3/4.4 REACTOR COOLANT SYSTEM

REACTOR COOLANT LOOPS

LIMITING CONDITION FOR OPERATION

3.4.1.1 Four reactor coolant pumps shall be in operation.

APPLICABILITY: Modes 1 and 2.

ACTION:

With less than four reactor coolant pumps in operation, be in at least HOT STANDBY within 6 hours.

SURVEILLANCE REQUIREMENTS

4.4.1 The Flow Dependent Selector Switch shall be determined to be in the 4 pump position within 15 minutes prior to making the reactor critical and at least once per 12 hours thereafter.

REACTOR COOLANT SYSTEM

HOT STANDBY

LIMITING CONDITION FOR OPERATION

3.4.1.2 a. At least two of the reactor coolant loops listed below shall be OPERABLE.

1. Reactor Coolant Loop (A) and at least one associated reactor coolant pump.
2. Reactor Coolant Loop (B) and at least one associated reactor coolant pump.
3. Shutdown Cooling Loop (A) (Mode 4 only).
4. Shutdown Cooling Loop (B) (Mode 4 only).

b. At least one of the above Reactor Coolant Loops shall be in operation*.

c. When operating with less than 4 reactor cooling pumps in Mode 3, the SHUTDOWN MARGIN requirement of Specification 3.1.1.1. shall be increased to and maintained at $\geq$ 4.1%. Δ k/K. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

APPLICABILITY: MODES 3 and 4

ACTION:

a. With less than the above required reactor coolant loops operable, restore the required loops to OPERABLE status with 72 hours or be in COLD SHUTDOWN within the next 30 hours.

b. With no reactor coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required loop to operation.

SURVEILLANCE REQUIREMENTS

4.4.1.2.1 At least the above required reactor coolant pumps, if not in operation, shall be determined to be OPERABLE once per 7 days by verifying correct breaker alignments and indicated power availability.

4.4.1.2.2 At least one cooling loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

*All reactor coolant pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause dilution of the reactor coolant system boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

REACTOR COOLANT SYSTEM

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.4.1.3 a. The two Shutdown Cooling loops listed below shall be OPERABLE:
1. Shutdown Cooling Loop (A)#
2. Shutdown Cooling Loop (B)#

b. At least one of the above coolant loops shall be in operation*.

APPLICABILITY: MODE 5 without RCS integrity

ACTION: a. With less than the above required coolant loops OPERABLE, immediately initiate corrective action to return the requried coolant loops to OPERABLE status as soon as possible. If required loops are not restored to OPERABLE within 8 hours, immediately initiate action to restore RCS integrity.

b. With no coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

APPLICABILITY: MODE 5 with RCS integrity

ACTION: With no coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and immediately initiate corrective action to return the required coolant loop to operation.

SURVEILLANCE REQURIEMENTS

4.4.1.3.1 The required shutdown cooling loop(s) shall be determined OPERABLE per the St. Lucie Unit Inservice Inspection Program, Pump Test Program, and Valve Test Program.

*All reactor coolant pumps and decay heat removal pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause dilution of the reactor coolant system boron concentration, and (2) core outlet temperature is maintained at least 10°F below saturation temperature.

#The normal or emergency power source may be inoperable in MODE 5.

REFUELING OPERATIONS

3/4.9.8 SHUTDOWN COOLING AND COOLANT CIRCULATION

ALL WATER LEVELS

LIMITING CONDITION FOR OPERATION

3.9 8.1 At least one shutdown cooling loop shall be in operation.

APPLICABILITY: MODE 6

ACTION:

a. With less than one shutdown cooling loop in operation, except as provided in b. below, suspend all operations involving an increase in the reactor decay heat load or a reduction in boron concentration of the Reactor Coolant System. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.

b. The shutdown cooling loop may be removed from operation for up to 1 hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of reactor pressure vessel hot legs.

c. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.1 At least one shutdown cooling loop shall be verified to be in operation and circulating reactor coolant at a flow rate of greater than or equal to 3000 gpm atleast once per 4 hours.

REFUELING OPERATION

LOW WATER LEVEL

LIMITING CONDITION FOR OPERATION

3.9.8.2 Two independent shutdown cooling loops shall be OPERABLE.*

APPLICABILITY: MODE 6 when the water level above the top of the irradiated fuel assemblies seated within the reactor pressure vessel is less than 23 feet.

ACTION:

a. With less than the required shutdown cooling loops OPERABLE, immediately initiate corrective action to return loops to OPERABLE status as soon as possible.

b. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.9.8.2 The required shutdown cooling loops shall be determined OPERABLE per the St. Lucie Unit 1 Inservice Inspection Program, Pump Test Program, and Valve Test Program.

*The normal or emergency power source may be inoperable for each shutdown cooling loop.

3/4.4.1 REACTOR COOLANT LOOPS

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above 1.30 during all normal operations and anticipated transients. By original design STARTUP and POWER OPERATION may be initiated and may proceed with one or two reactor coolant pumps not in operation after the setpoints for the Power Level-High, Reactor Coolant Flow-Low, and Thermal Margin/Low Pressure trips have been reduced to their specified values. Reducing these trip setpoints ensures that the DNBR will be maintained above 1.30 during three pump operations and that during two pump operation the core void fraction will be limited to ensure parallel channel flow stability within the core and thereby prevent premature DNB. However, less than 4 pump operation in Modes 1 and 2 is currently not authorized for the unit.

A single shutdown cooling loop or a single reactor coolant loop with its steam generator filled above the low level trip setpoint provides sufficient heat removal capability for core cooling while in MODES 3 and 4, however, single failure considerations require plant cooldown if component repairs and/or corrective action cannot be made within the allowable out-of-service time if at least 2 redundent loops are not OPERABLE. The additional SHUTDOWN MARGIN requirement for Mode 3 provides assurance of acceptable results should there be a MSLB with less than 4 RCPs operating.

For Mode 5 without RCS integrity (i.e. SG manways open) and Mode 6 when the water level above fuel assemblies seated in the vessel is less than 23 feet, a single shutdown cooling loop provides sufficient heat removal capability for core cooling; however, single failure considerations require that 2 loops be OPERABLE.

For Mode 5 with RCS integrity, in the event of a failure of the operating shutdown cooling loop, other methods of heat removal are viable and available, (i.e. injection via the required OPERABLE charging or HPSI pump). These provide, as a minimum, adequate time to initiate emergency measures to cool the core.

3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve 2 X 10^5 lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety valves are OPERABLE, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psia. The combined relief capacity of these valves is sufficient to limit the Reactor Coolant System pressure to within its Safety Limit of 2750 psia following a complete loss of turbine generator load while operating at RATED THERMAL POWER and assuming no reactor trip until the first Reactor Protective System trip setpoint (Pressurizer Pressure-High) is reached (i.e. no credit is taken for a direct reactor trip on the loss of turbine) and also assuming no operation of the pressurizer power operated relief valve or steam dump valves.

REFUELING OPERATIONS

BASES

3/4.9.6 MANIPULATOR CRANE OPERABILITY

The OPERABILITY requirements of the cranes used for movement of fuel assemblies ensure that: 1) each crane has sufficient load capacity to lift a fuel element, and 2) the core internals and pressure vessel are protected from excessive lifting force in the event they are inadvertently engaged during lifting operations.

3/4.9.7 CRANE TRAVEL - SPENT FUEL STORAGE BUILDING

The restriction on movement of loads in excess of the nominal weight of a fuel asembly and CEA over irradiated fuel assemblies ensures that no more than the contents of one fuel assembly will be ruptured in the event of a fuel handling accident. This assumption is consistent with the activity release assumed in the accident analyses.

3/4.9.8 COOLANT CIRCULATION

The requirement that at least one shutdown cooling loop be in operation ensures that (1) sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE, and (2) sufficient coolant circulation is maintained through the reactor core to minimize the effects of a boron dilution incident and prevent boron stratification.

The requirement to have two shutdown cooling loops OPERABLE when there is less than 23 feet of water above the core, ensures that a single failure of the operating shutdown cooling loop will not result in a complete loss of decay heat removal capability. With the reactor vessel head removed and 23 feet of water above the core, a large heat sink is available for core cooling, thus in the event of a failure of the operating shutdown cooling loop, adequate time is provided to initiate emergency procedures to cool the core.

The requirement that at least one shutdown cooling loop be in operation is consistent with the assumptions in the safety analysis of the boron dilution accident and prevents local variations in boron concentrations, thus minimizing the effects of inadvertent boron dilution. It also assures that sufficient cooling capacity is available to remove decay heat and maintain the water in the reactor pressure vessel below 140°F as required during the REFUELING MODE.

3/4.9.9 CONTAINMENT ISOLATION SYSTEM

The OPERABILITY of this system ensures that the containment isolation valves will be automatically isolated upon detection of high radiation levels within the containment. The OPERABILITY of this system is required to restrict the release of radioactive material from the containment atmosphere to the environment.

[illegible]

[illegible]

[illegible]

3/4.9.10 and 3/4.9.11 WATER LEVEL-REACTOR VESSEL AND STORAGE POOL WATER LEVEL

The restrictions on minimum water level ensure that sufficient water depth is available to remove 99% of the assumed 10% iodine gap activity released from the rupture of an irradiated fuel assembly. The minimum water depth is consistent with the assumptions of the accident analysis.

3/4.9.12 FUEL POOL VENTILATION SYSTEM-FUEL STORAGE

The limitations on the fuel handling building ventilation system ensures that all radioactive material released from an irradiated fuel assembly will be filtered through the HEPA filters and charcoal adsorber prior to discharge to the atmosphere. The OPERABILITY of this system and the resulting iodine removal capacity are consistent with the assumptions of the accident analyses.

3/4.9.13 SPENT FUEL CASK CRANE

The maximum load which may be handled by the spent fuel cask crane is limited to a loaded single element cask which is equivalent to approximately 25 tons. This restriction is provided to ensure the structural integrity of the spent fuel pool in the event of a dropped cask accident. Structural damage caused by dropping a load in excess of a loaded single element cask could cause leakage from the spent fuel pool in excess of the maximum makeup capability.

3/4.9.14 DECAY TIME - STORAGE POOL

The minimum requirement for decay of the irradiated fuel assemblies in the three 7X7 modules and the one 7X10 module nearest the fuel cask compartment prior to movement of the spent fuel cask into the fuel cask compartment ensures that sufficient time has elasped to allow radioactive decay of the fission products. This decay time is consistent with the assumptions used in the cask drop accident analysis.

SAFETY EVALUATION

RE: St. Lucie Unit 1
Docket No. 50-335
Proposed Tech Spec Amendment

I. Introduction

This evaluation supports a proposal to revise specifications 3.4.1, 3.4.1.2 and 3.4.1.3 and to add specifications 3.9.8.1 and 3.9.8.2 to ensure that the Limiting Conditions for Operation provide for redundancy in available decay heat removal systems.

II. Discussion

The proposed revisions to Technical Specifications 3.4.1, 3.4.1.2 and 3.4.1.3 and the addition of Technical Specification 3.9.8.1 and 3.9.8.2 are necessary to comply with a NRC letter dated June 11, 1980. The purpose of these changes is to provide for redundancy in the Shutdown Cooling and Reactor Coolant Systems to ensure adequate decay heat removal capability in all modes of reactor operation.

III. Conclusion

We have concluded, based on the considerations discussed above, that:(1) the amendment does not increase the probability or consequences of accidents previously considered and does not reduce the margin of safety, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

10-30-80