

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS -  $T_{avg} \geq 325^{\circ}F$

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be OPERABLE with each subsystem comprised of:

- CHANGE PREVIOUSLY SUBMITTED BY FPL Ltr. L-94-102 (5/23/94)
- a. One OPERABLE high-pressure safety injection (HPSI) pump. ~~one ECCS subsystem shall include HPSI pump A and the second ECCS subsystem shall include either HPSI pump B or C.~~ (one)
  - b. One OPERABLE low-pressure safety injection pump, and
  - c. An independent OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: MODES 1, 2 and 3\*.

ACTION:

- a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours<sup>#</sup> or be in HOT SHUTDOWN within the next 12 hours. *insert superscript*
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

\*With pressurizer pressure  $\geq 1750$  psia.

# If the ECCS subsystem is inoperable only because the LPSI train is inoperable, the 72 hour limit may be extended to a maximum of 7 days from initial discovery of failure to meet the ICO.

Add footnote

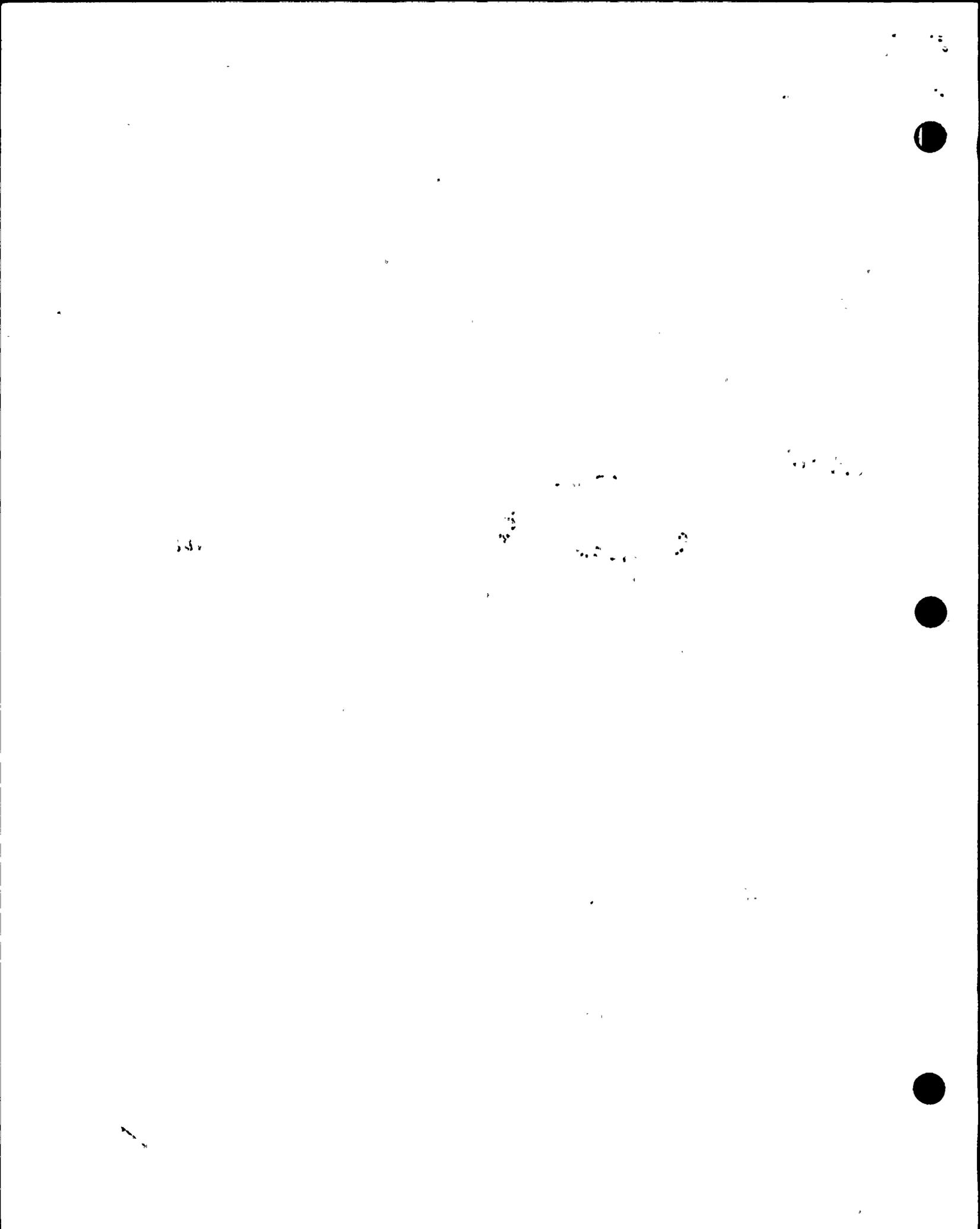


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EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- e. At least once per 18 months, during shutdown, by:
1. Verifying that each automatic valve in the flow path actuates to its correct position on a Safety Injection Actuation Signal.
  2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Signal;
    - a. High-Pressure Safety Injection pump.
    - b. Low-Pressure Safety Injection pump.
  3. Verifying on a ~~Sump~~ Recirculation Actuation Test Signal, the containment sump isolation valves open and the recirculation valves to the refueling water tank close. ~~DELETE~~ ADD
- f. By verifying that each of the following pumps develops the specified total developed head on recirculation flow when tested pursuant to Specification 4.0.5:
1. High-Pressure Safety Injection pumps: greater than or equal to 2571 ft.
  2. Low-Pressure Safety Injection pumps: greater than or equal to 350 ft.



St. Lucie Unit 1 and Unit 2  
Docket Nos. 50-335 and 50-389  
Proposed License Amendments  
LPSI System AOT Extension

ATTACHMENT 4

**ST. LUCIE UNIT 2 MARKED-UP TECHNICAL SPECIFICATION PAGES**

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## EMERGENCY CORE COOLING SYSTEMS

### 3/4.5.2 ECCS SUBSYSTEMS - T<sub>avg</sub> GREATER THAN OR EQUAL TO 325°F

#### LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

- a. One OPERABLE high pressure safety injection pump,
- b. One OPERABLE low pressure safety injection pump, and
- c. An independent OPERABLE flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal, and
- d. One OPERABLE charging pump.

APPLICABILITY: MODES 1, 2, and 3\*.

#### ACTION:

- a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours<sup>#</sup> or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. *insert superscript #*
- b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected safety injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

\*With pressurizer pressure greater than or equal to 1750 psia.

# If the ECCS subsystem is inoperable only because the LPSI train is inoperable, the 72 hour limit may be extended to a maximum of 7 days from initial discovery of failure to meet the LCO.

*Add footnote*



## EMERGENCY CORE COOLING SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

2. A visual inspection of the containment sump and verifying that the subsystem suction inlets are not restricted by debris and that the sump components (trash racks, screens, etc.) show no evidence of structural distress or corrosion.
  3. Verifying that a minimum total of 173 cubic feet of solid granular trisodium phosphate dodecahydrate (TSP) is contained within the TSP storage baskets.
  4. Verifying that when a representative sample of  $70.5 \pm 0.5$  grams of TSP from a TSP storage basket is submerged, without agitation, in  $10.0 \pm 0.1$  gallons of  $120 \pm 10^\circ\text{F}$  borated water from the RWT, the pH of the mixed solution is raised to greater than or equal to 7 within 4 hours.
- f. At least once per 18 months, during shutdown, by:
1. Verifying that each automatic valve in the flow path actuates to its correct position on SIAS and/or RAS test signals.
  2. Verifying that each of the following pumps start automatically upon receipt of a Safety Injection Actuation Test Signal:
    - a. High-Pressure Safety Injection pump.
    - b. Low-Pressure Safety Injection pump.
  3. Verifying that on a ~~Sump~~ Recirculation Actuation Test Signal, the containment sump isolation valves open and the recirculation valves ~~to the refueling water tank closed~~. ~~DELETE~~
- g. By verifying that each of the following pumps develops the specified total developed head on recirculation flow when tested pursuant to Specification 4.0.5:
1. High-Pressure Safety Injection pumps: greater than or equal to 2854 ft.
  2. Low-Pressure Safety Injection pump: greater than or equal to 374 ft.
- h. By verifying the correct position of each electrical and/or mechanical position stop for the following ECCS throttle valves:
1. During valve stroking operation or following maintenance on the valve and prior to declaring the valve OPERABLE when the ECCS subsystems are required to be OPERABLE.

DELETE

ADD

St. Lucie Unit 1 and Unit 2  
Docket Nos. 50-335 and 50-389  
Proposed License Amendments  
LPSI System AOT Extension

L-95-133

ENCLOSURE

Joint Applications Report

for

LOW PRESSURE SAFETY INJECTION SYSTEM AOT EXTENSION

(CE NPSD-995, Final Report CEOG Task 836; May, 1995)

**ATTACHMENT A**

**"Mark-up" of NUREG-1432 SECTIONS 3.5.2 & B 3.5.2**

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS—Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,  
MODE 3 with pressurizer pressure  $\geq$  [1700] psia.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p><i>INSERT A</i> →</p> <p>A. <del>One or more trains inoperable.</del> <u>AND</u> At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.</p>	<p>A.1 Restore <del>train(s)</del> <sup>subtrain</sup> to OPERABLE status.</p>	<p><del>12 hours</del> 7 days</p>
<p><i>INSERT B</i> →</p> <p><del>B.</del> Required Action and associated Completion Time not met.</p>	<p><del>C</del> <del>B.1</del> Be in MODE 3. <u>AND</u> <del>C</del> <del>B.2</del> Reduce pressurizer pressure to &lt; [1700] psia.</p>	<p>6 hours  12 hours</p>

INSERT A

One LPSI subtrain inoperable.

