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SUBJECT: Submits response to GL 98-02, "Loss of Reactor Coolant Inventory & Associated Potential for Loss of Emergency Mitigation Functions While in Shutdown Condition."

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Florida Power & Light Company, 6351 S. Ocean Drive, Jensen Beach, FL 34957

November 22, 1998

L-98-278
10 CFR 50.4
10 CFR 50. 54 (f)

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

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Generic Letter 98-02 Initial Response

The Florida Power and Light Company (FPL) response to Generic Letter (GL) 98-02, *Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions While in a Shutdown Condition*, for St. Lucie Units 1 and 2 is attached.

The NRC issued this generic letter to request that licensees (1) perform an assessment of whether the emergency core cooling systems (ECCS) at this facility include certain design features, such as a common pump suction header, which can render the systems susceptible to common-cause failure as a result of events similar to the Wolf Creek reactor coolant system (RCS) drain-down event of September 17, 1994; and (2) submit certain information, concerning the findings regarding potential pathways for inadvertent RCS drain-down and the suitability of surveillance, maintenance, modification and operating practices and procedures regarding configuration control during reactor shutdown cooling. The requested information will enable NRC staff to verify whether St. Lucie complies with NRC regulatory requirements and conforms with the current licensing bases, with regard to prescribing and accomplishing activities affecting quality per Criterion V of Appendix B to 10 CFR Part 50. The NRC staff was specifically concerned about the controls over the conduct of activities during hot shutdown conditions that may affect the safety-related functions of the RHR system and the ECCS, for example, the methods used to verify valve position, the controls in place to assure compliance with plant surveillance, maintenance, modification and operating procedures, and the adequacy of operator training for such activities. The FPL response was requested by November 24, 1998.

A001

FPL has performed the requested GL 98-02 review to assess plant design features which could allow interconnection of piping systems to the normal shutdown cooling flowpath that could either permit RCS drain-down or adversely impact the capability of the safety injection system to perform its design function. Potential valve lineup vulnerabilities were identified for both Unit 1 and Unit 2 that could, if misoperated, result in the scenarios identified in the GL. A procedural and process review has determined that the potential crossties are procedurally controlled prior to the initiation of shutdown cooling.

The attached information is provided pursuant to the requirements of Section 182a of the Atomic Energy Act of 1954, as amended, and 10 CFR 50.54(f).

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

Very truly yours,

J. A. Stall
Vice President
St. Lucie Plant

JAS/GRM

Attachment

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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

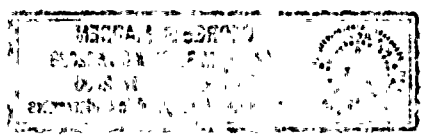
Sworn to and subscribed before me

this 22 day of November, 1998
by J. A. Stall, who is personally known to me.

Name of Notary Public - State of Florida

GEORGE R. MADDEN
MY COMMISSION # CC 562026
EXPIRES: June 17, 2000
Bonded Thru Notary Public Underwriters

(Print, type or stamp Commissioned Name of Notary Public)



St. Lucie Units 1 and 2
NRC Generic Letter 98-02 Response

NRC Request 1:

Perform an assessment of whether your emergency cooling systems include certain design features, such as a common pump suction header, which can render the systems susceptible to common-cause failure as a result of events similar to the Wolf Creek RCS drain-down event of September 17, 1994.

FPL Response 1:

Unit 1

Two trains of ECCS components, each containing one HPSI pump, one CS pump, and one LPSI pump are supplied from a common connection on the RWT which branches into separate suction headers for each train. During Mode 4, only one high pressure safety injection pump is required to be OPERABLE for injection into the RCS with suction from the RWT. The RWT is protected from backflow in the suction lines by check valves.

