February 22, 1988

Docket Nos. 50-335
and 50-389

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Mr. C. O. Woody
Executive Vice President
Florida Power & Light Company
P.O. Box 14000
Juno Beach, Florida 33408

Dear Mr. Woody:

SUBJECT: ST. LUCIE UNITS 1 AND 2 - ENVIRONMENTAL ASSESSMENT REGARDING TRANSFER OF UNIT NO. 1 SPENT FUEL TO UNIT NO. 2 (TAC NOS. 61938 AND 61939)

Enclosed is a copy of the Environmental Assessment relating to your July 2, 1986 application to amend the St. Lucie Plant, Unit No. 2, Facility Operating License NPF-16, as supplemented by your letters dated February 6 and 9, March 2 and 27 and April 28, 1987. The operating license change would permit Unit No. 1 spent fuel to be relocated from the Unit No. 1 spent fuel pool to the Unit No. 2 spent fuel pool.

A copy of the Notice of Issuance of Environmental Assessment and Finding of No Significant Impact, which will be published in the Federal Register, is also enclosed.

Sincerely,

Original signed by

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Enclosures:
As stated

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 22, 1988

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Mr. C. O. Woody
Executive Vice President
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Sincerely,

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation

Enclosures:
As stated

cc w/enclosures:
See next page

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ENVIRONMENTAL ASSESSMENT

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO THE TRANSFER OF UNIT NO. 1 SPENT FUEL

BETWEEN UNITS NO. 1 AND 2 OF THE ST. LUCIE PLANT

FACILITY OPERATING LICENSE NOS. DPR-67 AND NPF-16

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NOS 1 AND 2

DOCKET NOS. 50-335 AND 50-389

Date: February 22, 1988

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I. INTRODUCTION

The United States Nuclear Regulatory Commission (the Commission or staff) is considering amending Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit No. 2, to permit Unit No. 1 spent fuel to be transferred from the Unit No. 1 spent fuel pool to the Unit No. 2 spent fuel pool. The St. Lucie Plant, Unit Nos. 1 and 2, is operated by the Florida Power and Light Company, et al. (the licensee), and is located in St. Lucie County, Florida.

II. IDENTIFICATION OF THE PROPOSED ACTION

Facility Operating License No. DPR-67 for the St. Lucie Plant, Unit No. 1, currently permits storage of Unit No. 1 spent fuel in the Unit No. 1 spent fuel pool located in Fuel Handling Building Number 1. Similarly, Facility Operating License No. NPF-16 for the St. Lucie Plant, Unit No. 2, currently permits storage of Unit No. 2 spent fuel in the Unit No. 2 spent fuel pool located in Fuel Handling Building Number 2.

The Unit No. 1 spent fuel pool has a maximum licensed capacity of 728 fuel assemblies. As a result of the Unit No. 1 refueling outage, completed in April 1987, there is no longer enough storage space in the pool to completely off-load the Unit No. 1 reactor core should the need arise. The next Unit No. 1 refueling outage is scheduled for the summer of 1988. Additional spent fuel assemblies will be added to the pool at that time, compounding the problem. By letter dated June 12, 1987, the licensee has proposed a license amendment to re-rack the Unit No. 1 spent fuel pool, which will increase the storage capacity of the pool significantly. The application is under review as a separate licensing action.

The Unit No. 2 spent fuel pool has a maximum licensed capacity of 1076 fuel assemblies. Since Unit No. 2 was licensed in 1983 and is currently in its fourth operational cycle, there is a considerable amount of excess capacity in the Unit No. 2 spent fuel pool at this time.

The Fuel Handling Buildings are approximately 300 feet apart. The spent fuel pools do not communicate with each other. In order to store Unit No. 1 spent fuel in the Unit No. 2 spent fuel pool, a fuel shipping cask would have to be used to transfer the spent fuel between the fuel pools. The licensee proposes to use an approved shipping cask that would be used to transfer one fuel assembly at a time from Unit No. 1 to Unit No. 2 should the need arise.

The licensee does not presently have the authority to transfer spent fuel between units and store Unit No. 1 fuel in the Unit No. 2 spent fuel pool. By application dated July 2, 1986, the licensee proposed to transfer Unit No. 1 spent fuel between units should additional storage capacity for Unit No. 1 fuel become necessary. The licensee's amendment application was supplemented by letters dated February 6 and 9, 1987, March 2 and 27, 1987, and April 28, 1987.

