October 1, 2003

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 - ISSUANCE OF AMENDMENT REGARDING TECHNICAL SPECIFICATION CHANGE REQUEST FOR THE USE OF M5 ADVANCED ALLOY FUEL CLADDING (TAC NO. MB6590)

Dear Mr. Young:

The Commission has issued the enclosed Amendment No. 210 to Facility Operating License No. DPR-72 for Crystal River Unit 3 (CR-3). The amendment consists of changes to the existing Technical Specifications in response to your letter dated October 23, 2002, as supplemented July 25 and August 11, 2003.

The amendment revises Crystal River Unit 3 Improved Technical Specifications (ITS) 4.2.1, “Fuel Assemblies,” and ITS 4.2.2, “Control Rods,” to permit the use of Framatome ANP M5 advanced alloy for fuel rod cladding and fuel assembly structural components.

A copy of the Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Brenda L. Mozafari, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosures:
1. Amendment No. 210 to DPR-72
2. Safety Evaluation

cc w/encl: See next page

October 1, 2003

Mr. Dale E. Young, Vice President
Crystal River Nuclear Plant (NA1B)
ATTN: Supervisor, Licensing & Regulatory Programs
15760 W. Power Line Street
Crystal River, Florida 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 - ISSUANCE OF AMENDMENT REGARDING TECHNICAL SPECIFICATION CHANGE REQUEST FOR THE USE OF M5 ADVANCED ALLOY FUEL CLADDING (TAC NO. MB6590)

Dear Mr. Young:

The Commission has issued the enclosed Amendment No. 210 to Facility Operating License No. DPR-72 for Crystal River Unit 3 (CR-3). The amendment consists of changes to the existing Technical Specifications in response to your letter dated October 23, 2002, as supplemented July 25 and August 11, 2003.

The amendment revises Crystal River Unit 3 Improved Technical Specifications (ITS) 4.2.1, “Fuel Assemblies,” and ITS 4.2.2, “Control Rods,” to permit the use of Framatome ANP M5 advanced alloy for fuel rod cladding and fuel assembly structural components.

A copy of the Safety Evaluation is enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/
Brenda L. Mozafari, Senior Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-302

Enclosures:
1. Amendment No. 210 to DPR-72
2. Safety Evaluation

cc w/encl: See next page

<ins>Distribution</ins>:

PUBLIC	OGC	FOrr
PDII-2 R/F	ACRS	CLong
EHackett	GHill (2)	
TBoyce	JMunday, RII	
JUhle	AHowe	
EDunnington	BMozafari	

Adams: ML032760276 *See previous concurrence

OFFICE	PM:PDII/S2	LA:PDII/S2	SRXB*	OGC	SC:PDII/SC
NAME	BMozafari	EDunnington	JUhle	RWeisman	AHowe
DATE	9/30/2003	9/22/2003	9/9/2003	9/23/2003	9/30/2003

C:\ORPCheckout\FileNET\ML032760276.wpd

OFFICIAL RECORD COPY

FLORIDA POWER CORPORATION

CITY OF ALACHUA

CITY OF BUSHNELL

CITY OF GAINESVILLE

CITY OF KISSIMMEE

CITY OF LEESBURG

CITY OF NEW SMYRNA BEACH AND UTILITIES COMMISSION,

CITY OF NEW SMYRNA BEACH

CITY OF OCALA

ORLANDO UTILITIES COMMISSION AND CITY OF ORLANDO

SEMINOLE ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-302

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 210
License No. DPR-72

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Florida Power Corporation, et al. (the licensees), dated October 23, 2002, as supplemented July 25 and August 11, 2003, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-72 is hereby amended to read as follows:

    Technical Specifications

    The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 210, are hereby incorporated in the license. Florida Power Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Allen G. Howe, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical Specifications

Date of Issuance: October 1, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 210

FACILITY OPERATING LICENSE NO. DPR-72

DOCKET NO. 50-302

Replace the following page of the Appendix "A" Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains vertical lines indicating the areas of change.

Remove	Insert
4.0-1	4.0-1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 210 TO FACILITY OPERATING LICENSE NO. DPR-72

FLORIDA POWER CORPORATION, ET AL.

CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT

DOCKET NO. 50-302

1.0 INTRODUCTION

By application dated October 23, 2002, as supplemented by letters dated July 25 and August 11, 2003, Florida Power Corporation (the licensee, also doing business as Progress Energy Florida, Inc.) proposed changes to the Crystal River Unit 3 (CR-3) Technical Specifications (TS). The requested changes would revise CR-3 Improved Technical Specifications (ITS) 4.2.1, "Fuel Assemblies," and ITS 4.2.2, "Control Rods," to permit the use of Framatome ANP M5 advanced alloy for fuel rod cladding and fuel assembly structural components. The amendment would also delete certain design parameters from ITS 4.2.2.

The July 25 and August 11, 2003, supplemental letters contained clarifying information only and did not change the initial proposed no significant hazards consideration determination or expand the scope of the initial application.

2.0 REGULATORY EVALUATION

The NRC-approved Framatome Topical Report BAW-10227P-A, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR Reactor Fuel," dated February 2000, describes Framatome M5 fuel and provides justification for its use in pressurized-water reactor cores. The licensee has stated in its October 23, 2002, submittal that operating CR-3 with M5 in the reactor core will continue to meet the licensing limits of CR-3. The licensee has proposed TS revisions to account for the presence of M5 fuel in the CR-3 core.

The NRC staff reviewed the licensee's amendment request to ensure that operation with M5 clad fuel in the core in accordance with the proposed changes will be within the conditions of operation necessary for application of BAW-10227P-A, and that the licensee will continue to operate the plant within its design basis and comply with applicable regulatory requirements following implementation of the proposed changes. These include Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.46; General Design Criteria 4, 10, 33, 34, and 35; and Standard Review Plan Section 4.2.

3.0 TECHNICAL EVALUATION

3.1 Analyses and Evaluations

The licensee evaluated the performance of the M5 cladding performance for both loss-of-coolant accident (LOCA) and non-LOCA scenarios. The licensee's conclusion was that the results with M5 fuel would not be substantially different from the results obtained with only Zircaloy in the core. This conclusion is consistent with the conclusions in Framatome Topical Report BAW-10227P-A. The NRC staff concludes that the licensee may evaluate CR-3 operation (perform reload analyses) with cores including M5 fuel with its present NRC-approved models adjusted to compensate for the presence of M5 fuel. This ensures that the licensee will continue to meet the currently applicable regulatory requirements for LOCA and non-LOCA events.

3.1.1 LOCA Analyses

In the July 25, 2003, supplemental letter responding to the NRC staff's May 29, 2003, request for additional information, the licensee stated that it performed "CR-3 plant-specific Mark-B-HTP LOCA analyses that are acceptable for application to the CR-3 10 CFR 50.46 licensing basis." The NRC staff requested that the licensee verify that the referenced generically approved LOCA analysis methodologies apply specifically to CR-3. In a phone call to clarify what the licensee meant by a "plant-specific" analysis, the licensee confirmed that it, along with its vendor, has ongoing processes that assure that the input parameter values for the CR-3 LOCA analyses bound the as-operated plant values of those parameters.

The NRC staff requested the licensee to identify which versions of the topical reports it would be using in the plant-specific large-break (LB) and small-break (SB)LOCA methodologies because of a cross-referencing inconsistency in the topical reports describing the LOCA methodologies used by the licensee. In its supplemental letter dated July 25, 2003, the licensee clarified which versions of the reports it used in the CR-3 specific LBLOCA and SBLOCA methodologies.

Because the change in inputs to consider a new fuel constitutes a significant change in the plant-specific LOCA methodologies, the licensee provided the initial CR-3 LBLOCA and SBLOCA analyses results to the NRC. These analyses were provided to confirm the conclusion that CR-3 will meet 10 CFR 50.46(b).

