UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 35 TO LICENSE NO. DPR-16

JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

Introduction

Jersey Central Power & Light Company's (JCP&L and the licensee) application dated May 24, 1979, as supported by letters dated April 30, May 15 and 17, 1979, proposed certain reductions in Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) applicable to continued operations of the Oyster Creek Facility. Since these proposals modify the MAPLHGR limits in the facility Technical Specifications, they require NRC authorization to amend the Technical Specifications. Such modifications allow operation of the plant with one recirculation loop out of service using the more restrictive Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) limits (originally authorized by Amendment No. 30, dated March 14, 1978), with values extended to encompass higher exposure fuel.

Discussion

The licensee informed the NRC staff by letter dated April 30, 1979, that the facility was operating with four (4) of the five (5) reactor recirculation coolant loops in service and that the approved ECCS analysis (Amendment No. 33, dated November 11, 1978) did not consider operation in this mode. Therefore, to comply with the provisions of 10 CFR 50.46, the licensee administratively imposed more restrictive operational limits on the facility during this mode of operation. These limits were previously approved by Amendment No. 15, dated February 24, 1976. An extension of these limits was approved by Amendment No. 30, dated March 14, 1978.

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Operation with less than all loops in service was previously reviewed and approved by the NRC in Amendment No. 15. This evaluation was based upon the analysis presented by the licensee's March 25, 1975, submittal which described the ECCS evaluation model for the facility. This model utilized a blowdown analysis by the General Electric Company (GE) and individual heatup analyses by GE and the Exxon Nuclear Company for their respective fuel designs. This analysis provided the technical basis for our acceptance of the proposed Maximum Average Planar Linear Heat Generation Rate (MAPLHGR) curves for all loops and partial loop operational modes. This same basis was used to approve Amendment No. 30 which granted an extension of the Amendment 15 MAPLHGR curve for longer exposure.

Amendment No. 33, dated November 11, 1978, was requested by the licensee in response to a recommendation by the Advisory Committee on Reactor Safeguards (ACRS) that the ECCS evaluations be performed using a unified model rather than a combination of Exxon and GE calculations. This amendment provided revised MAPLHGR curves based on the Exxon Nuclear Company Non-Jet pump BWR ECCS evaluation model. The revised curves permitted less restrictive operating limits than the curves of Amendments 15 and 30.

Evaluation

As indicated in the licensee's letter of April 30, 1979, a telephone conversation between the licensee and Exxon Nuclear Company representatives revealed that the revised analysis of Amendment 33 had not considered plant operation with less-than-all-loops in service. Therefore, operation with the MAPLHGR curves of Amendment 33, with only four operable pumps, had not been analyzed. The licensee has indicated that only the core configuration has changes and not the major core parameters such as core power, flow distribution and voids; therefore, the previously approved ECCS analysis, which supports less than all loops in service, is still applicable. On this basis, the licensee has administratively imposed the more restrictive MAPLHGR limits of Amendments 15 and 30 to govern operation of the facility.

Flow distribution, with less-than-all-loops in service, inventory losses, backflow through the idle loop, and changes in void size are parameters that must be considered when evaluating the effect of partial loop flow on transients, the potential for new accidents, and accidents previously analyzed.

The results of our review of the material and analyses presented by the licensee in support of Amendment 15 indicated that operation with one recirculation pump out of service did not alter the transient analysis results because major core parameters such as total flow, core voids, and inventory were maintained the same as for operation with all loops in service. Since no changes were made to the facility that affect the above parameters, we conclude that the previously performed transient analysis remains valid and, therefore, acceptable. The addition of fuel assemblies of the same type previously analyzed will not create a significant change in core hydraulics. In addition the previous ECCS evaluation for one loop out of service is fully applicable to the present core configuration.

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Section 1.4.3 of our Safety Evaluation for Amendment No. 16 discussed the licensee's analysis of the improper startup of an idle loop transient. The analysis demonstrated that start up of the idle loop was not the most limiting transient for the Oyster Creek facility. Furthermore, technical specification 3.3.F.2 prohibits reactor operation if the idle loop is isolated, thereby assuring that a cold water addition accident is not likely to occur.