III. THE NEED FOR THE PROPOSED ACTION

The licensee does not have a full Unit 1 core off-load capability at this time, and the licensee's application for re-racking the Unit 1 pool is under review. If any unexpected event occurs at Unit No. 1 requiring the core to be off-loaded before the pool can be re-racked, there will be insufficient storage space in the Unit No. 1 spent fuel pool. Thus, the licensee would need to transfer some fuel from the Unit No. 1 spent fuel pool to the Unit No. 2 spent fuel pool.

The next refueling outage is scheduled for the summer of 1988. If the pool cannot be re-racked before this outage, the additional fuel stored as a result of the outage would physically preclude the re-racking because the licensee is not allowed to carry loads in excess of 2,000 pounds (e.g., a rack) over spent fuel. Thus, the licensee would need to transfer some fuel from the Unit No. 1 spent fuel pool to the Unit No. 2 spent fuel pool in order to effect the re-racking.

The staff and the licensee do not envision a need to transfer fuel if the pool can be re-racked before the next refueling outage. However, should a plant condition arise that requires full core off-loading or if the pool cannot be re-racked before the next outage, the proposed amendment would give the licensing authorization to transfer fuel, and the transfer could be accomplished in short order.

IV. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

The environmental impacts of plant operation were assessed in the "Final Environmental Statement Related to the St. Lucie Plant, Unit No. 1," U.S. Atomic Energy Commission, June 1973 and "Final Environmental Statement Related to the Operation of St. Lucie Plant, Unit No. 2," U.S. Nuclear Regulatory Commission, April 1982 (NUREG-0842). Each document was issued prior to the commercial operation of the respective unit.

The proposed amendment would not alter the type or amount of fuel that can be received, used, and possessed at the site. Limitations on the amount of fuel that may be stored in the Unit No. 2 spent fuel pool and the manner in which it may be stored and handled would also not be changed. Only the Unit No. 1 spent fuel that has aged for at least 1490 hours after withdrawal from the reactor would be transferred. Only shipping casks that have been registered with the NRC and for which a Certificate of Compliance has been issued by the NRC would be used to transfer spent fuel between units, thus ensuring that the casks to be used meet the packaging and transportation requirements of 10 CFR Part 71. Unit No. 1 spent fuel may be subsequently returned to the Unit No. 1 spent fuel pool after sufficient storage space has been provided.

The 1490 hour minimum aging time (approximately 62 days) is already a Unit No. 1 Technical Specification requirement. The actual minimum aging time would probably be more and would depend upon the cask requirement. For example, one of the casks proposed by the licensee is the NLI-1/2 cask. Its minimum aging

time is 150 days. The NLI-1/2 shipping cask has received a Certificate of Compliance for Radioactive Materials Packages, which was issued by the Commission (Certificate No. 9010, Revision 7, expiration date January 31, 1991). Such certificates are issued by the Commission to certify that the packaging (i.e., cask) and contents meet applicable safety standards of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material." By letter dated August 28, 1986, the Commission acknowledged Florida Power and Light Company, licensee for the St. Lucie Plant, as a registered user of the NLI-1/2 shipping cask pursuant to Section 71.12 of 10 CFR Part 71.

The proposed transfer process would begin with the spent fuel handling machine transferring an assembly underwater from the Unit No. 1 spent fuel storage racks to the spent fuel shipping cask. The fuel assembly would be placed in the cask while maintaining a prescribed minimum water level above the assembly. After the assembly has been loaded into the cask, the cask would be prepared for transport. Controls would be in effect to reduce the possible spread of contamination. The crane would then load the cask onto the transport vehicle for travel to Unit No. 2, a distance of approximately 300 feet. The offloading and storage of the Unit No. 1 spent fuel at Unit No. 2 would be accomplished in a manner similar to the above. The process would be repeated for each spent fuel assembly transferred. For purposes of assessing the environmental impact of the proposed transfer, the licensee conservatively estimated that no more than 728 Unit No. 1 spent fuel assemblies (the total capacity of the Unit No. 1 spent fuel pool) would be transferred per year between the units. The staff has evaluated the potential non-radiological environmental impacts associated with the above described transfer and concludes that they are not significant. Therefore, only the potential radiological environmental impacts are evaluated below.

