Docket No. 50-302 March 26, 1987

Mr. Walter S. Wilgus
Vice President - Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear Licensing
& Fuel Management
P.O. Box 14042; M.A.C. H-3
St. Petersburg, FL 33733

Dear Mr. Wilgus:

We have enclosed a copy of the Environmental Assessment associated with your February 17, 1986 amendment application, as supplemented November 19 and 25, 1986, and February 17, 1987. The proposed amendment would extend the license expiration date from September 25, 2008, to December 3, 2016 for Crystal River Unit 3.

A copy of the Notice of Issuance of Environmental Assessment and Finding of No Significant Impact published in the Federal Register on March 26, 1987 (52FR 10274), is also enclosed.

Sincerely,

/S/

Harley Silver, Project Manager
PWR Project Directorate #6
Division of PWR Licensing-B

Enclosures:
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Mr. W. S. Wilgus
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Crystal River Unit No. 3 Nuclear
Generating Plant

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

TEEAP

ENVIRONMENTAL ASSESSMENT

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO THE CHANGE IN EXPIRATION DATE OF

FACILITY OPERATING LICENSE NO. DPR-72

FLORIDA POWER CORPORATION, ET AL.

CRYSTAL RIVER UNIT NO. 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

Date: March 26, 1987

TABLE OF CONTENTS

1.0 INTRODUCTION

The United States Nuclear Regulatory Commission (the Commission or staff) is considering the issuance of a proposed amendment which would extend the expiration date of the operating license for Crystal River Unit No. 3 Nuclear Generating Plant (Crystal River Unit 3 or CR-3) from September 25, 2008 to December 3, 2016. Crystal River Unit 3 is operated by Florida Power Corporation (the licensee or FPC) and is located in Citrus County, Florida.

2.0 IDENTIFICATION OF THE PROPOSED ACTION

The currently licensed term for Crystal River Unit 3, is 40 years commencing with issuance of the construction permit. Accounting for the time that was required for plant construction, this represents an effective operating license term of 32 years. The licensee's application dated February 17, 1986, as supplemented on November 19 and 25, 1986, and February 17, 1987, requests an extension of the expiration date of the operating license to December 3, 2016. Therefore, the 40-year operating term would start with the issuance of the operating license and not the construction permit.

3.0 THE NEED FOR THE PROPOSED ACTION

The granting of the proposed license amendment would allow the licensee to operate Crystal River Unit 3 for an additional eight years beyond the currently approved date.

4.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

In May 1973, the Atomic Energy Commission issued the "Final Environmental Statement Related to the Proposed Crystal River Unit 3" (FES). This document evaluates the environmental impact associated with the operation of CR-3. The Commission's staff has reviewed this document to determine if any significant environmental impacts, other than those previously considered, would be associated with the proposed license extension.

4.1 Radiological Impacts

4.1.1 Environmental Impacts - General Public

The staff considered the radiological impacts expected as a result of a hypothetical design basis accident at CR-3 and from normal plant operation including the impact of revised population estimates. In previous documents (Safety Evaluation Report, July 1974, and Final Environmental Statement, May 1973), the staff evaluated the regional demography for CR-3 and found the land area within a 25 mile radius, as indicated by the population statistics, to be about 60% woodlands and 20% range and pasture lands. The population within 50 miles of the plant was 174,218 in 1970, 210,000 in 1980, with 328,221 projected for the year 2020. This corresponds to a 119% increase in 50 years, and is in substantial agreement with the population projections of the Bureau of Economic Analysis for the area surrounding the CR-3 facility. This increase in population can be expected as a result of improved employment conditions in the area as documented by

the northerly expansion of the Tampa-St. Petersburg metropolitan area, growth of the Gainesville area and the influence of Disney World (about 80 miles to the East, near Orlando). The most recently available data indicate that the 10 mile Emergency Planning Zone (EPZ) is still a low population area and is expected to continue as such in the future. The outer boundary of the low population zone (LPZ) is at a nominal distance of five miles from the plant. There are no residents at present within a three mile radius of the reactor. The population within the five mile LPZ was 500 in 1970, 710 in 1980, and projected resident population for the LPZ for the year 2020 is 1,550. The nearest population center is Ocala with a population of 22,583 located 36 miles ENE of the site. The staff concludes that, based upon the above population estimates, the current Emergency Planning Zone, Low Population Zone, and nearest population center distances will likely be unchanged from those used for licensing the unit. Therefore, the conclusion reached in the staff's Safety Evaluation in 1974 that CR-3 meets the requirements of 10 CFR Part 100 remains unchanged.

