March 31, 2008

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: TURKEY POINT NUCLEAR GENERATING UNITS 3 AND 4 - SAFETY EVALUATION OF RELIEF REQUEST PR-07 FOR THE FOURTH 10-YEAR INSERVICE TESTING PROGRAM (TAC NOS. MD8233 AND MD8234)

Dear Mr. Stall:

By letter dated March 6, 2008, as supplemented March 13, 2008, Florida Power & Light, the licensee, submitted Relief Request PR-07 for its fourth 10-year inservice testing program interval at Turkey Point Units 3 and 4.

The enclosed Safety Evaluation contains the Nuclear Regulatory Commission (NRC) staff's evaluation and conclusions. The NRC finds that Relief Request PR-07 is authorized for the duration of one cycle (18 months) for each unit pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(a)(3)(ii), based on the determination that compliance with the specified code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Sincerely,

/RA/
Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-250 and 50-251

Enclosure:
Safety Evaluation

cc w/encl: See next page

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OFFICIAL AGENCY RECORD

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM, FOURTH 10-YEAR INTERVAL

FLORIDA POWER & LIGHT

TURKEY POINT UNITS 3 AND 4

DOCKET NUMBERS 50-250 AND 50-251

1.0 INTRODUCTION

By letter dated March 6, 2008, Florida Power & Light (FPL), the licensee, submitted Relief Request PR-07 for the fourth 10-year inservice testing (IST) program interval at Turkey Point Units 3 and 4. The licensee requested one-time relief from the comprehensive pump test requirements contained in the 1998 Edition through 2000 Addenda of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code). By letter dated March 13, 2008, the licensee submitted additional information pertaining to the relief request. Nuclear Regulatory Commission (NRC) evaluation of relief request PR-07 is contained herein. The fourth 10-year IST intervals commenced on February 22, 2005, for Unit 3 and on April 15, 2005, for Unit 4.

2.0 REGULATORY EVALUATION

Section 55a of Part 50 to Title 10 of the *Code of Federal Regulations* (10 CFR), requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME Code incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the NRC pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, “Guidance on Developing Acceptable Inservice Testing Programs,” provides alternatives to Code requirements that are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, Revision 1, “Guidance for Inservice Testing at Nuclear Power Plants.”

3.0 TECHNICAL EVALUATION

3.1 Pump Relief Request PR-07

3.1.1 Code Requirements

The licensee requested a one time relief from the requirements of ISTB-3300, "Reference Values," and ISTB-3400, "Frequency of Inservice Tests," for the following Category B pumps:

3P214A	3A - Containment Spray Pump
3P214B	3B - Containment Spray Pump
4P214A	4A - Containment Spray Pump
4P214B	4B - Containment Spray Pump

ISTB-3300(e)(1) states that reference values shall be established within ±20% of pump design flow rate for the comprehensive test.

ISTB-3400 states that an inservice test shall be run on each pump as specified in Table ISTB-3400-1. Table ISTB-3400-1 states that a comprehensive test shall be run biennially for Group A and Group B pumps.

3.1.2 Licensee's Basis for Requesting Relief

The licensee states:

> The containment spray pumps receive an auto start "P" signal on hi-hi containment pressure subsequent to MSLB [Main Steam Line Break] and LOCA [Loss of Coolant Accidents] to maintain containment pressure and temperature below design limits. The pumps are also started manually during the long term recirculation phase, with suction supplied from the Residual Heat Removal (RHR) System, to re-spray containment for pressure reduction when required. The pumps have a design discharge capacity of 1450 gpm [gallons per minute].
> . . . .
>
> The design of the containment spray system is such that the test loop for the pumps consists of a 6" discharge line that has a branch connection to a 2" recirculation line back to the Refueling Water Storage Tank (RWST). The 6" discharge line terminates inside containment at the spray nozzle headers. Due to the restrictions associated with the existing piping configuration, ±20 percent of the design flow rate cannot be achieved through the 2" recirculation test line for either set of pumps.
>
> During preoperational testing (1971 and 1972 for Units 3 and 4 respectively), the containment spray pumps were full flow tested using a temporary recirculation system configuration (Ref. Figure 1). Three points on the manufacturer's curve were then verified, with the acceptance criteria such that the pump head and capacity would be above the FSAR [Final Safety Analysis Report] performance curve. Each of the pumps delivered at least 1450 gpm during preoperational testing.