IV.1 Occupational Radiation Exposure

The occupational radiation exposure for the proposed transfer operation is estimated to be less than 0.4 person-rems per spent fuel assembly. This small increase in radiation dose would not affect the licensee's ability to maintain individual occupational doses within the limits of 10 CFR 20, and is as low as is reasonably achievable (ALARA). A radiation protection program, as identified in the guidelines of Regulatory Guide 8.8, would preclude any significant occupational radiation doses. Based on present and projected operations, the staff estimates that the proposed transfer of Unit No. 1 spent fuel between the units should add only a small fraction to the total annual occupational radiation dose at the facility. The total occupational dose for 1984 and 1985 at the site was approximately 1304 person-rems per year. The total collective dose for the 728 spent fuel assemblies (the total capacity of the Unit 1 spent fuel pool) would be 291 person-rems. However, it is unlikely that it would be necessary to transfer the entire contents of the Unit No. 1 spent fuel pool. The licensee presently estimates moving less than 25 fuel assemblies if an entire core off-load is required before the summer of 1988. The licensee expects to add about 70 more assemblies to the spent fuel pool as a result of the summer 1988 outage. Thus, the staff assumed, for occupational radiation exposure purposes, that a maximum of 100 assemblies might need to be transferred; this would cause a dose of less than 40 person-rems. This estimate conservatively assumes that the re-rack takes place after the summer 1988 outage but before the subsequent refueling outage estimated for early 1990. This would be less than 3% of the annual occupational dose at the site. Thus, the staff concludes that the proposed transfer of spent fuel would not result in any significant increase in doses received by workers.

IV.2 Public Radiation Exposure

10 CFR Part 71.43 provides that a package (shipping cask) must be designed, constructed, and prepared for shipment so that under specified tests for normal conditions of operation, there will be no loss or dispersal of radioactive contents, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging. The licensee submitted a document entitled "Safety Analysis Report, NLI-1/2 Spent Fuel Cask" for the cask which is planned to be used for transporting the spent fuel between Unit No. 1 and Unit No. 2. This report describes the helium leak test procedures and acceptance criteria used on the NLI-1/2 cask to verify its compliance with 10 CFR Part 71 requirements.

10 CFR 71.47 provides that radiation levels external to the package must not exceed 10 millirem/hour at any point two meters beyond the outermost sides of the transporting vehicles. For a cask meeting this criterion, the corresponding dose rate is approximately 0.0001 millirem/hour at the nearest site boundary (approximately one mile from the transfer path between the units). The licensee stated that each loaded cask would be out-of-doors for up to approximately 8 hours during each transfer from one unit to the other. Under the above conditions, and assuming 728 transfers per year, the staff estimates that the annual dose commitments to a maximally exposed individual at the nearest site boundary due to the proposed transfer of spent fuel between the units would be approximately 3 millirem. This estimated annual total dose commitment is within the limitations of the plant Technical Specifications, which are based on the offsite dose requirements of 10 CFR Parts 20 and 50 and 40 CFR Part 190. Likewise, the staff estimates that the annual population dose to the general public due to the proposed transfer would be a small fraction of the three person-rem population dose estimated in the Unit Nos. 1 and 2 Final Environmental Statements for all transportation of fuel and waste to and from a nuclear power reactor.

Thus, the estimated annual total population dose, including the proposed transfer of spent fuel, would be very small compared to the annual dose to this same population from background radiation.

The staff has also reviewed the potential consequences of three postulated design basis accidents which involve spent fuel as part of the review of the acceptability of the licensee's request to transport spent fuel from the St. Lucie Unit No. 1 spent fuel pool to that of St. Lucie Unit No. 2. These accidents are the fuel handling, cask drop, and cask transport accidents. The radiological consequences of these accidents were previously analyzed by the staff and reported in Safety Evaluation Reports related to operating license dated November 8, 1974, March 1, 1976 (Suppl. 2), and March 29, 1978 (Amendment No. 22) for St. Lucie Unit No. 1, and October 1981 and October 16, 1984 (Amendment No. 7) for Unit No. 2. The previous fuel handling and cask drop accidents do not require reevaluation because the operations potentially involved with these accidents are not modified by the proposed license amendment. The cask transport accident previously involved the transport of 10 spent fuel assemblies following a 90 day cooldown period. The proposed license amendment would permit only the transport of a single fuel assembly in a cask which could occur at the earliest with a 1490 hour cooldown (according to Technical Specification 3/4.9.14, the earliest decay time of spent fuel, before a shipping cask would be allowed into the cask compartment in the area of the spent fuel pool with greater than a third of the core in storage, is 1490 hours).

The staff has reevaluated the consequences of the single fuel assembly cask transport accident. The accident assumptions are tabulated in Table 1. The calculated thyroid doses at the exclusion area and low population zone boundaries were 18.4 and 7.2 rem, respectively. The whole body doses at both locations were less than 0.1 rem. These calculated doses are well below the

guideline values stated in 10 CFR 100, i.e., 300 rem to the thyroid and 25 rem to the whole body. Thus, the staff concludes that the consequences of postulated design basis accidents for the spent fuel transfer are acceptable.