The following tables provide the LBLOCA and SBLOCA analysis results:

TABLE 1 - LBLOCA

	Whole Core		Mixed Core	
	M5	Zr	M5	Zr
Peak Cladding Temperature (PCT), ^{o}F	2050.8	2010	2022.2	2010
Maximum Local Oxidation	<4%	<2.5%	<4%	<2.5%
Whole Core H_2 Generation	<0.2%	<0.3%	<0.2%	<0.3%

TABLE 2 - SBLOCA

	Mixed Core	
	M5	Zr
Peak Cladding Temperature (PCT), °F	1248	1415
Maximum Local Oxidation	<1%	<1%
Whole Core H_2 Generation	<0.1%	<0.1%

At the NRC staff's request, the licensee also addressed the concern that the resident fuel may have preexisting oxidation that needs to be considered in estimating the maximum local oxidation in the event of a LOCA. In its supplemental letter dated August 11, 2003, the licensee provided its response to the concern, including reference to information in the Framatome Topical Report BAW-10227P-A and representative pre-LOCA oxidation values (at end of life). The NRC staff concludes from the analyses results identified above, and the oxidation values referred to in the licensee's August 11, 2003, letter, that the LOCA analyses for CR-3 consider the total LOCA oxidation and meet the oxidation criterion of less than or equal to 17% of the total cladding thickness before oxidation set forth in 10 CFR 50.46(b)(2). The licensee substantiated its conclusion in its July 25, 2003, supplemental letter. The NRC staff, therefore, finds that the LOCA analyses for CR-3 represent the total LOCA oxidation, including preexisting oxidation, and meet the oxidation criterion of 10 CFR 50.46(b)(2).

The NRC staff also notes that the preexisting oxidation of the fuel is not expected to contribute to the LOCA maximum core-wide hydrogen generation. Therefore, the NRC staff concludes that the core-wide hydrogen generation analyses results reported above demonstrate that CR-3 meets the core-wide hydrogen generation criterion of 10 CFR 50.46 (b)(3).

As discussed above, the licensee has performed LBLOCA and SBLOCA analyses for CR–3 using LBLOCA and SBLOCA methodologies approved for CR-3. The licensee's LBLOCA and SBLOCA calculations demonstrated the following:

A. The calculated LBLOCA and SBLOCA values for PCT (2050.8°F and 1415°F), maximum local oxidation (<4+Preexisting % and <1+Preexisting %), and core-wide hydrogen generation (0.3% and <0.1%) are less than the limits of 2200°F, 17%, and 1.0% specified in 10 CFR 50.46(b)(1)-(3), respectively.

B. Compliance with 10 CFR 50.46(b)(1)-(3) and (5) assures that the core will remain amenable to cooling as required by 10 CFR 50.46(b)(4). (The staff notes that other matters that could affect coolable geometry are not involved in the requested amendment.)

In summary, the NRC staff concludes that the licensee's LOCA analyses were performed with LOCA methodologies that apply to CR-3 and demonstrate that CR-3 complies with the requirements of 10 CFR 50.46 (b)(1)-(4). Therefore, the NRC staff finds the licensee's LOCA analyses acceptable.

3.2 Non-LOCA Analyses

The licensee stated in its October 23, 2002, application that it had performed evaluations that predicted no significant changes in results from evaluations performed in prior reloads with only Zircaloy-clad fuel. The licensee also referred to Framatome Topical Report BAW-10227P-A, which draws the similar conclusion that the difference in cladding alone is not likely to substantially change the analysis results. Based on information provided by the licensee and because the material properties of M5 cladding are similar to those of Zircaloy, the NRC staff has determined that this conclusion is reasonable. In addition, the licensee expects that the CR-3 Cycle 14 reload analyses, which will be performed using the methodologies identified in the CR-3 TS, COLR, and BAW-10179, will provide results that demonstrate that the use of M5 will not substantially affect the non-LOCA analyses. The NRC staff is familiar with these CR-3 non-LOCA analyses methods, which are consistent with the methods used in BAW-10227P-A. The NRC staff concludes that these methods are suitable for use in CR-3 safety analyses with cores containing M-5 fuel.

From the above, the NRC staff concludes that the use of M5 will not substantially affect the non-LOCA analyses and, therefore, the CR-3 licensing basis for non-LOCA events will not change. Therefore, the NRC staff finds that the licensee has acceptably addressed non-LOCA events.

3.3 Other Issues

3.3.1 Removal of Certain Design Features from the CR-3 TS

In the October 23, 2002, application, the licensee proposed to eliminate certain design features (including maximum fuel enrichment, nominal active fuel length, weight of uranium for fuel rods, and details of control rod content) from the CR-3 TS. In response to an NRC staff request for additional information, the licensee stated in its July 25, 2003, supplemental letter that these items would be relocated to other design documents (e.g., the Final Safety Analysis Report (FSAR)) and controlled under the 10 CFR 50.59 process and the 10 CFR Part 50, Appendix B, Criterion III, Design Control Program. The NRC staff finds that these provisions retain an acceptable amount of control relative to their importance in meeting core safety limits.

