

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE MATTER OF:)
)
MODIFICATION OF PERMIT NOS.)
AC-64-180842 AND AO-64-132060,)
FLORIDA POWER & LIGHT COMPANY,)
SANFORD UNIT NOS. 4 AND 5,)
ORIMULSION TEST BURN.)
_____)

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REQUEST FOR MODIFICATION OF PERMIT CONDITIONS
AND ORDER AUTHORIZING RESEARCH AND TESTING

Florida Power & Light Company (FPL), the owner and operator of Sanford Unit Nos. 4 and 5 in Volusia County, Florida, hereby requests, pursuant to Rules 17-4.080(2) and 17-103.120, Florida Administrative Code, a minor modification of Permit Nos. AC-64-180842 and AO-64-132060 and related Order of the Florida Department of Environmental Regulation (Department) dated October 4, 1990, and shows that:

BACKGROUND

1. An Order authorizing research and testing and Permit No. AC-64-180842 were issued pursuant to a request submitted by FPL to allow the testing of a new fuel with a trade name of Orimulsion which required the temporary relaxation of the certain emission limits for sulfur dioxide, particulate matter, and opacity contained either in the State Implementation Plan (SIP), Chapter 17-2 of the Florida Administrative Code, or air operating permit AO-64-132055 for Sanford Unit No. 4. FPL filed its initial

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request on April 2, 1990, and followed that with an application for Prevention of Significant Deterioration preconstruction review on May 22, 1990.

2. In light of the situation in the Persian Gulf, it is clearly consistent with the public interest to authorize completion of the Orimulsion testing to determine whether it is a viable alternative fuel. FPL is a major consumer of fuel oil. Last year, FPL burned approximately 25 million barrels of fuel oil. In an effort to reduce its dependency on oil and to avoid problems associated with emergency fuel supply shortages as occurred in the 1970s -- the OPEC curtailment of 1974 and the Iran oil embargo of 1979 -- FPL has actively pursued alternative fuel sources. In 1980, FPL successfully tested a coal-oil mixture and has evaluated coal-water mixtures and emulsified fuels. Recently, FPL became aware of a liquid fuel, emulsified bitumen, available from Venezuela with the trade name Orimulsion, which is shipped, stored, handled, and burned like oil. It has been estimated that the reserves of this naturally occurring hydrocarbon may be the approximate equivalent of one-half of the present coal reserves in the United States or the approximate equivalent of one-half of the proven reserves of conventional crude oil in the Middle East or as much as the proven reserves in Saudi Arabia. In addition to the vast quantities of the fuel which are available, Orimulsion is being marketed at coal prices which are considerably less

than for fuel oil. Because this fuel has not yet been tested in the United States, the results of the test promise to benefit not only FPL and other Florida utilities, but also the entire nation.

3. Based upon the best available information from tests conducted outside of the United States, FPL requested specific interim particulate matter and sulfur dioxide mass emission limitations and the following limit for opacity: steady state - 60 percent; excess emissions - 100 percent.

4. After a duly noticed public hearing, the Department entered an Order authorizing the test burn for ninety (90) full-power burn days (up to 120 days if necessary and authorized by the Department). The Environmental Protection Agency (EPA) approved the SIP revision, and notice was published in the Federal Register. The test burn was authorized to begin on January 7, 1991. The Department's Order and Permit No. AC-64-180842 provided the following opacity limit for Unit No. 4 while burning Orimulsion:

Visible Emissions: Steady-state - 60% opacity;
Excess emissions, not to exceed 3 hours per 24-hour period, for soot-blowing, startup, shutdown and load changes - 100% opacity; Excess emissions, not to exceed 2 hours per 24-hour period, for malfunction - 100% opacity.

FPL began burning Orimulsion at Sanford Unit No. 4 on January 9, 1991.

HIGHER OPACITIES DURING ORIMULSION BURN

5. The opacity levels observed under optimum boiler conditions are higher than were projected on the basis of the limited test data available. (See Exhibit 1.) FPL has exerted best efforts to identify the causes of these higher opacity emissions and to make all available operational adjustments to minimize opacity emissions. (See Exhibit 2.) As part of its analysis, FPL examined opacity emissions as a function of generating load. (See Exhibit 3.) The Orimulsion combustion process behaves abnormally in comparison with the process that is seen when residual oil is burned at the plant. For example, at loads near 150 MW, when excess air is minimized to achieve optimum combustion, boiler performance and pollution control equipment operation, opacity values unexpectedly increase rather than decrease, which is contrary to FPL's experience with other fossil fuels. This trend becomes more pronounced as loads are further increased. Consequently, opacity emissions cannot be controlled within the limits of Specific Condition 3(c) of the Department's permit for the test burn (No. AC-64-180842) throughout most of the load range, even though particulate matter emissions readily comply with permit limits.

6. As the public hearing record in this matter clearly demonstrated, it is essential that the unit operate during much of the test burn period at loads above 150 MW up to a

maximum load of 406 MW in order for the boiler and pollution control equipment to be adequately tested to provide information necessary for full conversion design. Although all of the pollution control test equipment has been installed onsite, the equipment cannot now be operated because of the unanticipated restrictions on generating load needed to comply with the current interim opacity limit.

