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RECIP. NAME RECIPIENT AFFILIATION
THADANI, A. C. PWR Project Directorate 8

SUBJECT: Forwards revised relief requests re frequency of flow measurement testing for listed pumps, including Boric Acid Makeup Pumps 2A & 2B, Auxiliary Feedwater Pumps 2A, 2B & 2C LPSI Pumps 2A & 2B.

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FLORIDA POWER & LIGHT COMPANY

OCTOBER 13 1986
L-86-404

Office of Nuclear Reactor Regulation
Attention: Mr. Ashok C. Thadani, Director
PWR Project Directorate #8
Division of PWR Licensing -B
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Thadani:

Re: St. Lucie Unit #2
Docket No. 50-389
Relief from Parts of ASME Section XI

Dear Mr. Thadani:

Your letter dated January 13, 1986 denied a relief request from the requirements of IWP-4600 of ASME Section X1 regarding flow measurement for certain pumps. Subsequent correspondence resulted in an interim relief from these requirements until the Fall 1987 refueling outage.

Since that time, we have again reviewed our systems design, 10CFR50.55a and the requirements of Section XI. As a result of these efforts, we have revised the relief requests pertaining to frequency of flow measurement testing for the following pumps:

1. Boric Acid Makeup (BAM) Pumps 2A & 2B
2. Auxiliary Feedwater (AFW) Pumps 2A, 2B & 2C
3. Low Pressure Safety Injection (LPSI) Pumps 2A & 2B
4. High Pressure Safety Injection (HPSI) Pumps 2A & 2B

The enclosed specific relief request relates to frequency of inservice tests (IWP-3400). We propose testing on a cold shutdown or refueling shutdown basis instead of on a three month basis.

Also enclosed is the basis for excepting the following pumps from certain testing requirements of the Code, i.e. flow measurements.

1. Containment Spray (CS) Pumps 2A and 2B
2. Diesel Generator Fuel Oil Transfer Pumps 2A and 2B

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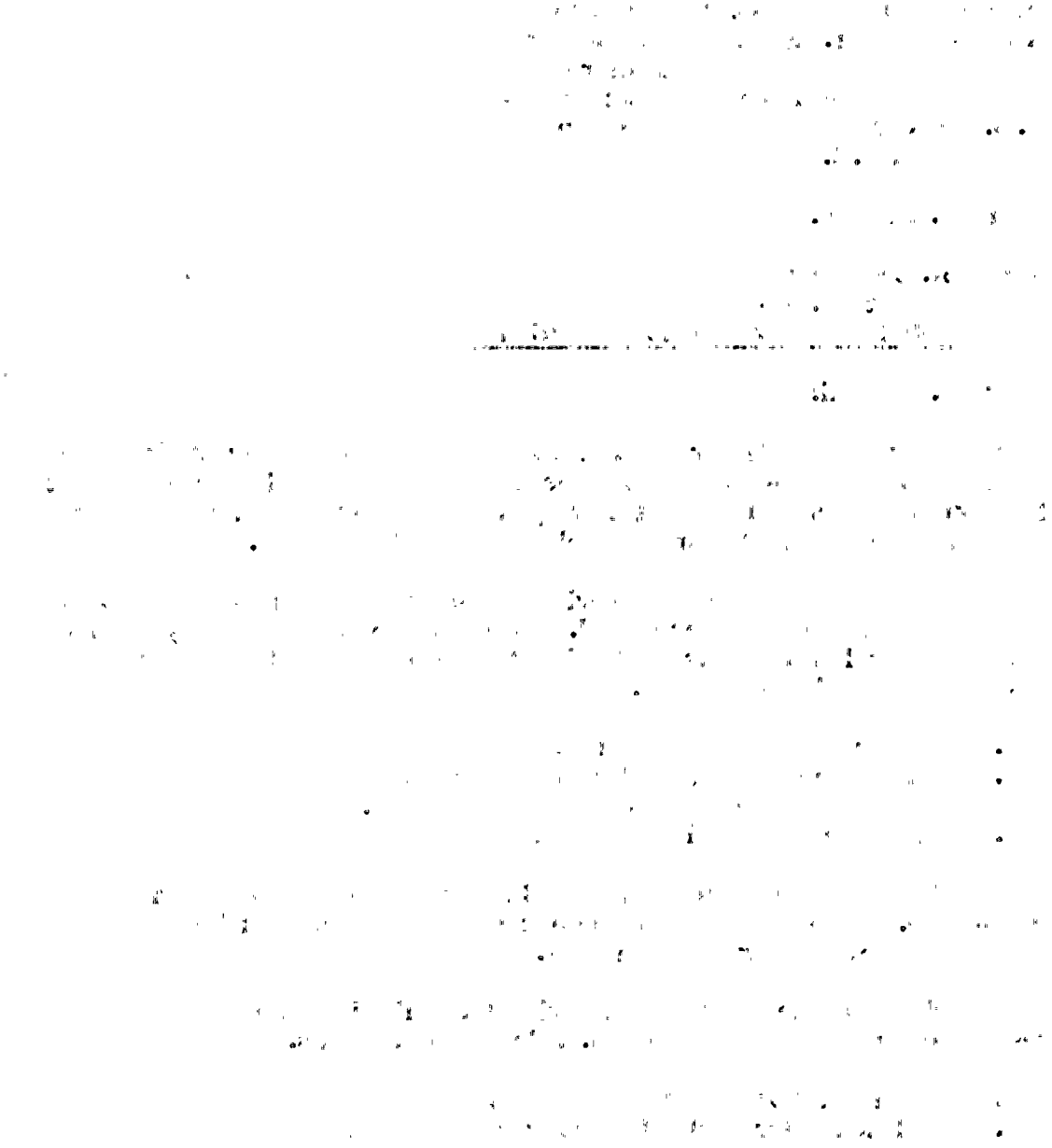

Exception is taken to the flow measurement requirement of the Code for these pumps since system design does not provide a flow path for flow rate measurement. The acceptability of not meeting the Code requirements for flow rate measurement is discussed in the enclosure . Since the system design does not allow for such flow measurement, the above two systems would need to be modified. This redesign and alteration would result in an extreme hardship and expense without a compensating increase in the level of quality and safety. Additionally, alterations to installed systems introduce new variables which may result in increased complexity with limited benefit gained. Since current testing provides a clear assessment of the flow capacities of the above pumps, the limited benefit gained by system modification does not appear to be sufficient to offset the increased potential for compromising the system safety function through misalignment, misoperation or component failure.

The information provided on the requested relief and exceptions is intended to amplify and support our earlier submittals on this topic. The attachment is intended to replace the Pump Test Program as submitted in our letter L-83-510, dated October 6, 1983.

Please contact us if you have any questions about this submittal.

Very truly yours,

C.O. Woody
Group Vice President
Nuclear Energy

COW/EJW/kc

Enclosure

cc: Dr. J. Nelson Grace, Region II, USNRC
Mr. Alan Schubert, Florida Dept. of Health and Rehabilitative Services
Harold F. Reis, Esquire

MCII:1

FLORIDA POWER & LIGHT COMPANY

PUMP	PUMP NO.	INLET PRESSURE P_i	DIFFERENTIAL PRESSURE ΔP	SPEED N	FLOW RATE Q	VIBRATION V	TEMP BRG T_b*	RELIEF REQUEST NO.
Boric Acid Makeup Pumps	2A	Yes	Yes	NA	Yes	Yes	Yes	1
	2B	Yes	Yes	NA	Yes	Yes	Yes	1
Component Cooling Water Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	1
	2B	Yes	Yes	NA	Yes	Yes	Yes	
	2C	Yes	Yes	NA	Yes	Yes	Yes	
Containment Spray Pump	2A	Yes	Yes	NA	No (1)	Yes	Yes	See Attached Exceptions
	2B	Yes	Yes	NA	No (1)	Yes	Yes	
Charging Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	
	2B	Yes	Yes	NA	Yes	Yes	Yes	
	2C	Yes	Yes	NA	Yes	Yes	Yes	
Intake Cooling Water Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	
	2B	Yes	Yes	NA	Yes	Yes	Yes	
	2C	Yes	Yes	NA	Yes	Yes	Yes	
Diesel Oil Transfer Pump	2A	Yes	Yes	NA	No (1)	Yes	Yes	See Attached Exceptions
	2B	Yes	Yes	NA	No (1)	Yes	Yes	