Subsequent to transitioning to the current Code of record, which requires a comprehensive pump test, a temporary modification has been used to facilitate full flow testing. The test has been performed for both Units 3 and 4 at 145 gpm with satisfactory pump performance results. This temporary modification was very similar to that used during the preoperational testing with the exception that the hydraulic test circuit consisted of a combination of temporary piping segments and vulcanized flexible hose with Victaulic couplings, as required (Ref. Figure 2). To establish the hydraulic test circuit, the discharge check valve (*-890A/B) bonnets were removed to provide a connection point at the pump discharge. The operator, bonnet and internals were removed from MOV [motor-operated valve] (*-846B) to provide a connection point for return flow to the RWST. Additionally, a temporary flow skid, containing a flow measuring orifice, a throttle valve and necessary instrumentation, was installed in the Auxiliary Building hallway with approximately 300 feet of piping and flexible hose and associated fittings within the recirculation loops to provide flow control during the comprehensive testing.

A comprehensive pump test with the temporary full flow recirculation system has been performed twice on Unit 3 and once on Unit 4. The following discussion pertains to that testing:

Unit 3
Procedure 3-OSP-068.5 was performed on 3/18/2006. This test was a baseline since it was the initial comprehensive test. Hydraulic and mechanical parameters were taken at five points from minimum flow to design flow. Satisfactory flow and required discharge pressure were achieved and vibration readings were within the required ranges.

Procedure 3-OSP-068.5 was performed again on 9/16/2007. During this test, flow was fixed at 1450 gpm. All hydraulic and mechanical test parameters were satisfactory.

Unit 4
Procedure 4-OSP-068.5 was performed on 11/11/2006. This test was a baseline since it was the initial comprehensive test. Hydraulic and mechanical parameters were taken at five points from minimum flow to design flow. Satisfactory flow and required discharge pressure were achieved and vibration readings were within the required ranges.

Although FPL has demonstrated the capability to establish full flow, there are several disadvantages in the methodology of the temporary modification. Significant commercial risks exist in that the temporary recirculation system with Victaulic couplings is routed through the Auxiliary Building, in close proximity to safety related electrical equipment. Although most of the equipment is not required to be operable during an outage, some equipment is energized. During the performance of the aforementioned testing, pump discharge test pressure reached a high of 278 psig [pounds per square inch

gauge]. A breach in the pressure boundary or a faulted Victaulic coupling could result in extreme damage to the safety related electrical equipment requiring a very lengthy outage extension to facilitate repairs.

In addition to the potential for damage to safety related energized electrical equipment should a leak in the temporary recirculation system occur, disassembly of valves to facilitate temporary recirculation system installation introduces different risks. During the performance of 3-OSP-068.5 on 9/16/2007, potential risks associated with leakage, Foreign Material Exclusion, and Health Physics were identified.

Based on the risks described above, FPL management is evaluating alternatives to install a permanent full flow recirculation line. Due to long lead delivery of the needed components and the time needed to develop a plant design change package, there is insufficient time to install a modification in Unit 4 during the Spring 2008 outage, and likely insufficient time to install a modification in Unit 3 during the Spring 2009 outage. FLP is looking at all alternatives to reduce the commercial risk to performing the full flow recirculation test.

Considering the commercial risk of the temporary recirculation system, FPL requests a one cycle dispensation from the full flow test for each unit to allow procurement of engineering and materials to install a more rugged permanent full flow recirculation test loops. FPL requests relief from compliance with the Code requirement of $\pm 20\%$ of design flow on an interim basis since compliance has been demonstrated to be a hardship with unusual difficulty, without a compensating increase in the level of quality and safety. Additionally, baseline comprehensive testing has demonstrated satisfactory performance.

In addition to the above stated hardship, FPL is incorporating an upgrade to each containment spray pump during the next Unit 4 refueling outage. The change involves the replacement of the existing pump seal with an approved seal to address Generic Safety Issue 191 downstream effects issues. The Post Modification Testing for this modification to the Containment Spray Pumps would be the Group A pump test as performed for all previous modifications since 1982, prior to use of the temporary recirculation system. The Unit 3 Containment Spray Pump seals do not require replacement due to differences in debris loading between the two containment structures.

3.1.3 Licensee's Proposed Alternative Testing

The licensee states:

For an interim period of one cycle (18 months), FPL proposes to utilize a Group A pump test on these Group B pumps with testing at a reference flow rate of 400 gpm (or new reference value) which corresponds to approximately 27.6% of design flow. As demonstrated by testing since the 2" recirculation line was installed in 1982, any degradation in pump performance at the set flow rate would be recognized or detected through a substantial change in the

measured pump differential pressure. Additionally, FPL proposes to perform full frequency spectrum vibration analysis during each quarterly IST run, and periodic oil analysis in accordance with the preventive maintenance program.

The following points provide further basis for the interim use of the proposed alternative:

- FPL is working on a design for a permanent piping modification that will facilitate the full flow testing; however, material delivery and time for engineering and planning is not practicable for completion during the next Units 3 and 4 refueling outages.

- The containment spray pump cubicles are extremely compact and the suction and discharge piping is somewhat fitting bound, making connections and stress analysis very difficult.

- There is insufficient room in the cubicles to get the necessary length of piping for adequate cooling; therefore, penetrations through walls and ceilings will be required.

- Procurement of the required large bore safety related valves have a significant lead time.

Compliance with the specific ISTB Code requirements identified in this interim relief request would require immediate hardware changes to minimize commercial risks and safely perform the tests. This would cause a hardship without a compensating increase in the level of quality and safety as previously described . . . .

The proposed alterative . . . . shall be utilized for a duration of one cycle (18 months) per each unit.

3.1.4 Evaluation

The licensee requested relief for an interim period of one cycle (18 months) from the ASME OM Code IST frequency requirement of ISTB-3400 and reference value requirement of ISTB-3300(e)(1) for containment spray pump comprehensive tests. Table ISTB-3400-1 requires that the comprehensive tests be conducted biennially. ISTB-3300(e)(1) requires that reference values be established within $\pm$20% of the pump design flow rate for comprehensive tests.

The installed system piping configuration does not permit testing of the containment spray pumps at or near design flow conditions. Testing at or near the design flow rate of 1450 gpm would require flow through the 6-inch discharge line leading to the spray nozzle headers, resulting in the undesirable wetting of equipment in the containment. The installed 2-inch recirculation test line, which returns to the refueling water storage tank, cannot achieve $\pm$20% of the design flow rate. The licensee is now evaluating alternatives to install a permanent full flow recirculation line.

The licensee has performed two comprehensive pump tests for Unit 3 and one for Unit 4, using a hydraulic test circuit consisting of temporary piping segments and vulcanized flexible hose with

Victaulic couplings. The staff has reviewed the pump performance data from these tests, as well as the pump performance data from the preservice tests and the manufacturer's pump performance data. The data shows that little if any pump degradation has occurred, and that there is adequate margin between the pump performance data and the minimum required design bases for the pumps.

Hardship and unusual difficulty would be incurred by testing at or near design flow rates prior the installation of a permanent full flow recirculation line. The temporary hydraulic test circuit is routed in close proximity to safety-related electrical equipment. A breach in the pressure boundary or a faulted Victaulic coupling could result in extreme damage to the safety-related electrical equipment, requiring a very lengthy outage extension to facilitate repairs. These hardships and unusual difficulties are not compensated for by an increase in the level of quality and safety since the licensee will take measures to ensure operational readiness of the pumps through the 18 month cycle. In addition to performing a quarterly Group A test (in lieu of a Group B test) on the pumps at a reference flow rate of 400 gpm, the licensee will perform full frequency spectrum vibration analysis during each quarterly IST test, and will perform a periodic oil analysis in accordance with their preventive maintenance program.

Extension of the due date for containment spray pump comprehensive tests for a period of one cycle (18 months) will allow time to plan and execute permanent system modifications to support comprehensive testing at the substantial flow rate required by the Code.

Quarterly Group A pump testing using the installed test recirculation line, quarterly full frequency spectrum vibration analysis and periodic oil analysis provide an acceptable level of quality and safety for containment spray pump testing activities until a comprehensive test meeting Code requirements can be completed prior to the end of the next cycle.

3.1.5 Conclusion

Based on the above evaluation, the staff concludes that the licensee's alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the specified requirement results in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the containment spray pumps. This alternative is authorized for the duration of one cycle (18 months) for each unit.

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Dated: March 31, 2008

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