

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of:

PETITION FOR AUTHORIZATION TO
CONDUCT TESTING AND RESEARCH;
PREVENTION OF SIGNIFICANT
DETERIORATION APPLICATION

PROPOSED FINAL ORDER

This hearing was held before the undersigned, pursuant to Chapters 120 and 403, Florida Statutes, Chapters 17-1, 17-2, and 28-5, Florida Administrative Code, Section 110(a) of the Clean Air Act of 1977, 42 U.S.C. 7401, et seq., and 40 C.F.R. Parts 51 and 52, to consider the Petition for Authorization to Conduct Testing and Research filed on April 3, 1990, by Florida Power & Light Company (Petitioner). The Petition was supplemented on May 22, 1990, with an Application for Prevention of Significant Deterioration (PSD) Permit. Timely notice of the hearing for both the Petition for Authorization to Conduct Testing and Research and the Application for PSD Permit was published in newspapers of general circulation in the state of Florida and in the Florida Administrative Weekly (Composite Exhibit A).

The hearing was held in DeBary, Florida, on September 6, 1990. The following parties entered appearances and participated in the proceedings through their counsel:

(1) Florida Power & Light Company (FPL) and (2) Florida Department of Environmental Regulation (DER).

Petitioner sought authorization to temporarily exceed limitations of the State Implementation Plan (SIP), Chapter 17-2, Florida Administrative Code, and Sanford Unit No. 4 air operating permit, Exhibit B, in order to allow Petitioner to conduct a test burn of Orimulsion for 120 full-power burn days equivalent. Petitioner sought an 18-month test period beginning with the date that Orimulsion burning commences. Eighteen months could be necessary to ensure that 120 full-power burn days equivalent. (90 plus an additional 30, if needed) can be completed, taking into account the intermittent nature of testing, system constraints, and operational problems. In particular, relief was sought from limitations on sulfur dioxide, steady-state particulate matter and opacity emissions, sulfur dioxide emissions, and particulate matter and opacity excess emissions during boiler cleaning and load changes.

Petitioner alleged entitlement to the relief sought, pursuant to Section 403.061(18), Florida Statutes, which empowers DER to "[e]ncourage and conduct studies, investigations, and research relating to pollution and its causes, prevention, abatement and control," and Rule 17-103.120, Florida Administrative Code, which empowers the Secretary to issue an order authorizing testing, demonstration, or research programs as a temporary source of air pollution.

Having considered all testimony and properly admitted evidence, and having heard arguments of counsel, the following Findings of Fact, Conclusions of Law, and Final Order are entered:

FINDINGS OF FACT

[Petitioner expects to prove the following at the hearing in this matter.]

Need for the Orimulsion Test

1. As recently as early 1979, Petitioner, the state's largest electric generating utility, relied upon residual oil to meet 55% of its customer's electrical demands. Extreme shortages of high quality oil were being experienced at that time and necessitated emergency relief under Florida law and the federal Clean Air Act in order to allow Petitioner to combust available fuel. Following the oil supply curtailments, FPL, at its own initiative and with encouragement from the Florida Public Service Commission (PSC), commenced a continuing investigation of fuel base expansion opportunities with the goal of incorporating alternate fuels in general, and coal-based fuels in particular, into its fuel base.

2. Since 1980, Petitioner has been able to negotiate power contracts with the Southern Companies to purchase coal-based energy "by wire" (transmission) from outside Florida. Petitioner has also become a joint owner with the Jacksonville Electric Authority (JEA) in a new coal-fired

power plant.

3. Petitioner's electrical generating system consists of thirteen power plants with a total net installed generating capability of approximately 14,000 MW. Nine of the larger fossil fuel-fired steam generating units have a nominal capacity of 400 MW and utilize a standard front-wall fired design boiler. The four largest and newest fossil units in the system have nominally 800 MW capacities and utilize Foster Wheeler boilers that are essentially scaled up versions of the 400 MW design.

4. Petitioner has investigated several fuel alternatives over the past decade including coal-water mixtures, coal-water slurries, and proposals to construct a coal-fired power plant in the Bahamas with transmission to Florida via undersea power cables. Of special relevance to the current proposal, Petitioner also successfully conducted a test burn of a coal-oil mixture (COM) at the Sanford Power Plant Unit No. 4 in 1980-1981. Although the COM test was successful from an engineering point of view the approximately 60% residual oil content of the fuel precluded favorable economics which could justify the capital commitment for pollution reduction and other equipment necessary for permanent conversion to COM.