In addition, the staff concludes that the projected population for 2020 would not change the overall conclusions of the FES concerning radiological consequences following accidents.

Finally, the staff has assessed the public risks from reactor accidents per year of operation at other reactors of comparable design and power level (and larger). In all cases, the estimated reactor accident risks of early and latent cancer fatality per year of operation have been small compared to the background cancer fatality risks to which the public is exposed and did not increase with longer periods of operation. If similar risks were estimated for Crystal River Unit 3, we would expect a similar comparison. Therefore, we conclude that the proposed additional years of operation would not increase the annual public risk from reactor accidents.

The principal factors associated with an additional period of operation which could potentially change the probability or consequence of an accident would be due to aging of electric equipment important to safety and changes in the fracture toughness properties of reactor vessel beltline materials due to neutron irradiation. The Commission has reviewed fracture toughness requirements for protection against pressurized thermal shock events and has determined that Crystal River Unit 3 can be operated for 40 calendar years without reaching pressurized thermal shock screening criterion specified in 10 CFR 50.61.

The Commission also finds that the licensee has established an environmental qualification program for electric equipment important to safety in accordance with 10 CFR 50.49, and that this program has given appropriate consideration to all significant types of degradation, including aging, which can have an effect on the functional capability of equipment. Under the licensee's environmental qualification program, equipment important to safety has either been determined to be qualified for at least 40 years of operation, or is designated for periodic replacement or refurbishment before the end of its predetermined life.

In addition to the environmental qualification program, numerous other programs exist at nuclear power plants to assure that the probability and consequence of any accident remains consistently small. Examples of such programs include the Technical Specifications which limit conditions for operation and require periodic surveillances; operating and emergency procedures; administrative procedures; inservice inspection requirements; periodic maintenance; quality control and quality assurance programs; personnel qualification and training programs; and other programs associated with continued conformance to national codes and standards. Such programs remain in effect throughout the duration of the operating license, including any extended operation authorized by the Commission. Accordingly, the Commission concludes that the proposed extension does not increase the probability or the severity of any accident. Although there does exist an inherent exposure to risk by virtue of the additional years of plant operation, the additional exposure to risk is not significant because the probability and consequences of accidents remain small. Accordingly, the proposed extension would not cause a significant increase in the public risks from reactor accidents and would not change any conclusions reached by the Commission in the FES.

The staff has also evaluated the radiological environmental effects associated with normal operation of the facility. This evaluation was conducted to assure that the licensee's "as low as is reasonably achievable" (ALARA) measures and dose projections are applicable for the additional years of plant service and are in accordance with 10 CFR Part 20 and the guidance of Regulatory Guide 8.8, "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low as is Reasonably Achievable" (Revision 3).

In the FES, the staff also calculated the dose commitment to the human population residing around CR-3 in order to assess the impact on people from radioactive material released as part of the normal operation of the plant. The annual dose commitment was calculated to be the dose that would be received over a 50-year period following the intake of radioactivity for one year under the conditions that would exist 15 years after the plant began operation. The 15-year period was chosen as representing the midpoint of plant life and was incorporated into the dose model by allowing for buildup of long life radionuclides in the soil. The buildup factor mainly affects the estimated doses for radionuclides with half-lives greater than a few years that are ingested by humans. For a plant licensed for 40 years, increasing the buildup period from 15 to 20 years would increase the dose from long life radionuclides via the ingestion pathways by less than one-third. It would have much less of an effect on a dose from shorter lived radionuclides. Table V-5 of the FES indicates that the estimated doses via the ingestion pathways are well below the annual dose design objectives of 10 CFR 50, Appendix I. For example, the ingestion dose to the thyroid from CR-3 is four mrem/yr compared to a dose design objective of 15 mrem/yr. Thus, the staff concludes that an increase of even as much as one-third in these pathways would remain well below the dose design objectives of 10 CFR 50, Appendix I, and will not be significant.