A review of plant procedures and drawings for operation at hot shutdown (Mode 4 on shutdown cooling) has identified six potential flow paths which could direct flow from the normal shutdown cooling flowpath. A summary of the six flowpaths is provided in Table 1 below:

Table 1 – Unit 1, 2 Inches and Greater Branch Connections from SDC Normal Flowpath

Flowpath	Isolation Valve(s) Train A/Train B	Impact on HPSI if Inadvertently Left Open	Potential for RCS Blowdown if Inadvertently Left Open
1 (To CS Suction)	V07272/V07271	Flashing in HPSI Pump Suction	Through Relief Valves SR-07-1A/1B and HPSI Pump Recirc to RWT
2 (To HPSI Suction)	V3663/V3662	Flashing in HPSI Pump Suction	Through HPSI Pump Recirc to RWT
3 (LPSI Recirc)	V3204/V3205	None	Pump Recirc to RWT
4 (SIT/RCS Drain)	V3459 and V3460	None	Pump Discharge to RWT
5 (To Letdown HX)	V03108 and V02000	None	Through CVCS Relief Valves
6 (To Purif. Filter)	V03000/V03001 and V02013	None	Through CVCS Relief Valves

Flowpaths 1 and 2 are from the shutdown cooling loop downstream of the SDC heat exchangers. The first is through the NaOH eductors, to the suction of the containment spray pumps. The suction of the spray pump is common with the suction of the same train high pressure safety injection pump. This flowpath is isolated procedurally by closing valves V07271 and V07272. The procedure requires independent verification that the valves are closed prior to initiating shutdown cooling. The second flowpath is through the normally closed valves V3662 and V3663 to the suction of the high pressure safety injection pumps.

While these flowpaths might impact the operation of the high pressure safety injection pump on the same train as the operating low pressure safety injection pump, flow would be prevented from directly entering the RWT from the suction lines by check valves V07119 and V07120. Flow however may be forced through the high pressure safety injection pump and its recirculation line to the RWT. The high pressure safety injection pump on the other train would be unaffected. The containment spray pump recirculation lines are normally locked closed. Inadvertent misposition of these isolation valves would be identified by either lifting of the relief valve on the containment spray/high pressure safety injection pump suction lines (SR-07-1A and 1B), high level alarms in the RWT (LIS-07-3) and/or pressure indication on the discharge of the high pressure safety injection pumps (PI-3308 and PI-3309).

Flowpaths 3 and 4 involve the ECCS pump recirculation lines to the RWT. These flowpaths would allow the RCS to be pumped to the RWT by the low pressure safety injection pumps. The first recirculation flowpath is the normal low pressure safety injection pump recirculation line. This flowpath is isolated procedurally by closing valves V3204 and V3205. The second recirculation flowpath is through two locked closed valves in series (V3459 and V3460).

For the recirculation cases, inadvertent misposition of the isolation valves would be identified by a high alarm in the RWT (LIS-07-3). A review of the NPSH calculation for the high pressure injection pumps during RCS injection from the RCS indicates that even if the RWT were completely filled with 325 °F water above the Technical Specification volume, sufficient NPSH for the high pressure safety injection pumps would still be available. It should be noted that a scenario similar to the one discussed above for the recirculation lines has previously occurred at St. Lucie Unit 1. RCS inventory was inadvertently diverted to the RWT through an incompletely closed recirculation isolation valve in June 1980 per AEOD/S95-01 and AEOD/E704.

Flowpaths 5 and 6 involve flow to the CVCS system. These flowpaths are through normally locked closed valves V03108 and V02000 or V03000/V03001 and V02013. These flowpaths can be opened for filtration/purification purposes when shutdown cooling loop conditions meet the pressure/temperature requirements of the CVCS system. Neither of these flowpaths would be directed to either the RWT or the suction of the high pressure safety injection pumps. However, introduction of shutdown cooling fluid into the low pressure portion of the CVCS system during the initial stages of the cooldown may provide a flowpath through CVCS system relief valves.

St. Lucie Unit 2:

Two trains of ECCS components, each containing one HPSI pump, one CS pump, and one LPSI pump are supplied from a common connection on the RWT which branches into seperate suction headers for each train. During Mode 4, only one high pressure safety injection pump is required to be OPERABLE for injection into the RCS with suction from the RWT. The RWT is protected from backflow in the suction lines by check valves.