V. ALTERNATIVES TO THE PROPOSED ACTION

Since the staff has concluded that there are no significant environmental impacts associated with the proposed action, any alternatives will either have no environmental impact or greater environmental impact. A possible alternative would be to deny the Unit No. 2 license change. If this alternative was taken, the Unit No. 1 core would not be able to completely off-load if the need arose because there is no full core off-load capability in the Unit No. 1 spent fuel pool at this time. Denial would not enhance the protection of the environment.

VI. ALTERNATE USE OF RESOURCES

This proposal does not involve the use of resources not previously considered in connection with the "Final Environmental Statement Related to the Operation of St. Lucie Plant, Unit No. 1," dated June 1973, and the "Final Environmental Statement Related to the Operation of the St. Lucie Plant, Unit No. 2," dated April 1982.

VII. AGENCIES AND PERSONS CONSULTED

The Commission's staff reviewed the licensee's request and did not consult other agencies or persons.

VIII. BASIS AND CONCLUSIONS FOR NOT PREPARING AN ENVIRONMENTAL IMPACT STATEMENT

The Commission has determined not to prepare an environmental impact statement for the proposed action. The staff has reviewed the proposed license amendment relative to the requirements set forth in 10 CFR Part 51. Based on this assessment, the staff concludes that there are no significant radiological or non-radiological impacts associated with the proposed action and that the

proposed action will not change any conclusions reached by the Commission in the Final Environmental Statements for Unit Nos. 1 and 2. Therefore, pursuant to 10 CFR 51.31, an environmental impact statement need not be prepared for this action. Based upon this environmental assessment, the Commission concludes that the proposed action will not have a significant effect on the quality of the human environment.

Table 1 - Assumptions used in the fuel transport accident analysis

Power Level	2754 Mwt
Number of Fuel Rods Damaged	236
Total Number of Fuel Rods in Core	51,212
Radiation Peaking Factor of Damaged Rods	1.65
Shutdown Time	1490 hours
Inventory Released from Damaged Rods	10% (iodines) 10% (noble gases other than Kr-85) 30% (Kr-85)
Atmospheric Diffusion Factors (seconds per cubic meter)	
0-2 hour X/Q Value at 1560 meters	1.6 E-4
0-8 hour X/Q Value at 1610 meters	6.3 E-5

UNITED STATES NUCLEAR REGULATORY COMMISSION

FLORIDA POWER AND LIGHT COMPANY, ET AL.

ST. LUCIE PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-335 AND 50-389

NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT

AND FINDING OF NO SIGNIFICANT IMPACT

The Nuclear Regulatory Commission (the Commission) is considering issuance of a license change to Facility Operating License NPF-16, issued to the Florida Power and Light Company, et al. (the licensee), for operation of the St. Lucie Plant, Unit No. 2, located in St. Lucie County, Florida.

Identification of the Proposed Action

The license change for the St. Lucie Plant, Unit No. 2, would permit spent fuel from Unit No. 1 to be stored in the Unit No. 2 spent fuel storage pool. The spent fuel assemblies from Unit No. 1 would be transferred one at a time in an NRC-approved shipping cask between the Unit No. 1 spent fuel pool and the Unit No. 2 spent fuel pool, a distance of approximately 300 feet. The transfer of spent fuel would take place if there is a need to completely off-load the Unit No. 1 reactor core before the licensee re-racks the Unit No. 1 spent fuel pool sometime in mid-1988, the next refueling outage. The transfer of spent fuel would also take place if the licensee cannot re-rack the pool before mid-1988 because additional spent fuel will be in the pool at that time and the licensee is not allowed to carry loads in excess of 2,000 pounds (e.g., rack) over spent fuel. The Unit No. 1 spent fuel pool does not have enough space at

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the present time for a Unit 1 reactor core off-load. The proposed license change is responsive to the licensee's application dated July 2, 1986, as supplemented by letters dated February 6 and 9, March 2 and 27, and April 28, 1987. The Commission's staff has prepared an Environmental Assessment of the proposed action, "Environmental Assessment by the Office of Nuclear Reactor Regulation Relating to the Transfer of Unit No. 1 Spent Fuel between Units No. 1 and No. 2 of the St. Lucie Plant, Facility Operating License Nos. DPR-67 and NPF-16, Florida Power and Light Company, et al., St. Lucie Plant, Unit Nos. 1 and 2, Docket Nos. 50-335 and 50-389," dated February 22, 1988.

Summary of Environmental Assessment

The Commission's staff has reviewed the potential environmental impact of the proposed license change to transfer Unit No. 1 spent fuel between the St. Lucie Plant Units. This evaluation considered the previous environmental studies, including the "Final Environmental Statement Relating to the Operation of St. Lucie Plant, Unit No. 1," dated June 1973, and the "Final Environmental Statement Relating to Operation of the St. Lucie Plant, Unit No. 2," dated April 1982.