5. Petitioner has also investigated the potential use of emulsified oils at its units. Petitioner's interest in petroleum-based emulsion fuels dates back to 1985 when members of its Research and Development Department began

their study of heavy oil residuals emulsified into water. In 1986, Petitioner co-funded a full-scale, single-burner combustion test of an emulsified fuel using a prototype "library" reference copy of the burners that are installed in Petitioner's 400 MW boiler units.

6. Over the past few years, an emulsified fuel produced from a naturally occurring bitumen found in the Venezuelan Orinoco River basin has become available. This fuel, with the trade name "Orimulsion," is produced when bitumen is recovered using conventional tertiary recovery techniques, is degassed and desalted, and then emulsified into fresh water with the aid of a surfactant additive. The resulting emulsified fuel -- Orimulsion -- has proven to be remarkably stable and exhibits excellent combustion characteristics. Orimulsion is presently under serious consideration as a boiler fuel in several countries, including the United States. The bitumen reserves in the Orinoco area are estimated to be great enough to maintain an annual production level equivalent to 200 million tons of coal for over 300 years. Thus, if proven to be of commercial value as a boiler fuel, Orimulsion could substantially increase Florida's (and the nation's) readily available energy supply.

7. In 1987, the Venezuelan government sponsored Orimulsion combustion tests in England using the same reference burner employed in the earlier FPL emulsion test burn work. Results from these large-scale, single-burner

tests have consistently confirmed high combustion efficiencies -- that is, low unburned carbon and CO levels with low excess air requirements. Following successful completion of these single-burner tests, the Venezuelans began a full-scale Orimulsion demonstration project in a 100 MW coal-fired unit at the Dalhousie Power Plant in New Brunswick, Canada. The Canadian boiler tested has a corner-fired burner design. The early results from the Canadian tests are now available and have been utilized by Petitioner to estimate potential emissions that could result if Orimulsion were burned in the Sanford Unit No. 4.

8. The Venezuelan government strategy is to market Orimulsion fuel at coal-comparable prices rather than the much more costly liquid fuel prices. This strategy promises tremendous economic benefits to FPL's customers and the State if the fuel performs well from an operational and environmental viewpoint. Potential fuel-cost savings could reach hundreds of millions of dollars over the life of a single 400 MW unit which is switched from residual oil to Orimulsion fuel.

9. While the Canadian test data are encouraging, the design differences between the 100 MW corner-fired, coal-burning unit in Canada and FPL's standard 400 MW front-wall fired, multiple-fuel capable generating units are sufficient to necessitate additional testing. Furthermore, information is lacking on the performance of available flue gas desulfurization technologies for removing gasses from oil

flames or flames from emulsified products such as Orimulsion. Thus, performance information must be generated through a demonstration test burn in order to enable proper design and sizing of necessary sulfur dioxide control equipment such as spray dryers and particulate control systems such as baghouses or precipitators.

10. A successful demonstration test burn of Orimulsion at an FPL unit is expected to confirm several environmental benefits of the fuel. Because of the combined effects of more complete combustion and the addition of pollution control equipment that would ultimately be installed for the use of Orimulsion on a permanent basis, reductions of particulate matter, sulfur dioxide, opacity, and CO emissions appear to be achievable.

Test Location

11. Petitioner proposes to undertake a full-scale demonstration test burn of Orimulsion at Sanford Unit No. 4 to investigate the potential benefits of a permanent conversion in light of economic, operational, and environmental data to be collected from the test. Questions regarding boiler performance and the effectiveness and efficiency of available pollution control technologies must be answered to achieve this objective.

12. The proposed demonstration burn of Orimulsion at Sanford Unit No. 4 will include boiler performance research and testing of several types of pollution control modules which are designed to provide sufficient operational data to

allow full engineering scale-up. The Electric Power Research Institute will contract to carry out testing and analysis of some of the equipment for the project. The proposed test concept involves the testing of Sanford Unit No. 4 during 90 full-capacity burn days equivalent with a provision for 30 additional full-capacity equivalent burn days if unanticipated problems develop within a maximum one and one-half year time frame. The proposed test duration is based partially upon the experience in the Canadian testing and the previous COM test burn at Sanford Unit No. 4.

13. The Sanford Plant, located approximately 25 miles northeast of Orlando, has been selected for the full-scale test demonstration because of its multiple-fuel capability and standardized design. This unit was utilized for the previous COM test and experienced operators and necessary equipment are available at the site to facilitate the test program. Also, in the event that the test procedure would decrease the unit's availability to the generating network, the Sanford Plant is located in a more independent position than other plants in Petitioner's system which are near major electrical load centers.

Projected Impacts of the Test

14. On the basis of earlier test work, including the Canadian test, it is estimated that emission from Sanford Unit No. 4 during the test burn would exceed currently permitted levels for sulfur dioxide, particulate matter, and opacity. In particular, Petitioner is seeking approval

during the test burn of the following emission limitations:

- (a) Sulfur dioxide - 4.3 lb/mm Btu heat input;
- (b) Suspended particulate matter - 0.3 lb/mm Btu heat input (steady state) and 0.6 lb/mm Btu heat input (excess emission up to three hours per day); and,
- (c) Steady State Opacity - 60%; Excess Emissions Opacity - 100%.

During the test period, Petitioner has committed to burn lower sulfur fuel (1% or less) at Sanford Units No. 3 and 5 in order to partially offset the increased emissions projected for Sanford Unit No. 4.

15. The projected cost savings to Florida citizens will be major if Orimulsion turns out to be a viable fuel alternative. A successful test is expected to confirm that these economic benefits can be realized concurrently with a reduction in present emission levels of major air pollutants, thereby resulting in environmental benefits as well if full conversion is implemented. The Orimulsion test burn also constitutes an important step in developing a strategy to allow Petitioner (and potentially other Florida electric utilities) to broaden its fuel base thereby reducing its dependence on oil, natural gas, and nuclear fuels.

CONCLUSIONS OF LAW

16. The hearing in this matter was held pursuant to Section 403.061(18), Florida Statutes, and Rules 17-103.120 and 17-2.500, Florida Administrative Code, to consider the Petition for authorization to Conduct Testing and Research

Prevention of Significant Deterioration application.

17. Reasonable notice of the hearing was given to all persons and parties entitled thereto and the general public; the notice requirements for State Implementation Plan revisions set forth in Section 110 of the Clean Air Act, and regulations promulgated thereunder, were met.

18. The record of the hearing consists of all pleadings and papers filed herein, the transcript of the hearing, and all evidence and exhibits entered into the record by document or official recognition.

19. The purpose of the hearing was to receive testimony and evidence to determine whether Petitioner is entitled by Section 403.061(18), Florida Statutes, and Rule 17-103.120, Florida Administrative Code, for temporary relief from the requirements of the SIP, Chapter 17-2, Florida Administrative Code, and Sanford Unit No. 4 Air Operating Permit.

20. Based on competent, substantial evidence of record, it is concluded that the Orimulsion test will confirm several environmental benefits, including but not limited to, a potential reduction in pollutant emissions through more complete combustion and the addition of pollution control equipment if full conversion is implemented.

21. The grant of increased particulate matter, sulfur dioxide, and opacity limitations during the Orimulsion test is necessary for the test to go forward.

22. The grant of relief herein will not jeopardize compliance with state and federal ambient air quality standards and applicable PSD increments. There are no standards of performance for new sources contained in 40 C.F.R. Part 60 or National Emissions Standards for Hazardous Air Pollutants contained in 40 C.F.R. Part 61 which apply to the facility. Additionally, because the Orimulsion fuel is substantially similar to residual fuel oil such that Sanford Unit #4 can accommodate its combustion under its original design, the Environmental Protection Agency has determined that the proposed test will not trigger the application of NSPS to boiler emissions. Because the boiler is designed to accommodate Orimulsion, there is no requirement that Best Available Control Technology (BACT) be applied to the boiler. Lastly, the program will not interfere with attainment of ambient air quality standards in non-attainment areas.

ORDER

23. Having reviewed the record of this proceeding, and based upon the Findings of Fact and Conclusions of Law set forth herein, it is hereby:

ORDERED that,

A. Petitioner is authorized pursuant to Section 403.061(18), Florida Statutes, and Rule 17-103.120, Florida Administrative Code, to temporarily exceed the following

limitations of the SIP, Chapter 17-2, Florida Administrative Code, and Sanford Unit No. 4 air operating permit:

- (1) SIP Limitations:
 - (a) Sulfur dioxide emission limitation - 2.75 lb/mm Btu heat input;
 - (b) Steady state opacity emission limitation - 40% (#2 on Ringleman Chart);
 - (c) Excess opacity emissions during boiler cleaning (soot blowing) and load changes - 60% (#3 on Ringleman Chart);
- (2) Chapter 17-2, F.A.C., emission limitation:
 - (a) Sulfur dioxide - 2.75 lb/mm Btu heat input;
 - (b) Steady state particulate matter emissions - 0.1 lb/mm Btu heat input;
 - (c) Excess particulate matter emissions during boiler cleaning (soot blowing), and load changes - 0.3 lb/mm Btu heat input average during the three-hour period of excess emissions in any 24-hour period.
- (3) Air Operating Permit No. A064-132055 reflecting above limits.

B. The grant of this relief shall begin on the date that Orimulsion is first burned at Sanford Unit No. 4 and shall end when Orimulsion has been burned 120 full-power burn days equivalent.