INSERT B

<p>B. One or more ECCS trains inoperable due to condition(s) other than Condition A.</p> <p><u>AND</u></p> <p>At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.</p>	<p>B.1 Restore ECCS train(s) to OPERABLE status.</p>	<p>72 hours</p>
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BASES

ACTIONS

A.1 ← and B.1  
(continued)

~~OPERABLE status within 72 hours. The 72-hour Completion Time is based on an NRC study (Ref. 4) using a reliability evaluation and is a reasonable amount of time to effect many repairs.~~

An ECCS train is inoperable if it is not capable of delivering the design flow to the RCS. The individual components are inoperable if they are not capable of performing their design function, or if supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. The intent of ~~this condition is to maintain a combination of OPERABLE equipment such that 100% of the ECCS flow equivalent to 100% of a single OPERABLE train remains available. This allows increased flexibility in plant operations when components in opposite trains are inoperable.~~ (S)

INSERT AA →

INSERT AB →

An event accompanied by a loss of offsite power and the failure of an emergency DG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact with one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 5 describes situations in which one component, such as a shutdown cooling total flow control valve, can disable both ECCS trains. ~~With one or more components inoperable, such that 100% of the equivalent flow to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analyses. Therefore, LCO-3.0.3 must be immediately entered.~~

INSERT AC →

~~C~~  
~~B.1 and B.2~~

If the inoperable train cannot be restored to OPERABLE status within the associated Completion Time, the plant must

(continued)

#### INSERT AA

each of Condition A and Condition B are

#### INSERT AB

Each of Condition A and Condition B includes a combination of OPERABLE equipment such that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train remains available.

Condition A addresses the specific condition where the only affected ECCS subsystem is a single LPSI subtrain. The availability of at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is implicit in the definition of Condition A.

If LCO 3.5.2 requirements are not met due only to the existence of Condition A, then the inoperable LPSI subtrain components must be returned to OPERABLE status within seven (7) days of discovery of Condition A. This seven (7) day Completion Time is based on the findings of the deterministic and probabilistic analysis that are discussed in Reference 6. Seven (7) days is a reasonable amount of time to perform many corrective and preventative maintenance items on the affected LPSI subtrain. Reference 6 concluded that the overall risk impact of this Completion Time was either risk-beneficial or risk-neutral.

Condition B addresses other scenarios where the availability of at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train exists but the full requirements of LCO 3.5.2 are not met. If Condition B exists, then inoperable components must be restored such that Condition B does not exist with 72 hours of discovery. The 72 hour Completion Time is based on an NRC reliability study (Ref. 4) and is a reasonable amount of time to effect many repairs.

#### INSERT AC

With one or more components inoperable such that 100% of the equivalent flow to a single OPERABLE ECCS is not available, the facility is in a condition outside of the accident analyses. In such a situation, LCO 3.0.3 must be immediately entered.

BASES

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ACTIONS

<sup>C</sup>  
~~B.1~~ and <sup>C</sup>  
~~B.2~~ (continued)

be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and pressurizer pressure reduced to < 1700 psia within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power in an orderly manner and without challenging unit systems.

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SURVEILLANCE  
REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves in position by removing power or by key locking the control in the correct position ensures that the valves cannot be inadvertently misaligned or change position as the result of an active failure. These valves are of the type described in Reference 5, which can disable the function of both ECCS trains and invalidate the accident analysis. A 12 hour Frequency is considered reasonable in view of other administrative controls ensuring that a mispositioned valve is an unlikely possibility.

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve automatically repositions within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position.

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.5.2.10 (continued)

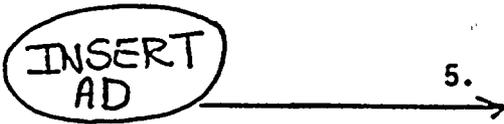
outage, on the need to have access to the location, and on the potential for unplanned transients if the Surveillance were performed with the reactor at power. This Frequency is sufficient to detect abnormal degradation and is confirmed by operating experience.

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REFERENCES

1. 10 CFR 50, Appendix A, GDC 35.
2. 10 CFR 50.46.
3. FSAR, Chapter [6].
4. NRC Memorandum to V. Stello, Jr., from R. L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.
5. IE Information Notice No. 87-01, January 6, 1987.

INSERT  
AD



INSERT AD

6. CE NPSD-995, "CEOG Joint Applications Report for Low Pressure Safety Injection System AOT Extension," April 1995.