The proposed amendment would not alter the type or amount of fuel that can be received, used, and possessed at the site. Limitations on the amount of fuel that may be stored in the Unit No. 2 spent fuel pool and the manner in which it may be stored and handled would also not be changed. Only the Unit No. 1 spent fuel that has been sufficiently aged would be transferred and an NRC-approved shipping cask would be used to transfer the fuel between units. The only potential radiological environmental impacts that are affected deal with occupational and public radiation exposure.

Radiological Impacts

The occupational exposure for the proposed transfer operation is estimated to be less than 0.4 person-rems per spent fuel assembly. Based on present and projected operations, the staff estimated that the proposed transfer of Unit No. 1 spent fuel between the units should only add a small fraction to the total annual occupational radiation dose at the facility. The total occupational dose for 1984 and 1985 at the site was approximately 1304 person-rems per year. Thus, the staff concluded that the proposed transfer of spent fuel will not result in any significant increase in doses received by workers.

10 CFR Part 71.43 provides that a package (shipping cask) must be designed, constructed, and prepared for shipment so that under specified tests for normal conditions of operation, there will be no loss or dispersal of radioactive contents, no significant increase in external radiation levels, and no substantial reduction in the effectiveness of the packaging.

10 CFR 71.47 provides that radiation levels external to the package must not exceed 10 millirem/hour at any point two meters beyond the outermost sides of the transporting vehicles. For a cask meeting this criterion, the corresponding dose rate is approximately 0.0001 millirem/hour at the nearest site boundary.

The staff estimated the annual total dose commitment to a maximally exposed individual at the nearest site boundary due to the proposed transfer of spent fuel, and found it to be within the limitation of the plant Technical Specifications which are based on the offsite dose requirements of 10 CFR Parts 20 and 50 and 40 CFR Part 190. Likewise, the staff estimated that the annual population dose to the general public due to the proposed transfer

would be a small fraction of the three person-rem population dose estimated in the Unit Nos. 1 and 2 Final Environmental Statements for all transporation of fuel and waste to and from a nuclear power reactor. The estimated annual total population dose including the proposed transfer of spent fuel would be very small compared to the annual dose to this same population from background radiation. Thus, the staff concluded that the proposed transfer of spent fuel would not result in any significant increase in doses received by the public.

The staff has also reviewed the potential consequences of three postulated design basis accidents which involve spent fuel. These accidents are the fuel handling, cask drop, and cask transport accidents. The previous evaluations of the fuel handling and cask drop accidents do not require reevaluation because the operations potentially involved with these accidents are not modified by the proposed license amendment. However, the staff reevaluated the single fuel assembly cask transport accident. The calculated doses are well below the guidelines stated in 10 CFR Part 100. Thus, the staff concluded that the consequences of postulated design basis accidents for the spent fuel transfer are acceptable.

Non-Radiological Impacts

The staff has evaluated the potential non-radiological environmental impacts associated with the proposed spent fuel transfer and concluded that they are not significant. The Commission has concluded that the proposed license change would not cause a significant increase in the impact to the environment and will not change any conclusions reached by the Commission in the Final Environmental Statement for each unit.

Finding of No Significant Impact

The Commission's staff has reviewed the proposed license change to transfer the spent fuel between the units relative to the requirements set forth in 10 CFR Part 51. Based upon the environmental assessment, the staff concluded that there are no significant radiological or non-radiological impacts associated with the proposed action and that the proposed license change would not have a significant effect on the quality of the human environment. Therefore, the Commission has determined, pursuant to 10 CFR 51.31, not to prepare an environmental impact statement for the proposed license change.

For further details with respect to this action, see (1) the application for license change dated July 2, 1986, as supplemented February 6 and 9, March 2 and 27 and April 28, 1987, (2) the "Final Environmental Statement Relating to the Operation of the St. Lucie Plant, Unit No. 1," dated June 1973, (3) the "Final Environmental Statement Relating to the Operation of the St. Lucie Plant, Unit No. 2," dated April 1982, and (4) the Environmental Assessment dated February 22, 1988 . These documents are available for public inspection at the Commission's Public Document Room, 1717 H Street, Washington, D.C. 20555, and at the Indian River Junior College Library, 3209 Virginia Avenue, Ft. Pierce, Florida.

Dated at Rockville, Maryland, this 22nd day of February, 1988.

FOR THE NUCLEAR REGULATORY COMMISSION

Herbert N. Berkow

Herbert N. Berkow, Director
Project Directorate II-2
Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulation