



Florida Power

CORPORATION
Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72

July 20, 2000
3F0700-08

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Pressurizer Heaters Emergency Power Supply, NUREG-0578, TMI-2 Lessons Learned Task Force Status Report and Short-Term Recommendations, Item 2.1.1 and NUREG-0737, Clarification of TMI Action Plan Requirements, Item II.E.3.1

References: 1) NRC to FPC letter dated May 5, 1980
2) NRC to FPC letter dated November 22, 1988

Dear Sir:

The purpose of this letter is to request NRC approval of a one-time alternative compliance to the subject NUREG requirements for operation of Florida Power Corporation's (FPC's) Crystal River - Unit 3 nuclear power plant (CR-3). This request provides a risk-informed balance between the subject NUREG requirements and current operational reactor coolant system (RCS) leakage for an interim period of time. This matter has been discussed with the NRC Project Manager for CR-3.

NUREG-0578, Item 2.1.1 and NUREG-0737, Item II.E.3.1 require the minimum number of pressurizer heaters needed to maintain the RCS in natural circulation conditions to be powered from redundant, emergency diesel generator-backed sources, which will ensure power availability during a Loss Of Off-site Power (LOOP). Subsequent to a plant trip caused by a LOOP, this minimum number of pressurizer heaters is needed to maintain RCS pressure control in hot standby (Mode 3) while compensating for ambient losses and RCS leakage.

CR-3 is currently experiencing leakage from the pressurizer steam space through one of two code safety / relief valves on the pressurizer. If this leakage does not stabilize, it may reach an amount that, when added to other RCS ambient losses, exceeds the pressurizer heater capability required by the subject NUREGs, i.e., powered from a single emergency power source (an emergency diesel generator). The use of both emergency power sources would accommodate leakage up to the Improved Technical Specification limit for identified leakage. A shutdown will be planned and scheduled within two months of the RCV-8 leakage exceeding the pressurizer heater capability powered from a single emergency power source.

ADD3

FPC requests NRC approval of the one-time alternate implementation method of the subject NUREG requirements using both emergency power supplies to supply the pressurizer heaters for a two-month period subsequent to RCV-8 leakage exceeding 6.0 gpm. Approval is requested by September 1, 2000 as the leakage from the relief valve may reach the current pressurizer heater capacity during September. This request is justified in Attachment A.

Commitments associated with this request are contained in Attachment B.

If you have any questions regarding this submittal, please contact Mr. Sid Powell, Manager, Nuclear Licensing at (352) 563-4883.

Sincerely,



John J. Holden
Vice President and Site Director

Attachments

xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector

PRESSURIZER HEATER EMERGENCY POWER SUPPLY REQUIREMENTS

Issue

NUREG-0578, TMI-2 Lessons Learned Task Force Status Report and Short Term Recommendations (July 1979), Item 2.1.1 and NUREG-0737, Clarification of TMI Action Plan Requirements (November 1980), Item II.E.3.1 required redundant emergency power be supplied to the pressurizer heaters so that natural circulation could be maintained in Hot Standby (Mode 3) subsequent to a Loss Of Off-site Power (LOOP).

When a LOOP occurs, the plant (including the reactor coolant pumps) will automatically trip and the Reactor Coolant System (RCS) will be in a natural circulation mode of cooling. If the pressurizer heaters are available (i.e., powered from the on-site emergency diesel generators), then the steam bubble in the pressurizer will be maintained and natural circulation will not be inhibited.

The concern is that if sufficient pressurizer heaters are unavailable, the RCS may eventually become solid due to the collapse of the steam bubble in the pressurizer. With no pressurizer heaters, the RCS would be more difficult to control and would result in operators using RCS make-up and letdown to control pressure. While this is not a normal operational situation, this evolution is included in the CR-3 Emergency Operating Procedures on which the operators are trained.

Background

On January 11, 1980, Florida Power Corporation (FPC) reported to the NRC that the current design of the CR-3 pressurizer heaters met the NUREG-0578 requirements with the exception of no automatic transfer of power from the non-safety related power supply to the safety related (emergency) power supply. FPC documented a manual power transfer within two hours of the LOOP that met the intent of NUREG-0578.

On May 5, 1980, the NRC documented its review of FPC's implementation of NUREG-0578 including acceptance of the manual power transfer.

On October 21, 1988, FPC informed the NRC that the CR-3 design for emergency power to the pressurizer heaters did not fully meet the redundancy requirement of NUREG-0578. This was also reported in Licensee Event Report (LER) 88-023 on November 16, 1988.