7. In response to concerns raised by the Department's Central District Office about the accuracy of the opacity continuous emissions monitor (CEM), FPL has obtained reconfirmation that the CEM for opacity is properly calibrated and has submitted documentation to the District to support its position. (See Exhibit 4.) Specific Condition 6(c) of the test burn permit, No. AC-64-180842, provides that the compliance method for opacity is the opacity CEM with six-minute averages. Because the CEM has been properly calibrated and is accurately monitoring opacity, FPL believes that the CEM should continue to be used by the Department as the method of assuring compliance. Moreover, FPL notes that the use of Method 9 may be less accurate than the opacity CEM because of the unusually high amounts of steam which are associated with Orimulsion and which could create a positive bias in the results the visible emissions determined through Method 9.

COMPLIANCE WITH MASS LIMITATIONS

8. A particulate matter compliance test with EPA Method 17, taken on January 18, 1991, demonstrated that the particulate matter limits in the test burn permit and order are being met. A summary of this stack test is attached as Exhibit 5. The f-Factor used in calculating the particulate matter emissions is 9190, the same value as the approved f-Factor for residual oil. (See Exhibit 6 for more detail.) In response to a question raised by the Central District Office, a letter from Entropy Environmentalists, Inc., which addresses the efficiency of the filters used in the particulate matter stack tests, is attached as Exhibit 7.

9. Both the continuous emissions monitor (CEM) results for sulfur dioxide and a compliance stack test using EPA Method 6C show that the sulfur dioxide emissions generated while burning Orimulsion do not exceed the limit contained in the permit and order. (See Exhibits 8 and 9, respectively.) As is usually the case with residual oil combustion, the calculated (theoretical) sulfur dioxide emissions based on the sulfur content of the Orimulsion fuel have been marginally higher than the actual emissions determined by CEM readings and Method 6C stack test results. (The fuel analyses are attached as Exhibit 10.) The difference between the calculated and actual sulfur

dioxide emissions values is discussed in more detail in Exhibit 11.

RELIEF REQUESTED

10. As noted in the petition requesting authorization for the test burn, FPL recognized the potential need to seek further relief based upon later developed data. Indeed it appears that a minor modification to the Order and permit, and subsequently a minor revision of the SIP, must be requested to authorize a higher average opacity limit to allow the test burn to continue.

11. FPL hereby requests that the Department, consistent with Rules 17-103.120 and 17-4.080(2), Florida Administrative Code, temporarily increase the interim opacity limitations until May 31, 1991, by replacing Specific Condition 3(c) of Permit No. AC-64-180842 with the following:

Visible Emissions Through May 31, 1991: Steady-state - 80 percent; Excess emissions - 100 percent, not to exceed 5 hours per 24-hour period for soot-blowing, startup, shutdown, load changes, and malfunctions.

Visible Emissions Beginning June 1, 1991: Steady-state - 60% opacity; Excess emissions, not to exceed 3 hours per 24-hour period, for soot-blowing, startup, shutdown and load changes - 100% opacity; Excess emissions, not to exceed 2 hours per 24-hour period, for malfunction - 100% opacity.

12. FPL will continue to use the opacity CEMs for compliance and will submit, no later than five days following the end of the weekly reporting period, summaries of opacity results on a weekly basis to the Department. FPL

hereby requests the following modification to Specific Condition 8(e)(v) of Permit No. AC-64-180842:

- v. A weekly monthly summary of opacity readings, including a daily log of excess opacity emissions, to be submitted within 5 days following the end of the weekly reporting period, and

ADDITIONAL MITIGATION

13. Because FPL finds it necessary to request increased interim opacity limits, it is prepared to further mitigate the particulate matter, sulfur dioxide, and opacity emissions by foregoing operation of Sanford Unit No. 5 at such times as Orimulsion is burned at Unit No. 4 during the test burn period. The effect of not operating Unit No. 5 is to reduce the potential combined particulate matter, sulfur dioxide and opacity emissions from Units 4 and 5 by up to 26 percent, 20 percent, and 13 percent, respectively. This proposed mitigative modification to the permit will therefore substantially reduce the potential environmental consequences of the test which were previously reviewed by the Department and the Environmental Protection Agency after full public input.

14. FPL hereby requests the following temporary modification to Specific Condition 2 of Permit No. AO-64-132060 for Sanford Unit No. 5:

(2) Permitted Fuels:

This source shall only be fired with natural gas, No. 2 Fuel Oil and/or No. 6 Fuel Oil with equivalent sulfur content (by weight) of one percent (1%) or less. Prior to June 1, 1991, this unit shall not operate during such times as Orimulsion is combusted in Unit No. 4.

CONCLUSION

15. The requested temporary increase in the interim opacity emission limitation would constitute a "minor" modification of the permit because increases in mass emissions limitations are not being requested.

16. In light of the foregoing, FPL respectfully requests that this Request for Modification of Permit Conditions be processed as expeditiously as possible, and that the Order granting the modification be transmitted to the Environmental Protection Agency pursuant to Section 110 of the Clean Air Act and regulations thereunder.

Respectfully submitted this 15th day of February, 1991.

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