By maintaining the discharge valve bypass line open and the recirculation pump suction valve open, thermal equilibrium between the idle loop and the core bulk inventory can be achieved, thus, eliminating the potential for a cold water reactivity addition accident to occur by restarting the idle loop. We conclude that with the present restriction or technical specification 3.3.F.2, idle loop startup and the cold water reactivity addition accident is not a concern.

The licensee stated that the GE blowdown analysis portion of the previously used model is insensitive to fuel design, core configuration, or the number of active flow loops, so with the same core power and flow conditions, no significant difference in blowdown characteristics would be observed for changes in core configuration or the number of flow loops in service. Assurance that the same flow conditions exist is provided by the Limiting Safety System setting for the flow-biased scram curve of technical specification Section 2.3.

Losses of coolant inventory can affect the analyzed blowdown. However, since no part of the idle loop's inventory is isolated from the remainder of the primary system, the inventory in that loop is available to flow through a postulated break and will not significantly affect the blowdown i.e., core uncovery time would not be significantly affected. Although flow conditions remain the same, available inventory remains unchanged, and idle loop startup acceptably resolved, a potential for slightly changing the void content in the core exists. However, since the pump is idle and the loop not isolated, a small amount of reverse flow through the inactive loop will occur. Backflow through the loop diverts flow that would normally be directed through the core, thus, the amount of water and voids originally accounted for during ECCS LOCA calculation may be different. Larger void amounts (smaller water inventory) leads to faster than predicted times for fuel uncovery which results in higher than previously calculated peak clad temperature. The licensee has stated that the amount of backflow through one inactive loop represents approximately 0.2 percent of total core flow (300 gpm). To account for the backflow, the measured flow will be reduced by an amount equal to twice the established backflow. Assurance that this amount of backflow is considered when performing core calculations is provided by upgraded procedures 1001.12, "core calculations" and 1001.33, "Daily Checks" (JCP&L ltr. dated 5/16/79). We find this manner of accountability acceptable.

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Insofar as the effects of four pump operation upon transient and accident analyses previously reviewed, only those accidents and transients which relate to a recirculation system malfunction need to be reviewed. The licensee addressed three such events for the five pump operation: 1) all recirculation pumps trip, 2) single recirculation pump trip and, 3) pump seizure (locked-rotor). Amendment No. 76 to the FDSAR addressed each of these events showing that the five pump trip was more severed than the single pump trip but approximately equal to a pump seizure. The licensee's analysis of the three transients predict a change in minimum critical power ratio (MCPR) of -.01 for the one-of-five pump stall and assumed -.07 as the difference between one-of-four and one-of-five pump stalls. These changes in MCPR are relatively minor when considering worst case transients. A steady state MCPR of 1.52 has been established such that as a result of the worst case transient (i.e., continuous rod withdrawal error) the resultant change in MCPR will not decrease below the transient limit of 1.34. As can be seen by the licensee's assessment, the resultant MCPR, following a pump seizure event while in the four pump operational mode, would be 1.44 leaving a substantial margin of 0.1 from the transient MCPR limit. On this basis, we find that the locked rotor event while operating with four recirculation pumps is bounded by the previously reviewed transient analysis and is, therefore, acceptable.

By letter dated May 15, 1979, the licensee provided a new set of MAPLHGR curves. These curves extend the previously approved MAPLHGR curves of Amendment No. 30 for higher exposures. JCP&L's application dated May 24, 1979, requested a license amendment to incorporate the extended curves in the Technical Specifications. We have reviewed the newly proposed MAPLHGR limits and have concluded that they are based on calculational methods previously accepted; they do not change MAPLHGR limits previously found acceptable but only extend the previous calculations to higher fuel exposures and, therefore, are acceptable.

Environmental Considerations

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR 51.5(d)(4) that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We further conclude, based on the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (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.

Date: May 30, 1979