On November 22, 1988, the NRC issued a revised safety evaluation that allowed operation of CR-3 until the next scheduled refueling outage and required the upgrade of the pressurizer heater emergency power supplies to fully meet the requirements of NUREG-0578 and NUREG-0737 at that time. FPC completed that upgrade in Refuel 7 Outage, which ended on June 23, 1990. The completion of the upgrade was reviewed in NRC Inspection Report 90-21, dated July 27, 1990.

Current Situation

On March 8, 2000, RCS leakage was identified as coming from pressurizer code safety / relief valve RCV-8. Precursor Card (PC) 00-0761 was written to document and track actions related to the leakage in the CR-3 Corrective Action Program. Improved Technical Specification (ITS) Limiting Condition for Operation (LCO) 3.4.12.c limits RCS identified leakage to no more than 10 gallons per minute (gpm). As of July 17, 2000, the identified leakage through RCV-8 is approximately 1.7 gpm.

The RCS leakage from the pressurizer steam space has certain unique attributes. Leaks from the RCS are replaced with make-up water. If the leak is anywhere except the pressurizer steam space, the make-up water is heated by the reactor core to RCS temperature. Leaks from the pressurizer steam space have a substantially higher enthalpy than the RCS water. Therefore, the pressurizer heaters must heat RCS water into steam (in addition to overcoming RCS ambient heat losses).

ITS LCO 3.4.8 requires the pressurizer to be operable when CR-3 is in Modes 1, 2, and 3. One requirement of operability is that at least 252 kW of pressurizer heaters be capable of being powered from each emergency bus. Each emergency bus is powered by one of the on-site emergency diesel generators. This pressurizer heater capacity implements the NUREG-0578 and NUREG-0737 requirements under normal circumstances as explained in the ITS 3.4.8 Bases. (The ITS Bases will be evaluated for revision when this request is approved.)

Engineering evaluations have shown that for a LOOP, an RCV-8 leak of up to 6.0 gpm can be accommodated by either emergency diesel-backed pressurizer heater capacity. The RCS is maintained in natural circulation in Mode 3 with some reduction from normal operating pressure.

Further engineering evaluations have shown that an RCV-8 leak of up to the 10 gpm ITS limit can be accommodated using both emergency diesel-backed pressurizer heater capacities.

Current projections show that the RCV-8 leak could increase to 6.0 gpm in September 2000 unless the leakage stabilizes. The need for power in Florida is normally high until early October. Therefore, FPC will plan and schedule a shutdown within two months of the RCV-8 leakage exceeding 6.0 gpm to repair or replace RCV-8.

The likelihood of a LOOP in the requested two-month time period is remote. The CR-3 specific Probabilistic Safety Assessment (PSA) input reflects the probability of a LOOP during a two-month period, based on the average annual (i.e., not seasonally adjusted) probabilities, to be approximately $4.3\text{E-}03$. Further, the probability that both emergency diesel generators would not be available and that off-site power is not recovered within the 2 hours that are allotted to manually align the pressurizer heaters to the emergency power busses is $7.62\text{E-}05$. It is noted that Emergency Procedure (EM) -220, Violent Weather, functionally tests both emergency diesel generators upon a hurricane warning for the plant site to ensure both are operable.

Should off-site power not be recovered within the 2 hours and one emergency diesel generator not be available, an alternate method of maintaining subcooling (i. e., makeup / letdown) is available using the remaining emergency power source, which is assumed to be operable during a LOOP. This scenario does not result in core damage since cooling to the core would remain available during a LOOP.

FPC recognizes that ITS LCO 3.4.12.c limits RCS identified leakage to no more than 10 gpm. The request for a one-time alternative compliance to the subject NUREG requirements will not supercede this ITS requirement, i.e., identified leakage (including RCV-8) will not be allowed to exceed the ITS limit.

Therefore, FPC requests approval of a one-time implementation method of the subject NUREG requirements using both emergency power sources.

List of Regulatory Commitments

The following table identifies those actions committed to by Florida Power Corporation in this document. Any other actions discussed in the submittal represent intended or planned actions by Florida Power Corporation. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager, Nuclear Licensing of any questions regarding this document or any associated regulatory commitments.

ID Number	Commitment	Commitment Date
3F0007-08-01	Evaluate ITS 3.4.8 Bases for revision to conform to NRC approval	Prior to RCV-8 exceeding 6.0 gpm leakage
3F0700-08-02	Crystal River – Unit 3 will shutdown to repair / replace RCV-8.	Within two months of RCV-8 leakage exceeding 6.0 gpm.