October 6, 2004

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 UNITS 3 AND 4 - SAFETY EVALUATION FOR RELIEF REQUESTS PR-01 AND PR-04 ASSOCIATED WITH THE FOURTH INSERVICE TESTING (IST) INTERVAL (TAC NOS. MC1723, MC1724, MC1729 AND MC1730)

Dear Mr. Stall:

By a letter to the Nuclear Regulatory Commission (NRC), dated January 6, 2004, as supplemented by letters dated May 3 and July 2, 2004, Florida Power and Light submitted nine relief requests (PR-01, PR-02, PR-03, PR-04, PR-05, PR-06, VR-01, VR-02, and VR-03), requesting relief from the requirements specified in American Society of Mechanical Engineers Code (the Code), Section XI, in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a paragraphs a(3)(i), a(3)(ii), or f(6)(i). The May 3, 2004, letter requested the withdrawal of six of the requests (PR-02, PR-05, PR-06, VR-01, VR-02, and VR-03), while the July 2, 2004, letter requested the withdrawal of Relief Request PR-03 and revised the Relief Request for PR-04.

Based on the review of your submittals, the NRC staff has concluded that, for Relief Request PR-01, compliance with the Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety, and that the proposed alternative provides a reasonable assurance that the equipment is operationally ready, therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). Also the NRC staff has concluded that, for Relief Request PR-04 the alternative proposed provides an acceptable level of quality and safety and, therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

These reliefs are authorized for the remainder of the fourth 10-year IST interval at Turkey Point Unit 3, which began February 22, 2004, and ends February 21, 2014, and for the remainder of the fourth 10-year IST interval at Turkey Point Unit 4, which began April 15, 2004, and ends April 14, 2014.

Sincerely,
/RA/

Michael L. Marshall, Jr., Acting Chief, Section 2
Project Directorate II
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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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

INSERVICE TESTING PROGRAM

RELIEF REQUEST NOS. PR-01 AND PR-04

FLORIDA POWER AND LIGHT

TURKEY POINT NUCLEAR PLANT, UNITS 3 AND 4

DOCKET NOS. 50-250 AND 50-251

1.0 INTRODUCTION

By letter dated January 6, 2004, Florida Power & Light Company (FPL, the licensee) submitted relief requests for the fourth 10-year inservice testing (IST) program plan for pumps and valves at Turkey Point, Units 3 and 4. The licensee proposed alternatives to the requirements of the *American Society of Mechanical Engineers* (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) for the Turkey Point, Unit 3 and 4 fourth 10-year interval IST program. In response to the NRC staff's request for additional information, the licensee submitted additional information to the Nuclear Regulatory Commission (NRC) in letters dated May 3, 20, and July 2, 2004. In its May 3, 2004, letter the licensee withdrew Relief Requests PR-02, PR-05, PR-06, VR-01, VR-02, and VR-03. In its July 2, 2004, letter the licensee withdrew Relief Request PR-03 and revised Relief Request PR-04. NRC evaluation of Relief Requests PR-01 and PR-04 are contained herein. The subject relief requests are for the remainder of the fourth 10-year IST interval at Turkey Point, Unit 3, which began February 22, 2004, and ends February 21, 2014, and for the remainder of the fourth 10-year IST interval at Turkey Point, Unit 4, which began April 15, 2004, and ends April 14, 2014.

2.0 REGULATORY REQUIREMENTS

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a, 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 ASME OM Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(i), (a)(3)(ii),or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 50.55a(f)(4)(iv), IST of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met. 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 which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

By letter dated January 6, 2004, FPL proposed alternatives to the requirements of the ASME OM Code for its Turkey Point, Units 3 and 4, fourth 10-year IST interval. The Turkey Point Unit 3 fourth 10-year IST interval commenced February 22, 2004. The Turkey Point Unit 4 fourth 10-year IST interval commenced April 15, 2004. The program was developed to meet the requirements of the 1998 Edition through 2000 Addenda of the ASME OM Code pursuant to 10 CFR 50.55a(f)(4)(ii).

3.0 TECHNICAL EVALUATION

3.1 Pump Relief Request PR-01

3.1.1 Code Requirements

The licensee requested relief from ISTB-5121(c) which requires that where it is not practical to vary system resistence, flow rate and pressure shall be determined and compared to their respective reference values. Relief was requested for the following pumps:

3P203A - 3A Boric acid transfer pump
3P203B - 3B Boric acid transfer pump
4P203A - 4A Boric acid transfer pump
4P203B - 4B Boric acid transfer pump

3.1.2 Licensee's Basis for Requesting Relief

The normal test loop for the boric acid transfer pumps consists of fixed resistance flow paths to limit flow, however, flow measuring instruments are not installed in the flow path. Since the system resistance is fixed and can be assumed to be constant, pump degradation can be detected by comparing successive measurements of pump differential pressure.

An alternate test circuit is available in which flow rate may be measured, however, this flow path requires injection of highly concentrated boric acid solution into the reactor coolant system. During power operation this test loop is highly impractical since severe power fluctuations would be created which would lead to a potential transient and subsequent trip of the reactor. Using the alternate flow path at cold shutdown intervals would also result in excessive boration of the reactor coolant system resulting in potential difficulties and delays in restarting the plant.

As an alternative to measuring differential pressure and flow during the quarterly test, only differential pressure will be measured and compared to its reference value. Additionally, vibration measurements are also recorded and compared to their reference values. During the comprehensive pump test when flow can be measured, full spectrum vibration analysis will be performed above the required vibration analysis required by the Code.

These pumps are included in the station preventive maintenance program which requires a pump inspection and oil analysis to be performed periodically. Based on the preventive maintenance inspection results, full spectrum analysis, and continued quarterly and comprehensive pump testing, an accurate assessment of pump health and operational readiness is determined.

3.1.3 Licensee's Proposed Alternative Testing

During the quarterly Group A test using a fixed resistance flow path, differential pressure and vibration will be measured and compared to the reference values. During the comprehensive pump test when flow can be measured, full spectrum vibration analysis will be performed above the required vibration analysis required by the Code.

3.1.4 Evaluation

The OM Code requires that flow rate be measured during a Group A test and that a Group A inservice test be run on each Group A pump nominally every 3 months (quarterly).

During normal power operation and cold shutdown a fixed resistance flow path without installed flow measuring instruments is the only flow path available to perform the quarterly Group A test. An alternate test circuit is available in which flow rate may be measured, however, this flow path requires injection of highly concentrated boric acid solution into the reactor coolant system. During power operation, conducting the test using this test loop would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, because severe power fluctuations would be created which would lead to a potential transient and subsequent trip of the reactor. Using the alternate flow path at cold shutdown intervals would also result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, because of excessive boration of the reactor coolant system resulting in potential difficulties and delays in restarting the plant. The alternate flow path will be used during performance of the biennial comprehensive pump test.

Compliance with the Code requirements would require system modifications and installation of flow measuring instruments in the fixed resistance flow path or injection of highly borated water into the reactor coolant system which would lead to a potential plant transient, and would, therefore, cause a hardship or unusual difficulty without a compensating increase in the level of quality and safety. In lieu of the Code required test, the licensee proposes to test the boric acid transfer pumps every quarter through a fixed resistance flow path without flow instruments and measure differential pressure and vibration. In addition, during the comprehensive pump test

where flow, differential pressure, and vibration can be measured, full spectrum vibration analysis will be performed in addition to the vibration analysis required by the Code.

Position 9 of GL 89-04 states that in cases where flow can only be established through a non-instrumented flow path during quarterly pump testing and a path exists at cold shutdown or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval is an acceptable alternative to the Code requirements, provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during this testing and that quarterly testing also measuring at least pump differential pressure and vibration is continued.

Additionally, the above mentioned pumps are included in the station preventive maintenance program which requires a pump inspection and oil analysis to be performed periodically. Based on the preventive maintenance inspection results, full spectrum analysis, and continued quarterly and comprehensive pump testing, an accurate assessment of pump health and operational readiness is determined.

The NRC staff finds that the alternative testing proposed by the licensee provides a reasonable assurance that the component is operationally ready, it also meets Position 9 of GL 89-04, and is, thus, acceptable.

3.2 Pump Relief Request PR-04

3.2.1 Code Requirements

The licensee requested relief from ISTB-3510(b)(1) which requires that the full-scale range of each analog instrument not exceed three times the reference value. Relief was requested for the suction and discharge pressure instruments associated with the following pumps:

3P210A - 3A residual heat removal (RHR) pump
3P210B - 3B RHR pump
4P210A - 4A RHR pump
4P210B - 4B RHR pump

3.2.2 Licensee's Basis for Requesting Relief

The RHR pumps suction and discharge pressure gages are sized to accommodate the pressure range of 4 to 600 psig (instrument range is 0 to 600 psig) expected under standby, cold shutdown, and emergency operation modes. During quarterly testing the typical RHR pump differential pressure (delta-P) is approximately 100 psig (discharge pressure approximately 120 psig and suction pressure approximately 20 psig) and as a result the installed suction and discharge pressure instrument ranges exceed the maximum Code allowed range of three times the reference value.

The suction and discharge pressure instruments are calibrated to an accuracy of plus or minus 0.25 percent and are of the “twice around” type such that they may accurately indicate pressure over all modes of RHR operation. The instrument range on the first revolution is 0 to 300 psig and 300 to 600 psig on the second revolution. The accuracy of the instruments exceed the maximum Code allowed accuracy of 2 percent.

Suction pressure measurements are recorded and used to derive the pump delta-P through calculation. The accuracy of the suction pressure measurement normally has little or no effect on the results of the calculation since, generally, the pump discharge pressure exceeds the suction pressure by 6 to 7 times the reference value. The maximum effect of suction pressure inaccuracies is 0.25 percent x 600 psig or 1.5 psig for the installed suction pressure instruments. The Code required gage range for suction pressure would be 0 to 60 psig. The Code required accuracy requirement of 2 percent would cause a maximum inaccuracy of 2 percent x 60 psig or 1.2 psig.