PROGRAM: St. Lucie Unit No. 2
TITLE: PUMP TEST PROGRAM

TABLE IV
TEST PARAMETERS

FLORIDA POWER & LIGHT COMPANY

PUMP	PUMP NO.	INLET PRESSURE P_i	DIFFERENTIAL PRESSURE ΔP	SPEED N	FLOW RATE Q	VIBRATION V	TEMP BRG T_b*	RELIEF REQUEST NO.
Auxiliary Feedwater Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	2
	2B	Yes	Yes	NA	Yes	Yes	Yes	2
	2C	Yes	Yes	Yes Turbine Driven	Yes	Yes	Yes	2
Low Pressure Safety Injection Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	3
	2B	Yes	Yes	NA	Yes	Yes	Yes	3
High Pressure Safety Injection Pump	2A	Yes	Yes	NA	Yes	Yes	Yes	4
	2B	Yes	Yes	NA	Yes	Yes	Yes	4
Hydrazine Pump	2A	No	No	NA	Yes	Yes	Yes	
	2B	No	No	NA	Yes	Yes	Yes	

NOTE: (1) Fixed Hydraulic resistance system test performed on recirculation.

* Bearing Temperature, T_b, is measured only on the annual test.

PROGRAM: St. Lucie Unit No. 2
TITLE: PUMP TEST PROGRAM

TABLE IV
TEST PARAMETERS

RELIEF REQUEST BASIS

1. Pumps:

   Boric Acid Make-up Pump No. 2A
   Boric Acid Make-up Pump No. 2B

Test Requirement: IWP-3400 "Frequency of Tests"

Relief Requested: Requesting relief from testing frequency.

Basis for Relief: Due to the inability to directly measure flow, these pumps cannot be tested quarterly in accordance with the requirements of the 1980 code during normal operation. This is because testing the boric acid make-up pumps would result in the addition of excess boron to the reactor coolant system resulting in a reactor shutdown.

Alternate Testing: The boric acid make-up pumps will be tested in accordance with IWP-3100 and IWP-4600 during cold shutdowns (mode 5) using the existing flow-rate meters.

Additional Testing: The boric acid make-up pumps will be tested quarterly in accordance with the 1974 Code Edition and Technical Specification 4.1.2.6 using the fixed hydraulic resistance (bypass loop) recirculation flow path.

Evaluation of the results of the quarterly boric acid make-up pump tests and the results of boric acid make-up pump tests using the existing flow meter flow path will provide a means for detecting significant changes in the hydraulic characteristics of the boric acid make-up pump.

Further, the measurement and evaluation of boric acid make-up pump vibration amplitude will provide a means for detecting significant changes in the mechanical characteristics of the boric acid make-up pumps.

2. Pumps

Auxiliary Feedwater Pump No. 2A
Auxiliary Feedwater Pump No. 2B
Auxiliary Feedwater Pump No. 2C

Test Requirement: IWP-3400 Frequency of Inservice Tests

Relief Requested: Requesting relief from testing frequency.

Basis for Relief: Due to the inability to directly measure flow these pumps cannot be tested quarterly in accordance with the requirements of the 1980 code during normal operation and hot shutdown because testing the Auxiliary Feedwater Pump (AFW) would result in the injection of cold water at ambient temperature 85 °F from the Condensate Storage Tank (CST) into the feedwater line to the associated steam generator which is normally operating at a temperature of approximately 435 °F. This would result in an abnormal severity and frequency of thermal shock to the feedwater system.

