December 28, 2000

MEMORANDUM FOR: Kahtan N. Jabbour, Senior Project Manager
Projects Division ll
Division of Licensing and Project Management
Office of Nuclear Reactor Regulation

FROM: Peter R. Wilson, Acting Chief ***/RA by J Y Lee Acting For/***
Licensing Section
Probabilistic Safety Assessment Branch
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

SUBJECT: SAFETY EVALUATION FOR PROPOSED CHANGES TO ST. LUCIE TECHNICAL SPECIFICATIONS CONCERNING CONTAINMENT PENETRATIONS DURING REFUELING OPERATION (TAC NO. MB0417)

In response to your request, the Probabilistic Safety Assessment Branch (SPSB) has completed its review of proposed changes to the St. Lucie Technical Specifications requested by Florida Power and Light Company for St. Lucie, Unit 1. The proposed changes concern opening of personnel airlock doors during core alterations or movement of irradiated fuel in containment during refueling operation. Our safety evaluation is attached.

On the basis of our review of the licensee's analysis and our own confirmatory assessment of the radiological consequences resulting from the postulated fuel handling accident with personnel airlock doors opened, we find that the proposed amendment requested by the licensee is acceptable.

Docket No.: 50-335

Attachment: As stated

Contact: Jay Lee, NRR/DSSA/SPSB
415-1080

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
FLORIDA POWER AND LIGHT COMPANY
ST. LUCIE UNIT 1
DOCKET NO. 50-335

1.0 INTRODUCTION

By letter dated October 30, 2000, Florida Power and Light Company, the licensee for the St. Lucie Unit 1, requested an amendment to the St. Lucie Unit 1 Technical Specification (TS). Specifically, the licensee requested to revise Limiting Condition for Operation (LCO) 3.9.4, "containment penetration status during refueling operation." The proposed amendment would allow both containment personnel airlock (PAL) doors to be open during core alterations or movement of irradiated fuel in the containment during refueling operation if (1) at least one PAL door is capable of being closed, (2) the plant is in Mode 6 with at least 23 feet of water above the fuel in the reactor core, and (3) a designated individual is available outside the PAL to close the door. The current LCO 3.9.4 requires a minimum of one door to be closed during core alterations and movement of irradiated fuel in the containment during refueling operation.

2.0 EVALUATION

The containment air locks, which are part of the containment pressure boundary, provide a means for personnel access during reactor operation. During core alterations or movement of irradiated fuel assemblies within containment, containment closure is required; therefore, at least one air lock door must always remain closed. The requirement on containment penetration closure ensures that a release of fission products from containment due to a fuel handling accident (FHA) will be restricted from escaping to the environment. During core alterations or movement of irradiated fuel assemblies within containment, the most limiting radiological consequences result from a fuel handling accident.

The licensee performed and submitted a radiological consequence analysis resulting from a fuel handling accident with the PAL doors open and concluded that the release of fission products, subsequent to a FHA, will result in doses that are well within the dose guideline values specified in 10 CFR Part 100 for the site boundary and the dose acceptance criteria specified in General Design Criteria (GDC) 19 for control room operator.

The licensee reached this conclusion
(1) assuming one whole fuel assembly with the highest radial peaking factor is damaged releasing its fission products in the fuel gap into the spent fuel pool water,
(2) using a fission product decay period of 72 hours (time period from the reactor shutdown to the first fuel movement), and
(3) using an overall decontamination factor of 100 for the iodine isotopes in the spent fuel pool with minimum pool water depth of 23 feet.

The staff has reviewed the licensee's analysis and finds that the calculational methods used for the radiological consequence analysis are consistent with those provided in the Standard Review Plan (SRP) Sections 6.4 and 15.7.4, and Regulatory Guide 1.25, "Assumptions Used

for Evaluating the Potential Radiological Consequence of Fuel Handling Accident and Storage Facility for boiling and Pressurized Water Reactors." To verify the licensee's analyses, the staff performed a confirmatory radiological consequence calculation. The resulting radiological consequences calculated by the staff are shown in Table 1, and the major parameters and assumptions used by the staff are listed in Tables 2.

3.0 CONCLUSION

The doses calculated by the staff and the licensee are well within the dose guideline values specified in 10 CFR Part 100 and meet the acceptance dose criteria specified in the SRP Section 15.7.4. The dose to the control room operator calculated by the staff and the licensee are within the acceptable dose criterion given in the SRP Section 6.4 and GDC 19 of Appendix A to 10 CFR Part 50. Therefore, the staff concludes that the radiological consequences analyzed and submitted by the licensee are acceptable.

On the basis of this evaluation, the staff concludes that the license amendment requested by the licensee to have the PAL doors open during core alterations or movement of irradiated fuels in containment during refueling operation is acceptable.

TABLE 1

Radiological Consequences
for
Fuel Handling Accident
(rem)

	Thyroid	Whole Body
Exclusion Area Boundary	16	<1
Control Room	2.6	<1
Dose Acceptance Criteria:		
Exclusion Area Boundary	75 rem thyroid and 6 rem whole body	
Control Room	30 rem thyroid and 5 rem whole body	

Table 2
Parameters and Assumptions Used in
Radiological Consequence Calculations
Fuel Handling Accident

Parameter	Value
Radial peaking factor	1.65
Fission product decay period	72 hours
Number of fuel rods damaged	176
Number of fuel rods in one fuel assembly	176
Fuel pool water depth	23 ft
Fuel gap fission product inventory	
Noble gases excluding Kr-85	5%
Kr-85	10%
Iodine except I-131	5%
I-131	8%
Fuel pool decontamination factors	
Iodine	200
Noble gases	1
Dose conversion factors	FGR 11 and 12
Control room	
Unfiltered infiltration	100 cfm
Recirculation flow through charcoal adsorber	2,000 cfm
Charcoal adsorber iodine removal efficiency	90%
Atmospheric relative concentrations ($sec/m^{3)}$	
Exclusion area boundary	
0 to 2 hours	1.80E-4
Control room	
0 to 8 hours	4.84E-4
8 to 24 hours	4.17E-4
1 to 4days	1.60E-4
4 to 30 days	6.36E-4
Duration of fission product release	2 hours
Computer code used in dose calculation	HABIT 1.1