3.3.2 Retaining an ITS Statement Regarding Lead Test Assemblies

In its October 23, 2002, application, the licensee proposed a TS change to add the statement "A limited number of lead test assemblies (LTA) that have not completed representative testing may be placed in non-limiting core regions," to be consistent with ITS wording. However, the NRC staff observed that the licensee did not plan to have any LTAs in the core during CR-3 Operating Cycle 14, and requested that the licensee withdraw or justify the requested change regarding LTAs. In its July 25, 2003, supplemental letter, the licensee withdrew its request regarding LTAs.

3.3.3 Addition of Zirconium-Clad Filler Rods

The licensee also proposed to add "zirconium alloy or" to the sentence in TS Section 4.2.1, "Fuel Assemblies," permitting limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications. The NRC staff finds this addition of zirconium cladding acceptable because the cladding type is not expected to significantly change the influence of the filler rods on the consequences of CR-3 safety analyses.

3.3.4 Editorial Change

The licensee also proposed an editorial change to the CR-3 ITS to include the word “ROD” into the term “AXIAL POWER SHAPING ROD” assemblies. The NRC staff finds that this editorial change is acceptable because it clarifies the term.

3.4 Technical Conclusion

The NRC staff concludes that it is acceptable to operate CR-3 with M5 fuel, so long as operation is within the bounds of the analyses performed with the specific methodologies applicable to CR-3 as stated in this Safety Evaluation and as specified in the licensee’s TS and FSAR. The NRC staff concludes that it is acceptable to operate CR-3 with the M5 fuel as proposed because it is technically justified, as discussed above, and because appropriate TS control is provided. This Safety Evaluation, in combination with an exemption to 10 CFR 50.46, 10 CFR 50.44, and 10 CFR Part 50, Appendix K, dated September 26, 2003, provides the basis for operation of CR-3 with its core partially or fully loaded with M5 fuel assemblies. On the same basis, the NRC staff also concludes that use of fuel assembly structural components made of M5 is acceptable for CR-3 operation.

4.0 STATE CONSULTATION

Based upon a letter dated May 2, 2003, from Michael N. Stephens of the Florida Department of Health, Bureau of Radiation Control, to Brenda L. Mozafari, Senior Project Manager, U.S. Nuclear Regulatory Commission, the State of Florida does not desire notification of issuance of license amendments.

5.0 ENVIRONMENTAL CONSIDERATIONS

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (68 FR 805). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The NRC staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: F. Orr

Date: October 1, 2003

cc:

Mr. R. Alexander Glenn
Associate General Counsel (MAC-BT15A)
Florida Power Corporation
P.O. Box 14042
St. Petersburg, Florida 33733-4042

Mr. Jon A. Franke
Plant General Manager
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. Jim Mallay
Framatome ANP
1911 North Ft. Myer Drive, Suite 705
Rosslyn, Virginia 22209

Mr. William A. Passetti, Chief
Department of Health
Bureau of Radiation Control
2020 Capital Circle, SE, Bin #C21
Tallahassee, Florida 32399-1741

Attorney General
Department of Legal Affairs
The Capitol
Tallahassee, Florida 32304

Mr. Craig Fugate, Director
Division of Emergency Preparedness
Department of Community Affairs
2740 Centerview Drive
Tallahassee, Florida 32399-2100

Chairman
Board of County Commissioners
Citrus County
110 North Apopka Avenue
Inverness, Florida 34450-4245

Mr. Donald L. Taylor
Manager Support Services
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Mr. Daniel L. Roderick
Director Site Operations
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Senior Resident Inspector
Crystal River Unit 3
U.S. Nuclear Regulatory Commission
6745 N. Tallahassee Road
Crystal River, Florida 34428

Mr. Richard L. Warden
Manager Nuclear Assessment
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, Florida 34428-6708

Steven R. Carr
Associate General Counsel - Legal Dept.
Progress Energy Service Company, LLC
Post Office Box 1551
Raleigh, North Carolina 27602-1551