies Corporation**, Santa Clara, CA
  A Low-Cost and High-Quality Solid Fuel from Biomass and Coal Fines
  Contact: Mehdi Namazian (408)982-2303

  This project is for the development of an integrated dewatering and extrusion device for pelletizing biomass and coal using sewage sludge as a binder and sealer. The resultant pellets are weather-proof and have superior transportability characteristics.

- **CQ Inc.**, Homer City, PA
  Production of New Biomass/Waste-Containing Solid Fuels
  Contact: David J. Akers, Vice President (724)479-3503

  This project is for the development of a novel die for pellet mills that facilitates the removal of excess moisture from various feeds to produce strong, weather-proof, and transportable composite fuels consisting of different combinations of biomass, waste, and coal. The technology is an extension of the commercially-applied E-Fuel technology developed by the proposer.

- **University of Missouri**, Columbia, MO
  Compacting Biomass and Municipal Solid Wastes to Form an Upgraded Fuel
  Contact: Richard Otto (573)882-7560

  This project is for the development of a rotary press for dewatering and compacting biomass into logs for various types of combustion applications. The technology is an adaptation of the coal log technology developed by the proposer.

- **McDermott Technology, Inc.**, Alliance, OH
  New Solid Fuels from Coal and Biomass Waste
  Program Manager: Hamid Farzan
  Contact: Karl W. Boettger (330)829-7430

  This project is for the development of a technology for the drying and pelletizing of municipal sewage sludge and paper sludge both with and without the addition of coal to produce pellets for co-firing in a cyclone boiler. Any toxics present in the sludges become encased in the slag produced by the cyclone boiler.

Removing Air Toxic Impurities

The Environmental Protection Agency is in the final stages of gathering information to determine whether mercury emissions from power plants should be regulated. Mercury is one of more than one hundred substances classified as a "hazardous air pollutant." In coal, mercury exists in trace amounts within the carbon latticework that makes up coal's complex structure. When the coal is burned, mercury is converted to gaseous form which may be much more difficult to capture. Removing it prior to combustion, therefore, may be the most cost-effective approach if future controls are mandated.

The ninth project selected by the Energy Department will develop an innovative approach to remove mercury from coal before it is burned:

- **EXPORTech Company, Inc.**, New Kensington, PA
  Removal of Selected Hazardous Air Pollutant Precursors by Dry Magnetic Separation
  Contact: Robin F. Oder (724) 337-4415

  This project proposes to develop a technology for the pre-combustion removal of mercury from coal using dry magnetic separation on pulverizer recycle streams at pulverized-coal power plants. The process is applicable to both cleaned and uncleaned coals and removes mercury via its association with pyrite that is liberated during the pulverization process.

Projects Reflect a Redirection of DOE's Coal Preparation R&D

The nine projects selected for negotiations represent a new direction for the coal preparation research historically carried out by the Federal Energy Technology Center, the coal research arm of the Energy Department's fossil energy program. The past program was oriented largely on developing improved coal cleaning technologies to remove potential pollutants from coal. While pollutant removal is still a key part of the effort, the new program has been renamed the "Solid Fuels and Feedstocks Program" to reflect its expanded research role in biomass/waste coprocessing, premium carbon products from coal, and the production of tailored feedstocks for industrial processes, residential use, chemicals, and transportation fuels.

-- End of *TechLine* --

For more information, contact:

Hattie Wolfe, DOE Office of Fossil Energy, 202/586-6503, e-mail: hattie.wolfe@hq.doe.gov

Otis Mills, DOE Federal Energy Technology Center, 412/892-5890, e-mail: mills@fetc.doe.gov

Technical Contact: Carl Maronde, DOE Federal Energy Technology Center, 412/892-6246, e-mail: marond@fetc.doe.gov

Florida Power
CORPORATION

September 28, 1998

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

Dear Mr. Fancy:

Re: Coal "Briquettes" Fuel

As you discussed with Mike Kennedy last week, Florida Power Corporation (FPC) has been approached by its fuel supplier, Electric Fuels Corporation, concerning the possibility of burning "coal briquettes" at its Crystal River plant. The briquettes are produced from coal fines at the mines that currently supply the coal for Crystal River Units 1, 2, 4, and 5. Coal fines are combined under heat and pressure with a small amount of oil (maximum of 5% Bunker C oil) at the mine. The oil is the binding agent for the coal fines. Subjecting the coal fines to heat and pressure removes moisture and produces the coal briquettes, which are small chunks of coal that can be handled and burned with the regular coal supply.

Attachment 1 contains laboratory analyses of the coal supply for Units 1 and 2 and of an 80%/20% blend of coal and coal briquettes. The coal analysis represents the average coal delivered in 1997. Attachment 2 contains the same comparison for the low-sulfur fuel that is burned in Units 4 and 5. Note that since the briquettes are produced from the same coal supply as that being burned in the Crystal River units, the analyses are virtually identical. Therefore, burning the coal briquettes in Crystal River Units 1, 2, 4, and 5 will not result in an increase in air pollutant emissions.

As discussed in your meeting with Mr. Kennedy, since the Crystal River units are currently permitted to burn coal, oil, and used oil, and the coal briquettes are produced from coal fines at the mine from the same coal supply, FPC requests that the DEP add "coal briquettes" to the list of fuels authorized to be burned in units 1, 2, 4, and 5. Please contact Mike Kennedy at (727) 826-4334 if you have any questions.

Sincerely,

W. Jeffrey Pardue, C.E.P.
Director, Environmental Services
FPC Responsible Official

ONE POWER PLAZA, 263 - 13th Avenue South, BB1A, St. Petersburg, FL 33701-5511 •
P.O. Box 14042, BB1A • St. Petersburg • Florida 33733-4042 • (727) 866-5151
A Florida Progress Company

Attachment 1

Units 1 and 2 Fuel Supply Analysis

Electric
Fuels
Corporation

Coal Analysis Report - Steam Coal

Electric Fuels Corporation

September 1998

Typical FPC "A" Quality
(Based on 1997 Deliveries)

Proximate Analysis

	As Received	Dry Basis
Moisture, %	6.56	***
Ash, %	8.49	9.09
Volatile Matter, %	35.43	37.92
Fixed Carbon, %	49.52	52.99
Sulfur, %	1.09	1.17
Btu/lb.	12691	13582
MAF Btu	14940	
SO2/MBtu	1.72	

Ultimate Analysis

	As Received	Dry Basis
Carbon, %	71.11	76.10
Hydrogen, %	4.72	5.05
Nitrogen, %	1.35	1.45
Oxygen, %	6.68	7.14
Chlorine, %	0.11	0.12

Sulfur Forms

	As Received	Dry Basis
Sulfate	0.01	0.01
Pyritic	0.41	0.45
Organic	0.67	0.71

Mineral Ash Analysis

	Ignited Basis
SiO2	52.70
Al2O3	29.00
Fe2O3	9.20
MgO	1.10
CaO	1.80
K2O	2.10
Na2O	0.45
TiO2	1.30
P2O5	0.30
SO3	1.30
Undetermined	0.75
Base/Acid Ratio	0.18
Slagging Index	0.21
Fouling Index	0.08
Silica Value	81.33
T250 Temperature	2875

Ash Fusion Temperatures

Degrees Fahrenheit

	Reducing	Oxidizing
Initial Deformation	2610	2700 +
Softening	2690	2700 +
Hemispherical	2700 +	2700 +
Fluid	2700 +	2700 +

Hardgrove Grindability Index 43

This analysis is for informational purposes only and is not intended to represent contractual guarantees.

Analyses provided are typical average values.

Electric
Fuels
Corporation

Coal Analysis Report - Steam Coal

Electric Fuels Corporation

September 1998

Proprosed "A" Quality
(Based on 1997 Quality blended including 200,000 of coal briquettes)

Proximate Analysis

	As Received	Dry Basis
Moisture, %	6.55	***
Ash, %	8.48	9.07
Volatile Matter, %	35.48	37.97
Fixed Carbon, %	49.48	52.96
Sulfur, %	1.09	1.17
Btu/lb.	12696	13586
MAF Btu	14941	
SO2/MBtu	1.72	

Ultimate Analysis

	As Received	Dry Basis
Carbon, %	71.12	76.11
Hydrogen, %	4.72	5.06
Nitrogen, %	1.35	1.45
Oxygen, %	6.68	7.14
Chlorine, %	0.11	0.12