Alternate Tests: The AFW pumps will be tested in accordace with IWP-3100 and IWP-4600 during cold shutdowns (mode 5) using the existing flow-rate meters installed in the flow path that is used when the AFW pump is performing its safety-related function.

Additional Testing: The AFW pumps will be tested quarterly, in accordance with the 1974 Code Edition and Technical Specifications 4.7.1.2.1 and 4.7.1.2.2, using the fixed hydraulic resistance recirculation (bypass loop) flow path.

Evaluation of the results of the quarterly AFW pump tests and the results of AFW pump tests using the safety-related flow path will provide a means for detecting significant changes in the hydraulic characteristics of the AFW pump.

Further, the measurement and evaluation of AFW pump vibration amplitude will provide a means for detecting significant changes in the mechanical characteristics of the AFW pumps.

3. Pumps

Low Pressure Safety Injection Pump No. 2A
Low Pressure Safety Injection Pump No. 2B

Test Requirement: IWP-3400 Frequency of Inservice Tests

Relief Requested: Requesting relief from testing frequency.

Basis for Relief: Due to the inability to directly measure flow these pumps cannot be tested quarterly in accordance with the requirements of the 1980 code during normal operation. This is because the Low Pressure Safety Injection (LPSI) pumps do not develop sufficient discharge pressure to establish a flow path from the Refueling Water Tank (RWT) to the Reactor Coolant System (RCS).

Alternate Testing: The LPSI pumps will be tested in accordance with IWP-3100 and IWP-4600 during cold shutdowns (mode 5), when the system is aligned for shutdown cooling, using the existing flow meters installed in the flow path that is used when the LPSI pump is performing its safety-related function.

Additional Testing: The LPSI pumps will be tested quarterly, in accordance with the 1974 Code Edition and Technical Specification 4.5.2.g.2, using the fixed hydraulic resistance recirculation (bypass loop) flow path.

Evaluation of the results of the quarterly LPSI pump tests and the results of LPSI pump tests using the safety-related flow path will provide a means for detecting significant changes in hydraulic characteristics of the LPSI pump.

Further, the measurement and evaluation of LPSI pump vibration amplitude will provide a means for detecting significant changes in the mechanical characteristics of the LPSI pumps.

4. Pumps:

High Pressure Safety Injection Pump No. 2A
High Pressure Safety Injection Pump No. 2B

Test Requirement: IWP-3400 Frequency of Inservice Tests

Relief Requested: Requesting relief from testing frequency.

Basis for Relief: Due to the inability to directly measure flow these pumps cannot be tested quarterly in accordance with the requirements of the 1980 code during normal operation. This is because the High Pressure Safety Injection (HPSI) pumps do not develop sufficient discharge pressure to establish a flow path from the Refueling Water Tank (RWT) to the Reactor Coolant System (RCS).

Further, the HPSI pumps cannot be tested at cold shutdown (mode 5) because it could subject the Reactor Pressure Vessel (RPV) and the RCS to conditions exceeding the pressure-temperature limits of Technical Specification 3.4.9.1.

Alternate Testing: The HPSI pumps will be tested in accordance with IWP-3100 and IWP-4600 during refueling shutdown (mode 6), while filling the refueling cavity with the RPV head removed, using the existing flow meters installed in the flow path that is used when the HPSI pump is performing its safety-related functon.

Additional Testing: The HPSI pumps will be tested quarterly, in accordance with the 1974 Code Edition and Technical Specification 4.5.2.g.1, using the fixed hydraulic resistance recirculation (bypass loop) flow path.

Evaluation of the results of the quarterly HPSI pump tests and the results of HPSI pump tests using the safety-related flow path will provide a means for detecting significant changes in the hydraulic characteristics of the HPSI pump.

Further, the measurement and evaluation of HPSI pump vibration amplitude will provide a means for detecting significant changes in the mechanical characteristics of the HPSI pumps.

ST. LUCIE UNIT #2

PUMP AND VALVE PROGRAM

EXCEPTIONS

In accordance with 10CFR50.55a, the rules of Table IWP-3100-1 "Inservice Test Quantities" and Subarticle IWP-3400 "Frequency of Inservice Tests", which require the measurement of Flow, Q, at a 3-month frequency, are not applicable to the ASME Class 2 Containment Spray Pumps 2A and 2B or the ASME Class 3 Diesel Oil Transfer Pumps 2A and 2B.

10CFR50.55a (g)(3)(iv) states that "Pumps and Valves which are classified as ASME Code Class 2 and Class 3 shall be designed and be provided with access to enable the performance of inservice testing of the pumps and valves for assessing operational readiness set forth in Section XI of editions of the Boiler and Pressure Vessel Code and Addenda applied to the construction of the particular pump or valve or the Summer 1973 Addenda, whichever is later."

In the case of St. Lucie Unit #2, the latest ASME Section Code edition and addenda which can be considered to apply to the design of systems is 1974 Edition through Summer 1975 Addenda. Footnote 1 to Table IWP-3100-1 "Inservice Test Quantities" states, "In a fixed resistance system it is required to measure P or Q, not both. In a variable resistance system, both shall be measured." The Containment Spray and Diesel Oil Transfer "minimum recirc" lines are each equipped with a fixed orifice; current testing methods measure P. The applicable design requirement is thus satisfied.

10CFR50.55a (g)(4) states, "Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Class 1, Class 2 and Class 3 shall meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and the materials of construction of the component.

In summary, the Containment Spray Pumps and the Diesel Oil Transfer Pumps are excepted from the ASME Section XI requirement to measure flow directly in order to assess operational readiness of pumps since:

1) the ASME Code applicable to the design of the systems did not require flow to be measured in fixed orifice systems, the design of the system components satisfies the requirements for design as specified in 10CFR50.55a (g)(3)(iv) and;

2) 10CFR50.55a (g)(4) excepts design from having to be changed to meet the requirements of later Editions and Addenda of Section XI which become effective, and the design of the subject system components would have to be changed and alterations performed to the system components to make flow measurement possible and;

3) 10CFR50.55a (g)(4) requires that ASME Class 1, Class 2 and Class 3 components meet the requirements set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified for original purchase to the extent practical. The required flow measurement is clearly impractical based upon the design of the system, since a flow path providing for adequate flow measurement does not exist. In the case of the Containment Spray Pumps and Diesel Generator Fuel Oil Transfer Pump, the redesign and modifications necessary to satisfy the requirement would result in costs exceeding $550,000.00.

Even if the test requirement were to be considered applicable to the subject pumps, the existing design limitations render the changes necessary to meet the requirement impractical and unnecessary for the following reasons:

1) Since the pumps involved are single-stage centrifugal pumps, the measurement of the other test quantities of Table IWP-3100-1 and satisfying the requirements of Technical Specification 4.6.2.1b and 4.8.1.1.2a.3, provides sufficient data to assess the operational readiness of these pumps and assure an adequate level of quality and safety. This includes measurement of pump P with a fixed resistance system, satisfying the original design requirements for the system components, as specified in 10CFR50.55a (g)(3)(iv).

2) Alteration of installed systems introduces new variables which may result in the unnecessary complexity of the systems. The limited benefit gained by adding flow measurement to the quantities currently used in assessing the operational readiness of the Containment Spray Pumps and Diesel Fuel Oil Transfer Pumps does not appear sufficient to offset the increased potential for compromising the system safety function through misalignment, misoperation or component failure.

3) The redesign and alteration of installed systems as necessary to accomplish the performance of flow measurement at the specified frequency would result in an extreme hardship, expense and unnecessary burden without a compensating increase in the level of quality and safety.