Discharge pressure measurements are also recorded and used to derive the pump delta-P through calculation. The maximum effect of the discharge pressure inaccuracies is 0.25 percent x 600 psig or 1.5 psig for the installed discharge pressure instruments. The Code required gage range for discharge pressure would be 0 to 360 psig. The Code required accuracy requirement of 2 percent would cause a maximum inaccuracy of 2 percent x 360 psig or 7.2 psig.

Based on the inaccuracies of the installed suction and discharge pressure gages, the largest possible error in the delta-P calculation is plus or minus 3 psig. Using the installed pressure instruments which exceed the Code allowed accuracy requirements but do not meet the Code range requirements results in overall delta-P inaccuracies that are less than the Code allowable inaccuracies.

3.2.3 Licensee’s Proposed Alternative Testing

Quarterly RHR pump tests will be performed using installed pressure instruments that do not meet the Code required range requirements but which exceed the Code required accuracies.

3.2.4 Evaluation

The licensee requests relief from the instrument range requirements of ISTB-3510(b)(1) for the RHR pump suction and discharge pressure instruments during the quarterly pump test. The Code requires that the full-scale range of each analog instrument shall not be greater than three times the reference value. The licensee proposes to use instruments which do not meet this Code requirement.

For Group A and Group B tests, the Code requires instrument accuracy to be within 2 percent of full-scale and the full-scale range of each instrument be no greater than three times the

reference value. The combination of these two requirements results in an effective accuracy requirement of plus or minus 6 percent of the reference value.

Suction pressure measurements are recorded and used to derive the pump delta-P through calculation. The maximum effect of suction pressure inaccuracies is 0.25 percent x 600 psig or 1.5 psig for the installed suction pressure instruments. The Code required gage range for suction pressure would be 0 to 60 psig. The Code required accuracy requirement of 2 percent would cause a maximum inaccuracy of 2 percent x 60 psig or 1.2 psig.

Discharge pressure measurements are also recorded and used to derive the pump delta-P through calculation. The maximum effect of the discharge pressure inaccuracies is 0.25 percent x 600 psig or 1.5 psig for the installed discharge pressure instruments. The Code required gage range for discharge pressure would be 0 to 360 psig. The Code required accuracy requirement of 2 percent would cause a maximum inaccuracy of 2 percent x 360 psig or 7.2 psig.

The maximum inaccuracy of the installed suction and discharge pressure instruments individually is 1.5 psig. The maximum inaccuracy of the combination of suction and discharge pressure readings is 3 psig. The accuracies of the installed RHR pump suction and discharge instruments (plus or minus 0.25 percent) when combined with the instrument range (600 psig) yield delta-P readings at least equivalent to the readings achieved from instruments that meet Code requirements and, thus, provide an acceptable level of quality and safety.

4.0 CONCLUSION

Based on the information provided in the licensee's submittals, the NRC staff concludes that, for Relief Request PR-01, compliance with the Code requirements results in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Also, that the proposed alternative, as described above, provides a reasonable assurance that the equipment is operationally ready, therefore, Relief Request PR-01 is authorized pursuant to 10 CFR 50.55a(a)(3)(ii). For Relief Request PR-04, the NRC staff concludes that the proposed alternative, as described above, provides an acceptable level of quality an safety, and is, therefore, authorized pursuant to 10 CFR 50.55a(a)(3)(i). These reliefs are authorized for the remainder of the fourth 10-year IST intervals at Turkey Point, Unit 3, which began February 22, 2004, and ends February 21, 2014, and for the remainder of the fourth 10-year IST interval at Turkey Point, Unit 4, which began April 15, 2004, and ends April 14, 2014. This authorization is limited to those components described in Sections 3.1.1 and 3.2.1 above.

5.0 REFERENCES

1. *U.S. Code of Federal Regulations*, Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.55a, Codes and standards.

2. American Society of Mechanical Engineers, *ASME Code for Operation and Maintenance of Nuclear Power Plants*, 1998 Edition through 2000 Addenda, New York, NY.

3. U.S. Nuclear Regulatory Commission, "Guidance on Developing Acceptable Inservice Testing Programs," Generic Letter 89-04, through Supplement 1, April 4, 1995.

4. U.S. Nuclear Regulatory Commission, "Guidance for Inservice Testing at Nuclear Power Plants," NUREG-1482, April 1995.

5. Letter, T. O. Jones, Florida Power & Light Company to NRC, "Fourth 10 Year Testing Interval Pump and Valve Relief Requests," dated January 6, 2004.

6. Letter, T. O. Jones, Florida Power & Light Company to NRC, "Fourth 10 Year Interval Inservice Testing Program Select Relief Requests Withdraw," dated May 3, 2004.

7. Letter, T. O. Jones, Florida Power & Light Company NRC, "Response to Request for Additional Information Regarding Fourth Interval Inservice Relief Requests Dated June 4, 2004," dated July 2, 2004.

Principal Contributor: William Poertner, NRR

Date: October 6, 2004

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TURKEY POINT PLANT

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