Additionally, the total-body population doses from effluent releases have been well below projected values (NUREG/CR-2850, Volume 4, June 1986; Annual Environmental Report, 1985). The CR-3 annual offsite dose calculation values

are well below PWR averages, and have typically been so for each year of operation. These values are expected to remain typical for plant operations through the year 2016. Thus, an increase of even as much as 10% in these pathways would not be significant.

4.1.2 Environmental Impacts - Uranium Fuel Cycle

The impacts on the uranium fuel cycle considered for the FES were originally based on 30 years of operation of a model light water reactor (LWR). The fuel requirements for the model LWR were assumed to be one initial core load and 29 annual refuelings (approximately 1/3 core per refueling). In considering the annual fuel requirement for 40 years for the model LWR, fuel use is averaged over a 40-year operating life (one initial core and 39 refuelings of approximately 1/3 core) which results in a slight reduction compared to the annual fuel requirement averaged over a 30-year operating life. The net result is an approximately 1.5% reduction in the annual fuel requirements for the model LWR due to averaging the initial core load over 40 years, instead of 30 years. This small reduction in fuel requirements would not lead to significant changes in the annual impacts on the uranium fuel cycle.

For CR-3, the licensee projects four additional refueling cycle years over the extended plant life. The staff concludes that there will not be any changes to the FES with regard to uranium fuel cycle impact in order to consider 40 years of operation. If anything, the values in the FES become more conservative when a 40-year period of operation is considered, particularly since the licensee has extended the refueling cycle intervals from 12 months to 18 months.

4.1.3 Environmental Impacts - Occupational Exposures

The staff has evaluated the licensee's dose assessment for the years 2008 to 2016 (the additional years during which CR-3 would operate), and compared it with current CR-3 and overall industry occupational dose experience. The average dose for CR-3 over the recent five-year period covering 1980-1985 has been 417 person-rem per year, which is comparable to the current five-year average of 569 person-rem dose per unit per year for operating pressurized water reactors in the United States. The staff expects that CR-3 will incur an average annual dose of about 224 person-rem for each additional year of operation. The total occupational dose projected over the period of the operating license extension is approximately 1792 person-rem, and considers four additional refuelings during this period, with no major unanticipated maintenance. This is only a small fraction of the 271,183 person-rem accumulated by all operating reactors over a similar five-year period (1980-1984). The staff expects that increased doses from maintenance and corrosion product build-up will be offset by a continually improving ALARA program, dose-saving plant modifications, and fewer major modifications. CR-3 has been average in the numbers of workers receiving measurable doses, but well below average in dose per worker during this same period, compared to other U.S. PWRs. Overall, occupational radiation exposures can be expected to remain about as estimated in the FES and as experienced during the initial operation period.

CR-3 ranks mid-range in overall volume of radwaste shipped over the period 1980-1985. Occupational doses and population doses from radwaste processing and shipping are well within the estimates made in the FES. Radioactive waste shipments are expected to remain at about the present level for the remaining life of the plant.

Spent fuel will be stored in the reracked spent fuel pool (previously evaluated by the staff for radiological environment consequences) in lieu of shipment offsite as stated in the FES, and in accordance with current national policy. Any further expansion of on-site spent fuel storage capacity (such as through rod consolidation) will be further evaluated for radiological environmental effects by the staff at the time it is proposed.

The staff concludes that the licensee's occupational dose assessment is acceptable, and their radiation protection program is adequate to ensure that occupational radiation exposures will be maintained ALARA and in continued compliance with the requirements of 10 CFR Part 20.