C. Rule 17-103.120 provides that the Department may "authorize the construction or operation of a temporary source of pollution subject to ... any other requirement different from that established by rule, permit or certification condition, or Department Order."

D. When burning Orimulsion, the Petitioner shall comply with the following interim stack emission limitations:

- (1) Sulfur dioxide emissions - 4.3 lb/mm Btu heat input;
- (2) Steady state particulate emissions - 0.3 lb/mm Btu heat input;
- (3) Steady state visible emissions - 60 opacity (#2 on Ringleman Chart);
- (4) Excess emissions -- 0.6 lb/mm Btu heat input of particulate matter, 24-hour average; less than or equal to 100% opacity.

E. Because of the limited data on Orimulsion emissions, Petitioner must reserve the right to modify its request for relief later in this proceeding or to subsequently seek additional relief, if justified by later developed data.

F. To verify compliance with the interim particulate matter limitations during Orimulsion testing, Petitioner shall conduct a compliance test no later than 14 days after Orimulsion burning begins.

G. Petitioner will accept a temporary 1% sulfur fuel oil use restriction at Units No. 3 and No. 5 in order to partially offset SO₂ emissions increases experienced at Unit No. 4 during the test burn. The temporary SO₂ emissions restriction at Units No. 3 and No. 5 during the test period shall not be considered to be a part of the SIP revision; such restriction shall not apply during any periods that Orimulsion burning is stopped for seven days or longer.

H. Petitioner shall collect any solid wastes generated by the Orimulsion-related test burn equipment and dispose of it off-site at a landfill approved by the Department.

I. The Department acknowledges the PSD permit which was granted on _____, 1990, a copy of which is attached as Exhibit C. The PSD permit gives Petitioner permission to construct the facility needed for the Orimulsion test. Construction under the permit may begin immediately. However, Petitioner may not exceed the emission limits of the current SIP until the SIP revision is approved by the U.S. Environmental Protection Agency.

J. Those portions of this Order which constitute a relaxation of the SIP shall be submitted to the Environmental Protection Agency pursuant to § 110 of the Clean Air Act.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

DALE H. TWACHTMANN, SECRETARY

DATED: _____

wrn:FPLpfo

**FLORIDA POWER & LIGHT COMPANY SANFORD UNIT NO. 3
TEMPORARY MODIFICATION OF PERMIT NO. AO64-131230**

AMENDMENT

Pursuant to the Final Order signed by the Secretary of the Department of Environmental Regulation on the ____ day of _____, 1990, the air operating permit for Florida Power & Light Company's (FPL) Sanford Unit No. 3, Permit No. AO64-131230, is temporarily modified as follows:

Specific Condition (2) for Permitted Fuels, which states that "[t]his source shall be fired with No. 6 Residual Oil, No. 2 Fuel Oil, Used Oil or Natural Gas only," shall be temporarily modified to restrict Unit No. 3 to burn Natural Gas, No. 2 Fuel Oil and/or No. 6 Fuel Oil with a maximum equivalent sulfur content (by weight) of one percent (1%). This restriction shall begin upon initial burning of Orimulsion in Sanford Unit No. 4 and shall remain in effect until FPL notifies the Department that the Orimulsion Test Burn has been completed; this restriction shall not apply during any periods that burning of Orimulsion is stopped for seven (7) days or longer.

DALE S. TWACHTMANN, Secretary
State of Florida Department
of Environmental Regulation

DATE:

FLORIDA POWER & LIGHT COMPANY SANFORD UNIT NO. 5
TEMPORARY MODIFICATION OF PERMIT NO. AO64-132060

Pursuant to the Final Order signed by the Secretary of the Department of Environmental Regulation on the _____ day of _____, 1990, the air operating permit for Florida Power & Light Company's (FPL) Sanford Unit No. 5, Permit No. AO64-132060, is temporarily modified as follows:

Specific Condition (2) for Permitted Fuels, which states that "[t]his source shall be fired with No. 6 Residual Oil, No. 2 Fuel Oil, Used Oil or Natural Gas only," shall be temporarily modified to restrict Unit No. 5 to burn Natural Gas, No. 2 Fuel Oil and/or No. 6 Fuel Oil with a maximum equivalent sulfur content (by weight) of one percent (1%). This restriction shall begin upon initial burning of Orimulsion in Sanford Unit No. 4 and shall remain in effect until FPL notifies the Department that the Orimulsion Test Burn has been completed; this restriction shall not apply during any periods that burning of Orimulsion is stopped for seven (7) days or longer.

DALE S. TWACHTMANN, Secretary
State of Florida Department
of Environmental Regulation

DATE:
