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SUBJECT: Application for amend to license NPF-16, extending semi-annual surveillance interval specified in Table 4.3-2 for testing ESFAS subgroup relays to interval consistent w/CEOG Rept CEN-403, Rev 1-A for March 1996.

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August 1, 1997

L-97-191
10 CFR 50.90

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Unit 2
Docket No. 50-389
Proposed License Amendment
ESFAS Subgroup Relay Surveillance

Ref: NRC Letter: Bruce A. Boger, Director, Division of Reactor Controls and Human Factors to D. F. Pilmer, Chairman, Combustion Engineering Owners Group, Subject: REVIEW OF CE OWNERS GROUP TOPICAL REPORT CEN-403, REVISION 1, "ESFAS SUBGROUP RELAY TEST INTERVAL EXTENSION;" February 27, 1996.

Pursuant to 10 CFR 50.90, Florida Power & Light Company (FPL) requests to amend Facility Operating License NPF-16 for St. Lucie Unit 2 by incorporating the attached Technical Specifications (TS) revisions. The amendment will extend the semi-annual surveillance interval specified in Table 4.3-2 for testing the Engineered Safety Features Actuation System (ESFAS) subgroup relays to an interval consistent with Combustion Engineering Owners Group Report CEN-403, Revision 1-A, March, 1996, and its associated safety evaluation (Reference). It is requested that the proposed amendment, if approved, be issued by December 1, 1997.

Attachment 1 is an evaluation of the proposed TS changes. Attachment 2 is the "Determination of No Significant Hazards Consideration." Attachment 3 contains a copy of the affected TS pages marked-up to show the proposed changes.

The proposed amendment has been reviewed by the St. Lucie Facility Review Group and the Florida Power & Light Company Nuclear Review Board. In accordance with 10 CFR 50.91 (b)(1), a copy of the proposed amendment is being forwarded to the State Designee for the State of Florida.

Please contact us if there are any questions about this submittal.

Very truly yours,

J. A. Stall
Vice President
St. Lucie Plant

JAS/RLD

Attachments
cc: See next page

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cc: Regional Administrator, Region II, USNRC.

Senior Resident Inspector, USNRC, St. Lucie Plant.

Mr. W.A. Passetti, Florida Department of Health and Rehabilitative Services.

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STATE OF FLORIDA)
) ss.
COUNTY OF ST. LUCIE)

J. A. Stall being first duly sworn, deposes and says:

That he is Vice President, St. Lucie Plant, for the Nuclear Division of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.



J. A. Stall

STATE OF FLORIDA
COUNTY OF ST LUCIE

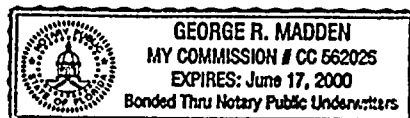
Sworn to and subscribed before me

this 1 day of AUGUST, 1997

by J. A. Stall, who is personally known to me.



Signature of Notary Public-State of Florida



Name of Notary Public (Print, Type, or Stamp)

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L-97-191, ATTACHMENT 1

EVALUATION OF PROPOSED TS CHANGES

EVALUATION OF PROPOSED TS CHANGES

Introduction

The proposed amendment to Facility Operating License NPF-16 for St. Lucie Unit 2 (PSL2) will extend the surveillance interval required for the Engineered Safety Features Actuation System (ESFAS) subgroup relays from six months to at least once per 18 months (refueling cycle), with testing performed on a staggered test basis. The mean time between failures (MTBF) for the PSL2 ESFAS subgroup relays is 84 months. The proposed surveillance interval is based on demonstrated relay reliability and confirmation that the generic analysis contained in Combustion Engineering Owners Group (CEOG) Report CEN-403, Revision 1-A, with the plant-specific clarifications provided in this submittal, is applicable to PSL2. In a letter and associated safety evaluation transmitted to the CEOG Chairman on February 27, 1996, the NRC staff approved this topical report for use by licensees as a basis for changes to plant technical specifications. The staff concluded that the failure data and analyses presented therein, and in supporting documents, supports the proposed refueling interval staggered test basis for the subject relays. Approval of this amendment will constitute a technical specification improvement as described in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," and will improve safety by reducing the amount of testing performed at power.

Description of Proposed Technical Specification (TS) Changes

Copies of the affected TS pages, marked-up to show the proposed changes, are contained in Attachment 3.

TABLE 4.3-2 (Pages 3/4 3-22 and 3/4 3-23), ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS, is revised as follows:

- (1) The "SA(2)" surveillance frequency notation shown for the Automatic Actuation Logic CHANNEL FUNCTIONAL TEST applicable to Safety Injection (SIAS), Containment Spray (CSAS), Containment Isolation (CIAS), Main Steam Isolation, and Containment Sump Recirculation (RAS), is changed to read "R(3)."
- (2) Footnote (3) is added to describe the ESFAS subgroup relay test, which "shall be performed on a STAGGERED TEST BASIS at subintervals of 6 months, such that each subgroup relay is tested at least once per 18 months."
- (3) Footnote (2), which will continue to apply to the Auxiliary Feedwater (AFAS) Automatic Actuation Logic, is revised to more accurately reflect terminology associated with AFAS.

Bases 3/4.3.1 and 3/4.3.2 (Page B 3/4 3-1), REACTOR PROTECTIVE AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEMS INSTRUMENTATION, is revised to include a new paragraph which provides additional information relative to ESFAS subgroup relay testing.

Background

The ESFAS is designed to initiate automatic operation of Engineered Safety Features (ESF) components that are required for proper performance of the safety injection, containment isolation, containment spray, main steam isolation, containment sump recirculation, and auxiliary feedwater systems. The ESFAS includes circuitry for redundant initiating variable measurement devices, trip bistables, coincidence logic matrices, actuation modules, output (subgroup) relays, and manual and automatic testing. Individual ESF components are assigned to a specific "group," and each group is actuated by an output (electro-magnetic) relay; hence the term "subgroup relay." Each subgroup relay operates in response to signals from the coincidence logic matrix and actuation modules, and is either energized at nominal rated voltage or completely de-energized, depending on its normal non-accident state. As such, the ESFAS subgroup relays are not subject to time-related instrument drift. It should be noted that ESFAS functions applicable to the auxiliary feedwater system are performed by an independent Auxiliary Feedwater Actuation System (AFAS), which consists of circuitry, components, and cabinets designed and constructed specifically for AFAS. The current PSL2 Technical Specifications require each ESFAS subgroup relay to be tested on a semi-annual basis. The test includes energization/dc-energization of each relay and verification of its operability.

In December 1984, the NRC staff established the Technical Specifications Improvement Program (TSIP) to provide the framework for rewriting and improving facility technical specifications. As an element of the TSIP, all TS surveillance requirements were comprehensively examined. The results of that effort are presented in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," wherein it is stated, "... that while some testing at power is essential to verify equipment and system operability, safety can be improved, equipment degradation decreased, and unnecessary personnel burden relaxed by reducing the amount of testing at power." Relative to ESFAS slave [subgroup] relays, Section 5.2 of NUREG-1366 states that relay reliability is generally good, that testing the relays at power contributes to the frequency of inadvertent equipment starts and reactor trips, and that the reliability of slave relays is a reasonable basis for relaxing test requirements.

The CEOG Topical Report, CEN-403, Revision 1-A, was prepared to justify extending the surveillance test interval for ESFAS subgroup relays used in Combustion Engineering (CE) Nuclear Steam Supply System (NSSS) plants, and documents an analysis of subgroup relay performance which included the PSL2 ESFAS. This effort resulted in the CEOG recommendation (with certain exceptions stated in the report) that the applicable subgroup relays be tested at a minimum required frequency of once per fuel cycle, and an endorsement of the recommendation in Section 5.2 of NUREG-1366, "Perform relay [slave relay or sub-group relay] testing on a staggered test basis over a [fuel] cycle and leave the tests carrying highest risk to a refueling outage or other cold shutdown." The type of relays employed in the PSL2 AFAS, which is a separate system performing the ESFAS functions for auxiliary feedwater, was not included in the relay failure analysis reported in CEN-403.

The NRC staff found the CEOG topical report acceptable, and further concluded that licensees referencing the report as a basis for proposed TS changes should: (1) Confirm applicability of the CEN-403, Rev. 1, analyses for their plant, and (2) Confirm that the applicable setpoint calculations account for any increase in instrument drift caused by the extended test interval. In addition, the staff determined that if two or more ESFAS subgroup relays fail in a 12-month period, the licensee should consider the design, maintenance, and testing of all ESFAS subgroup relays to evaluate the adequacy of the surveillance interval. If the licensee determines that the surveillance interval is inadequate for detecting a single relay failure, the surveillance interval should be decreased such that the licensee can detect an ESFAS subgroup relay failure prior to occurrence of a second failure.

Bases for Proposed TS Change

The proposed TS surveillance requires testing the ESFAS subgroup relays on a staggered test basis, e.g., approximately 1/3 of the relays will be tested every 6 months such that each relay is tested at least once per 18 months (refueling cycle). The staggered test basis provides a reasonable time limit in which common-mode failures could be detected. The subgroup relays that cannot be tested at power or otherwise offer the greatest potential for an inadvertent plant transient will be tested during a scheduled refueling outage or other plant shutdown. This is consistent with the goal of reducing the potential of challenges to safety systems due to testing during power operation.

St. Lucie Unit 2 is one of 15 plants included in a generic comparative analysis of ESFAS subgroup relay performance in CE plants that was conducted by Combustion Engineering. The analysis addressed the effect of ESFAS subgroup relay surveillance test interval extensions on the availability of the ESFAS for two broad classes of CE plant designs: plants with an ESFAS designed by CE, and plants with a non-CE ESFAS design. The latter design applies to PSL2. Topical Report CEN-403, Revision 1-A, summarizes ESFAS subgroup relay performance history for both types of ESFAS design.

Table 1, "ESFAS SUBGROUP RELAY RELIABILITY," shown in the NRC staff's safety evaluation for the topical report, lists the mean time between failures (MTBF) for St. Lucie Unit 2 as 108 months. The MTBF was calculated by dividing the number of plant operating years by the number of ESFAS subgroup relay failures, then converting the result into months. FPL has reviewed relay failure data from the Nuclear Plant Reliability Data System (NPRDS) and has confirmed that one additional relay failure occurred at PSL2 subsequent to the data collection phase of the CE study. This failure occurred on January 14, 1993, and results in a revised MTBF of 84 months. To support a surveillance interval extension to once per 18 months (refueling cycle), the MTBF should be greater than 22.5 months (18 month interval plus 25% tolerance permitted by TS). The plant-specific data more than satisfies this criterion.

FPL has confirmed that the relay data presented in CEN-403, Revision 1-A, is applicable to St. Lucie Unit 2; however, two minor discrepancies are noted in the information contained in the report: (1) the report states that St. Lucie Unit 1 and Unit 2 each have about 200 relays whereas the correct number is approximately 100 relays per unit; and (2) the report states that St. Lucie uses Couch model KEN 431A part number 4CP AF relays which is an over-simplification of the specific make and model numbers used. The error in the number of relays installed in the unit is not significant because it has no effect on the calculated MTBF, a critical attribute used in the NRC staff evaluation to support the conclusion that the reliability (small number of failures) justifies extending the surveillance intervals. The relay make and model over-simplification is a reporting detail only (KEN 431A is a supplier part number and not a relay model number), and does not affect the conclusions of the report since the failure history and data evaluated in the report is associated with the relays currently in use at PSL2. As such, CEN-403, Revision 1-A, remains applicable to St. Lucie Unit 2.

In addition to confirming CEN-403, Revision 1-A, applicability to PSL2, the staff's safety evaluation for the topical report states that the licensee should confirm that applicable setpoint calculations account for any increase in instrument drift caused by the extended test interval. Since the subgroup relays are part of the actuation logic downstream of the ESFAS trip bistables, setpoint uncertainty calculations are not affected by the proposed surveillance interval extension, i.e., in the ESFAS design configuration and modes of operation, the subgroup relays are not subject to time-related instrument drift. However, setpoint calculations are applicable to the

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ESFAS bistables which will continue to be tested at the presently required monthly surveillance frequency. The TS change proposed for this amendment only applies to the semi-annual surveillance testing presently required for the subgroup relays.

Consistent with the staff's position regarding two or more ESFAS subgroup relay failures in a 12-month period (stated in the safety evaluation for CEN-403, Revision 1-A), the proposed TS Bases revision states that the design, maintenance, and testing of all ESFAS subgroup relays should be considered to evaluate the adequacy of the surveillance interval. If it is determined that the surveillance interval is inadequate for detecting a single relay failure, the surveillance interval should be decreased such that FPL can detect an ESFAS subgroup relay failure prior to occurrence of a second failure. In addition to the Bases statements, plant procedures will be revised to reflect this provision upon implementation of an amendment incorporating the proposed surveillance interval extension.

Conclusion

The proposed surveillance interval extension for the St. Lucie Unit 2 ESFAS subgroup relays is consistent with the recommendations of the CEOG and NUREG-1366. CEN-403, Revision 1-A is applicable to PSL2, and this request for TS change using that topical report as a basis conforms to the conditions specified in the NRC staff's acceptance letter and associated safety evaluation for that report.

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DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION



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DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Description of amendment request: The proposed amendment will extend the semi-annual surveillance interval specified in Table 4.3-2 for testing the Engineered Safety Features Actuation System (ESFAS) subgroup relays to an interval consistent with Combustion Engineering Owners Group Report CEN-403, Revision 1-A, March, 1996, and its associated Safety Evaluation which was issued by the NRC staff on February 27, 1996. The proposed surveillance interval is at least once per 18 months, with testing to be performed on a staggered test basis.

Pursuant to 10CFR50.92, a determination may be made that a proposed license amendment involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety. Each standard is discussed as follows:

(1) Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed amendment revises the testing frequency of ESFAS subgroup relays, and is based on demonstrated relay reliability. These relays actuate the engineered safety features (ESF) equipment which is installed to mitigate design basis accidents. ESF system components are not considered initiators of any design basis accident. Therefore, operation of the facility with the proposed amendment would not involve a significant increase in the probability of an accident previously evaluated.

The proposed amendment does not alter the design or operation of ESF systems. The mean time between failures demonstrated by the ESFAS subgroup relays is significantly greater than the proposed surveillance interval, and testing will be performed on a staggered test basis. This, in addition to ESF redundancy, provides assurance that these systems will continue to function as evaluated to mitigate design basis accidents. Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant increase in the consequences of an accident previously evaluated.

(2) Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed amendment will not change the physical plant or the modes of operation defined in the facility license. The changes do not involve the addition of new equipment or the modification of existing equipment, nor do they alter the design of St. Lucie plant systems. Therefore, operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated.

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(3) Operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

The proposed amendment revises the surveillance interval for testing the ESFAS subgroup relays consistent with the Combustion Engineering Owners Group topical report CEN-403, Revision 1-A, and conforms to criteria specified in the associated safety evaluation issued by the NRC staff. The St. Lucie Unit 2 subgroup relay mean time between failures is significantly greater than the proposed surveillance interval, and testing will be performed on a staggered test basis. ESFAS setpoints, system operation, and plant configuration will not be changed, and the subgroup relays are not subject to time-related instrument drift. Accident analyses assumptions, initial conditions, and conclusions reported in the Updated Final Safety Analysis Report are not changed by the revised surveillance interval. Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant reduction in a margin of safety.

Based on the discussion presented above and on the supporting Evaluation of Proposed TS Changes, FPL has concluded that this proposed license amendment involves no significant hazards consideration.