4.1.4 Environmental Impacts - Transportation of Fuel and Waste

The staff reviewed the environmental impacts attributable to the transportation of fuel and waste to and from the CR-3 site. With respect to the normal conditions of transport and possible accidents in transport, the staff concludes that the environmental impacts are bounded by those identified in Table S-4, "Environmental Impact of Transportation of Fuel and Waste To and From One Light-Water-Cooled Nuclear Power Reactor" of 10 CFR 51.52. The bases for this conclusion are that:

1) Table S-4 is based on an annual refueling and an assumption of 60 spent-fuel shipments per reactor year. Presently, Crystal River Unit 3 is on an 18-month refueling cycle which would require less than 30 spent fuel shipments per reactor year. Reducing the number of fuel shipments will reduce the overall impacts related to population exposure and accidents discussed in Table S-4.

2) Table S-4 represents the contribution of such transportation to annual radiation dose per reactor year to exposed transportation workers and to the general public. Current fuel enrichment and average fuel irradiation levels slightly exceed those specified in 10 CFR 51.52(a)(2) and (3) as the bases for Table S-4. The radiation levels of the transport fuel casks are limited by the Department of Transportation and NRC regulations and are not dependent on fuel enrichment and/or irradiation levels. Therefore, the estimated doses to exposed individuals per reactor year will not increase over that specified in Table S-4.

Based on the above, the annual radiation dose to individuals would not be changed by the extended period of operations. Although some risk with respect to normal conditions of transportation and possible accidents in transport would be attributed to the additional years of operation, the risk would not be significant because the annual risk for such transportation is small.

4.1.5 Conclusion

Based on the above, the staff concludes that the impacts associated with a 40-year operating license duration are not significantly different from those associated with a 30-year operating license duration and are not significantly different from those assessed in the CR-3 FES.

4.2 Non-Radiological Impacts

In the FES, the staff had considered the effect of plant operation on aquatic life in the surrounding area. The CR-3 operating license was issued with the requirement that environmental monitoring called for in the FES be undertaken to monitor such effects. This requirement was subsequently (October 12, 1982) deleted from the Technical Specifications since such monitoring would henceforth be administered under a National Pollutant Discharge Elimination System Permit issued by the Environmental Protection Agency. Requirements of this Permit would be extended to cover the operating license extension.

A number of plant modifications have been made since issuance of the FES. As discussed above in Section 4.1, numerous programs exist which will assure either 40-year component life, periodic replacement before the end of the predetermined life, or identification and correction of any unforeseen degradation. For modifications, environmental impacts were considered and where necessary evaluated, and found to be minimal.

We conclude that the proposed license extension would not cause a significant increase in the impacts to the environment and would not change any conclusions reached by the Commission in the FES.

5.0 ALTERNATIVES TO THE PROPOSED ACTION

The principal alternative to issuance of the proposed license extension would be to deny the application. In this case, Crystal River Unit 3 would shut down upon expiration of the present operating license. CR-3 currently provides about 30% of the electric power generated by FPC.

In Section 11 of the FES, a cost-benefit analysis is presented. Included in the analysis is comparison among various options for producing an equivalent electrical power capacity. Even considering significant changes in the economics of the alternatives, operation of CR-3 for an additional eight years would only require incremental yearly costs. These costs would be substantially less than the purchase of replacement power or the installation of new electrical generating capacity. Moreover, the overall cost per year of the facility would decrease since the large initial capital outlay would be averaged over a greater number of years. In summary, the cost-benefit advantage of CR-3 compared to alternative electrical power generating capacity improves with the extended plant lifetime.

6.0 ALTERNATIVE USE OF RESOURCES

This action does not involve the use of resources not previously considered in connection with the FES.

7.0 AGENCIES AND PERSONS CONSULTED

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

8.0 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 will not change any conclusions reached by the Commission in the FES. 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.

