

October 7, 1994

Mr. Percy M. Beard, Jr.  
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ATTN: Manager, Nuclear  
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Distribution  
Docket File 50-302  
Public  
PDII-2 RF  
SVarga  
GLainas  
VMcCree  
EDunnington  
LRaghavan  
OGC  
EJordan  
ACRS (10)  
OPA  
CMcCracken  
DVerelli, RII

Dear Mr. Beard:

SUBJECT: EXEMPTION FROM CERTAIN REQUIREMENTS OF 10 CFR 50, APPENDIX R  
REACTOR COOLANT PUMP LUBE OIL SYSTEM - CRYSTAL RIVER UNIT 3  
(TAC No. M86794)

The Commission has issued the enclosed exemption from certain requirements of 10 CFR 50, Appendix R, Section III. O, "Oil collection system for reactor coolant pump." This exemption is consistent with your application dated June 7, 1993, as supplemented March 28, 1994, and would allow installation of a new reactor coolant pump motor with an oil collection system which is capable of collecting oil leakage from all potential pressurized and unpressurized leakage sites except for four potential oil leakage sites. The four potential leakage sites are: the anti-reverse device (ARD) vents, upper oil supply lines from the lift pump to the ARD, lower motor leak detection system piping, and lower guide bearing thermocouple wells.

A copy of the exemption is being forwarded to the Office of the Federal Register for publication.

Sincerely,



L. Raghavan, Project Manager  
Project Directorate II-2  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

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Docket No. 50-302

Enclosure:  
As stated

cc w/enclosure  
See next page

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Office	LA:PDII-2	PM:PDII-2 <i>LR</i>	PD:PDII-2	OGC <i>initials</i>	SPLB #15 <i>SFA</i>
Name	EDunnington	LRaghavan	<i>VMcCREE</i> <i>H Berkow</i>	<i>S. Horn</i>	CMcCracken
Date	1 / 94	9 / 1 / 94	10 / 7 / 94 *	9 / 20 / 94	9 / 1 / 94

\* received in PDII-2 from OGC on 10/6

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Florida Power Corporation

Crystal River Unit No. 3  
Generating Plant

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
FLORIDA POWER CORPORATION	)	Docket No. 50-302
	)	
Crystal River Nuclear Generating	)	
Plant Unit 3	)	
	)	

EXEMPTION

I

Florida Power Corporation (the licensee) is the holder of Facility Operating License No. DPR-72, which authorizes operation of the Crystal River Nuclear Generating Plant Unit 3. The license provides, among other things, that the licensee is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The facility is of a pressurized water reactor type and is located in Citrus County, Florida.

II

Title 10 Code of Federal Regulations Part 50 (10 CFR 50), Appendix A, "General Design Criteria for Nuclear Power Plants," Criterion 3, "Fire protection," specifies that "Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions."

10 CFR 50, Appendix R, sets forth fire protection features required to satisfy general design Criterion 3 of the Commission's regulations. Pursuant to 10 CFR 50, Appendix R, Section III. O, "Oil collection system for reactor coolant pump," the reactor coolant pump (RCP) shall be equipped with an oil collection system which "...shall be capable of

collecting lube oil from all potential pressurized and unpressurized leakage sites in the reactor coolant pump lube oil systems."

The licensee proposed to replace the existing RCP motors with a new motor and implement a re-designed RCP lube oil system. As a result of physical interferences and other design difficulties, four specific sites in the RCP motor lube oil system could not accommodate an oil collection system for collecting potential oil leakage. The four potential leakage sites are: the anti-reverse device (ARD) vents, upper oil supply lines from the lift pump to the ARD, lower motor leak detection system piping, and lower guide bearing thermocouple wells.

An exemption from 10 CFR 50, Appendix R, Section III. O, is required to permit the four specific sites in the RCP lube oil systems not to be equipped with an oil collection system, and thus, exclude them from leakage protection.

By letter dated June 7, 1993, as supplemented March 28, 1994, the licensee submitted its exemption request for this purpose.

### III

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50 when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule...".

The underlying purpose of 10 CFR 50, Appendix R, Section III. O, is to establish an oil collection system such that lube oil leakage from potential pressurized and unpressurized leakage sites in the RCP lube oil systems will not lead to fire during normal or design basis accident conditions and that there is reasonable assurance that the system will withstand the Safe Shutdown Earthquake (SSE).

The licensee's proposed RCP motor lube oil system could not accommodate an oil collection system for collecting potential oil leakage from four specific sites. The staff evaluation of these sites is as follows.

The RCP motor lube oil system, with its pumps and associated piping, supply oil to several parts of the RCP. The existing RCP lube oil system includes a high pressure and an induced flow system. The high pressure system consists of two independent pumps, and associated piping, and supplies oil, among other components, to the ARD. The induced flow system is driven by the rotation of the RCP motor and provides lube oil to the thrust bearings, guide bearings, and to the ARD.

In the new design, the ARD vents located at the top of each RCP motor would be equipped with demisters. According to the equipment vendor, the ARD vent lines only contain oil mist or foam during startup, shutdown, and normal operation. The demisters are equipped with a filter to prevent lube oil mist from escaping to the atmosphere. Two upper lube oil supply lines provide oil to the ARD from the low pressure lube oil system lift pump during startup and shutdown of the RCP motor. During normal operation, oil is provided to the ARD by the induced flow system.