A review of plant procedures and drawings for operation at hot shutdown (Mode 4 on shutdown cooling) has identified four potential flow paths that could direct flow from the normal shutdown cooling flowpath. A summary of the four flowpaths is provided in Table 2 below:

Table 2 – Unit 2, 2 Inches and Greater Branch Connections from SDC Normal Flowpath

Flowpath	Isolation Valve(s) Train A/Train B	Impact on HPSI if Inadvertently Left Open	Potential for RCS Blowdown if Inadvertently Left Open
1 (LPSI Recirc)	V3767/V3205	None	Pump Recirc to RWT
2 (SIT/RCS Drain)	V3460/V3511 and V3459 and LCV-07-12	None	Pump Discharge to RWT
3 (To U/S of Purif. Filter)	V3712/V03012 and V02000	None	Through CVCS Relief Valves
4 (To D/S of Purif. Filter)	V03000/V03001 and V02013	None	Through CVCS Relief Valves

Flowpaths 1 and 2 involve the ECCS pump recirculation lines to the RWT. These flowpaths would allow the RCS to be pumped to the RWT by the low pressure safety injection pumps. The first recirculation flowpath is the normal low pressure safety injection pump recirculation line. This flowpath is isolated procedurally by closing valves V3767 and V3205. The second recirculation flowpath is through two locked closed valves and one normally closed valve in series (V3511/V3460 and V3459 and LCV-07-12).

For the recirculation cases, inadvertent misposition of the isolation valves would be identified by a high alarm in the RWT (LIS-07-3). A review of the NPSH calculation for the high pressure injection pumps during RCS injection from the RCS indicates that even if the RWT were completely filled with 325 °F water above the Technical Specification volume, sufficient NPSH for the high pressure safety injection pumps would still be available.

Flowpaths 3 and 4 involve flow to the CVCS system. These flowpaths are through normally locked closed valves V3712/V03012 and V02000 or V03000/V03001 and V02013. These flowpaths can be opened for filtration/purification purposes when shutdown cooling loop conditions meet the pressure/temperature requirements of the CVCS system. Neither of these flowpaths would be directed to either the RWT or the suction of the high pressure safety injection pumps. However, introduction of shutdown cooling fluid into the low pressure portion of the CVCS system during the initial stages of the cooldown may provide a flowpath through CVCS system relief valves.

NRC Request 2:

If this susceptibility is found by the review of request 1, prepare, with consideration of plant-specific design attributes, a description of the features of your Appendix B quality assurance program (for example, the methods used to verify valve position, the controls in place to assure compliance with plant surveillance, maintenance, modification and operating procedures, and the adequacy of operator training for such activities) that provide assurance that the safety-related functions of the RHR system and ECCS will not be adversely affected by activities conducted at hot shutdown (such as occurred at Wolf Creek). Addressees may limit their attention to those surveillance, maintenance, modification and operational activities at hot shutdown during which it is feasible to divert RCS fluid to the RWST, resulting in simultaneous drain-down of the RCS and voiding in the suction header for the RHR and ECC system pumps. Addressees may further limit their response to the consideration of potential configurations and conditions that involve flow paths with pipe diameters equal to or greater than 2 inches. The response to part (2) of the above information request need not be submitted to the NRC. However, responses to parts (1) and (2) of the required information shall be kept in a retrievable licensee system that NRC can verify on an as-needed or sample basis.

FPL Response 2:

FPL has completed a review of the controls in place to assure compliance with plant surveillance, maintenance, modification and operating procedures, and the adequacy of operator training for such activities) that provide assurance that the safety-related functions of the shutdown cooling system and ECCS will not be adversely affected by activities conducted at hot shutdown (such as occurred at Wolf Creek). Adequate operator training is included in Lesson Plans (LP) 4502007, *Good Operating Practices 98.6*, and LP 0802208, *Outage Tasks and Outage Related Events*, Process controls are included in ADM 09.04, *In-Plant Clearance Orders*, and AP 0010145, *Shutdown Cooling Controls*. The flow paths identified in the response to part 1 have been procedurally identified and valves that could admit reactor coolant system flow to the suction of the ECCS pumps while on shutdown cooling in MODE 4 are either locked closed or closed and independently verified for correct valve position. These procedures include NOP-1-0030127, OP-1-0410020, NOP-1-0410022, NOP-2-0410022, ADM 17.06, and AP-1-0010123.

FPL will retain the descriptions of these controls to assure compliance with plant surveillance, maintenance, modification, and operating procedures, and the adequacy of operator training for such activities) that provide assurance that the safety-related functions of the shutdown cooling system and ECCS will not be adversely affected by activities conducted at hot shutdown.