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UNITED STATES NUCLEAR REGULATORY COMMISSION

FLORIDA POWER CORPORATION, ET AL

CRYSTAL RIVER UNIT NO. 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

NOTICE OF ISSUANCE OF ENVIRONMENTAL ASSESSMENT

AND FINDING OF NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License No. DPR-72, issued to Florida Power Corporation (the licensee), for operation of the Crystal River Unit No. 3 Nuclear Generating Plant (Crystal River Unit 3), located in Citrus County, Florida.

Identification of Proposed Action:

The amendment would extend the expiration date of the operating license for Crystal River Unit 3 from September 25, 2008 to December 3, 2016. The license amendment is responsive to the licensee's application dated February 17, 1986, as supplemented on November 19 and 25, 1986, and February 17, 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 Change in Expiration Date of Facility Operating License No. DPR-72, Florida Power Corporation, et al., Crystal River Unit No. 3 Nuclear Generating Plant, Docket No. 50-302", dated March 26, 1987.

Summary of Environmental Assessment:

The Commission's staff has reviewed the potential environmental impact of the proposed change in the expiration date of the operating license for Crystal River Unit 3. This evaluation considered the previous environmental studies, including the "Final Environmental Statement Related to the Proposed Crystal River Unit 3" (FES), May 1973, and more recent NRC policy.

Radiological Impacts:

Based on current and projected populations, the Commission's staff concludes that the Low Population Zone and the nearest population center distances will likely be unchanged from those used for licensing the unit. Therefore, the conclusion reached in the staff's Safety Evaluation in 1974 that Crystal River Unit 3 meets the requirements of 10 CFR 100 remains unchanged. The staff further concluded that overall conclusions of the FES concerning radiological consequences following accidents would not change.

Principal factors associated with an additional period of operation which could potentially change the probability or consequences of an accident were examined, and the staff has determined that the proposed extension would not cause a significant increase in the radiological consequences or in public risk from reactor accidents, and would not change any conclusions reached by the Commission in the FES.

With regard to normal plant operation, the licensee complies with Commission guidance and requirements for keeping radiation exposures "as low as is reasonably achievable" (ALARA) for occupational exposures and for radioactivity in effluents. The licensee would continue to comply with these requirements during any additional years of facility operation and also apply

advanced technology when available and appropriate. Estimated doses from effluent releases have been well below projected values and dose design objectives, and increases due to extended plant operation will not be significant. Occupational exposures are expected to remain about as estimated in the FES. Accordingly, the Commission's staff has concluded that radiological impacts on man, both onsite and offsite, due to extended plant operations will not be significant and that our previous cost-benefit conclusions remain valid.

With regard to transportation of fuel and waste, estimated doses to individuals per reactor year will not increase beyond Table S-4 of 10 CFR 51.52, and environmental impacts will not be significantly different from those previously assessed in the FES.

Non-Radiological Impacts:

The Commission has concluded that the proposed extension will not cause a significant increase in the impacts to the environment and will not change any conclusions reached by the Commission in the FES.

FINDING OF NO SIGNIFICANT IMPACT

The Commission's staff has reviewed the proposed change to the expiration date of the Crystal River Unit 3 Facility Operating License relative to the requirements set forth in 10 CFR 51. Based upon the environmental assessment, the Commission's staff concluded that there are no significant radiological or non-radiological impacts associated with the proposed action and that the proposed license amendment will 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 amendment.

For further details with respect to this action, see (1) the application for amendment dated February 17, 1986, as supplemented on November 19 and November 25, 1986, and February 17, 1987, (2) the FES issued May 1973, and (3) the Environmental Assessment dated March 26, 1987. These documents are available for public inspection at the Commission's Public Document Room, 1717 H Street, Washington D.C., 20555 and at the Crystal River Public Library, 668 N.W. First Avenue, Crystal River, Florida 32629.

Dated at Bethesda, Maryland, this 26th day of March, 1987.

FOR THE NUCLEAR REGULATORY COMMISSION

John F. Stolz, Director
PWR Project Directorate #6
Division of PWR Licensing-B