The ARD vents are not part of a pressurized system. Therefore, spray shield protection for mechanical connections is not provided. If leakage were to occur during normal plant operations from the ARD demisters or

from the mechanical connections, the oil would run down the side of the torque drum and bearing housing, be collected by a one-inch lip on the bottom of the upper RCP motor bearing housing, and then be channeled to the oil collection drain pan for the upper lube oil cooler. The two upper lube oil supply lines are part of a pressurized system and, therefore, lube oil spray from a leak at a mechanical connection may not be fully captured by this lip and could potentially run down the RCP motor onto hot Reactor Coolant System (RCS) surfaces.

The lower RCP motor leak detection system provides detection of water leakage from the RCP motor heat exchanger. Consequently, this system normally contains cooling water. However, oil may enter into the cooling water either from overfilling the lube oil reservoir or from leakage at the lower RCP motor bearing. The mixture of water/oil could potentially leak at the threaded connections of the leak detection system piping and run off onto hot RCS surfaces. It is not expected that this oil/water mixture would represent a fire hazard under these conditions. These lines are not part of a pressurized system and are not provided spray protection for this potential leakage site.

The lower guide bearing and oil temperature thermocouples are located near the lower RCP motor bearing housing. Each of these instruments has two threaded connections. One of these connections is at the RCP motor lower bearing oil reservoir and the other is at the outer end of the thermocouple pipe where the thermocouple is inserted into the pipe. These thermocouple connections are located in a non-pressurized portion of the lube oil system and are not provided with spray shields. The innermost connections are located directly over the RCP motor lower oil drain pan and it is expected that leakage from these connections would be captured by the lower drain pan.

The new oil lubricating system would contain approximately 200 gallons of oil and would eliminate one of the two lift pumps and its components, which should result in a decrease in the number of potential leakage sites. Of the four potential leakage sites, ARD vents and lower RCP motor leak detection system piping do not contain oil under routine operating conditions. The upper oil supply lines from the lift pump to the ARD are pressurized only during a brief period of motor startups and shutdowns. The lower guide bearing thermocouple wells are passive in nature. If leakage were to occur during normal plant operations, the oil would channel to the drain pan. Any lube oil leak which may not have been fully captured could potentially run down the RCP motor onto hot Reactor Coolant System surfaces. However, the flammability characteristics of the oil, flashpoint of 452°F, and an auto ignition temperature of 500°F - 700°F, that would be used in the lube oil system, reduce the likelihood that the oil will readily ignite upon coming in contact with hot RCS piping surfaces. Additionally, if the oil leak became ignited, the fire would be localized in the area of the leakage and detected by the thermal fire detectors.

Fire protection features for the RCP motors include three temperature heat detectors with 190°F setpoints located over each RCP. Any localized fire in the area would result in an alarm function in both the reactor building and annunciate in the main control room. Additional indications of potential RCP fire are provided by control room alarms on low level oil, low oil pressure or high vibrations. It is expected that the control room operators would evaluate these alarms associated with the RCP and its lube oil system and initiate fire brigade entry into the reactor building to investigate and fight the fire. The reactor building is equipped with an internal firefighting standpipe hose station system

and fire extinguishers are appropriately distributed throughout the structure. RCP firefighting would be accomplished by using either portable fire extinguishers or water from a hose stream or a combination of both. Access to the four RCPs for firefighting can be accomplished by making entry into the "D" rings.

The existing Crystal River Unit 3 RCP motor lube oil system is a non-seismic system. The new RCP lube oil system and lube oil collection systems would be seismically qualified to withstand an SSE. Therefore, if an SSE were to occur, the system is not expected to fail.

Based on the design features of the new RCP motors and associated lube oil collection systems, there is reasonable assurance that the RCP lube oil system will not lead to fire during normal and design basis accident conditions or present a major fire hazard during a seismic event. In addition, based on the present level of fire protection provided for the RCPs and the fact that the plant has a trained fire brigade, if a fire were to occur in the area of RCP lube oil system ARD vents, upper oil supply lines from the lift pump to the ARD, lower motor leak detection system piping, and lower guide bearing thermocouple wells, there is reasonable assurance that the fire condition will be detected and mitigated.

#### IV

For the foregoing reasons, the NRC staff has concluded that the licensee's proposed implementation of the RCP lube oil system with the four potential leakage sites (the ARD vents, upper oil supply lines from the lift pump to the ARD, lower motor leak detection system piping, and lower guide bearing thermocouple wells not equipped with an oil collection system) will not present an undue risk to public health and safety and is consistent with the common defense and security. The

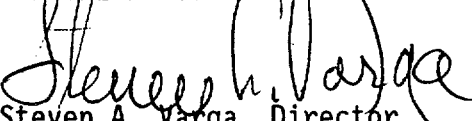


NRC staff has determined that there are special circumstances present, as specified in 10 CFR 50.12(a)(2), such that application of 10 CFR 50, Appendix R, Section III. O, as it relates to the oil collection at four specific sites in the RCP, is not necessary in order to achieve the underlying purpose of this regulation.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), an exemption is authorized by law, will not endanger life or property or common defense and security, and is otherwise in the public interest. Therefore, the Commission hereby grants Florida Power Corporation an exemption from those requirements of 10 CFR 50, Appendix R, Section III. O, relating to oil collection in the RCP. This exemption is applicable only to the four potential leakage sites in the RCP lube oil system: the ARD vents, upper oil supply lines from the lift pump to the ARD, lower motor leak detection system piping, and lower guide bearing thermocouple wells.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not result in any significant adverse environmental impact (59 FR 48338).

FOR THE NUCLEAR REGULATORY COMMISSION

  
Steven A. Varga, Director  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland,  
this 7th day of October 1994.