Sulfur Forms

	As Received	Dry Basis
Sulfate	0.01	0.01
Pyritic	0.41	0.45
Organic	0.67	0.71

Mineral Ash Analysis

	Ignited Basis
SiO2	52.71
Al2O3	29.01
Fe2O3	9.20
MgO	1.10
CaO	1.80
K2O	2.10
Na2O	0.45
TiO2	1.30
P2O5	0.30
SO3	1.30
Undetermined	0.73
Base/Acid Ratio	0.18
Slagging Index	0.21
Fouling Index	0.08
Silica Value	81.33
T250 Temperature	2878

Ash Fusion Temperatures

Degrees Fahrenheit

	Reducing	Oxidizing
Initial Deformation	2610	2700 +
Softening	2690	2700 +
Hemispherical	2700 +	2700 +
Fluid	2700 +	2700 +

Hardgrove Grindability Index 43

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Analyses provided are typical average values.

Attachment 2

Units 4 and 5 Fuel Supply Analysis

Electric
Fuels
Corporation

Coal Analysis Report - Steam Coal

Electric Fuels Corporation

September 1998

Typical FPC "D" Quality
(Based on 1997 Deliveries)

Proximate Analysis

	As Received	Dry Basis
Moisture, %	7.78	***
Ash, %	9.17	9.94
Volatile Matter, %	33.09	35.88
Fixed Carbon, %	49.96	54.18
Sulfur, %	0.68	0.74
Btu/lb.	12430	13479
MAF Btu	14966	
SO2/MBtu	1.09	

Ultimate Analysis

	As Received	Dry Basis
Carbon, %	69.90	75.80
Hydrogen, %	4.61	5.00
Nitrogen, %	1.34	1.45
Oxygen, %	6.52	7.07
Chlorine, %	0.11	0.12

Sulfur Forms

	As Received	Dry Basis
Sulfate	0.01	0.01
Pyritic	0.11	0.12
Organic	0.56	0.61

Mineral Ash Analysis

	Ignited Basis
SiO2	56.50
Al2O3	28.60
Fe2O3	5.40
MgO	1.20
CaO	1.80
K2O	2.20
Na2O	0.45
TiO2	1.40
P2O5	0.30
SO3	1.40
Undetermined	0.75
Base/Acid Ratio	0.13
Slagging Index	0.09
Fouling Index	0.06
Silica Value	87.06
T250 Temperature	2950

Ash Fusion Temperatures

Degrees Fahrenheit

	Reducing	Oxidizing
Initial Deformation	2690	2700 +
Softening	2700 +	2700 +
Hemispherical	2700 +	2700 +
Fluid	2700 +	2700 +

Hardgrove Grindability Index 42

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Electric
Fuels
Corporation

Coal Analysis Report - Steam Coal

Electric Fuels Corporation

September 1998

Proposed FPC "D" Quality
(Based on 1997 Deliveries including 400,000 tons of coal briquettes)

Proximate Analysis

	As Received	Dry Basis
Moisture, %	7.77	***
Ash, %	9.16	9.93
Volatile Matter, %	33.14	35.93
Fixed Carbon, %	49.93	54.14
Sulfur, %	0.68	0.74
Btu/lb.	12435	13483
MAF Btu	14969	
SO2/MBtu	1.09	

Ultimate Analysis

	As Received	Dry Basis
Carbon, %	69.92	75.81
Hydrogen, %	4.62	5.01
Nitrogen, %	1.34	1.45
Oxygen, %	6.51	7.06
Chlorine, %	0.11	0.12

Sulfur Forms

	As Received	Dry Basis
Sulfate	0.01	0.01
Pyritic	0.11	0.12
Organic	0.56	0.61

Mineral Ash Analysis

	Ignited Basis
SiO2	56.51
Al2O3	28.60
Fe2O3	5.40
MgO	1.20
CaO	1.80
K2O	2.20
Na2O	0.45
TiO2	1.40
P2O5	0.30
SO3	1.40
Undetermined	0.74
Base/Acid Ratio	0.13
Slagging Index	0.09
Fouling Index	0.06
Silica Value	87.06
T250 Temperature	2950

Ash Fusion Temperatures

Degrees Fahrenheit

	Reducing	Oxidizing
Initial Deformation	2690	2700 +
Softening	2700 +	2700 +
Hemispherical	2700 +	2700 +
Fluid	2700 +	2700 +

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