



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 47 TO LICENSE NO. DPR-16

JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated March 31, 1980, Jersey Central Power & Light Company requested a Technical specification change that would modify section 4.3 to provide for an augmented inservice inspection of the core spray spargers and repair assemblies beginning with the 1981 refueling outage.

Scheduled inservice inspection and subsequent tests of the reactor internals during the 1978 refueling outage at the Oyster Creek Nuclear Generating Station identified and confirmed the existence of a crack in a portion of one of the two core spray system spargers inside the reactor vessel. Action was taken during the Fall 1978 outage to strengthen the sparger at the crack location by the installation of a mechanical clamp assembly.

During the 1980 refueling outage, additional cracks were discovered by a significantly improved procedure for inservice inspection of the spargers. (It is not known whether these are new cracks, or previously existing cracks that were overlooked during the 1978 inspection.)

The proposed repair was designed to return the core spray system to a fully operational state capable of delivering the required core spray. The associated Technical Specification change would have required augmentation of the inspection requirements to assure continued system functional capability.

2.0 DISCUSSION

The Oyster Creek reactor vessel contains two independent core spray sparger assemblies which are fed by two separate core spray systems. Each of these systems is provided with full redundant pumps, valves, power supplies, controls and instrumentation, so that either system can perform the safety function in the presence of a single failure in the other system. Only one system is needed to accomplish the safety objective. When the system is activated, core spray water is directed through the reactor vessel and shroud into the core spray sparger assemblies. Each core spray sparger contains spray nozzles that are designed to provide a spray pattern that ensures each fuel bundle receives adequate coolant flow.

8005300026

Each sparger consists of two 180° segments, each of which is supported at the centrally located inlet pipe connection that is welded to the shroud, and by three approximately equally spaced support brackets on either side of the central inlet pipe connection. The sparger arms, supported in the radial and vertical directions, are free to slide circumferentially as required to accommodate any differential thermal expansion between the shroud and the sparger during injection of cool core spray water.

Inservice inspections performed during the Fall 1978 outage revealed a single crack in the upper sparger that was determined to be through-wall for about 135° circumferentially.

Although analyses indicated that the cracked sparger would be adequate for continued operation, a mechanical support clamp was installed to assure that both core spray systems would have full design capability.

Examination of the spargers during the 1980 refueling outage showed that the repair clamp assembly remained as installed in 1978. Inspection of the balance of the spargers in January 1980 revealed a number of additional cracks in both upper and lower spargers. The proposed repair is the addition of seven clamp assemblies to the upper sparger and two clamp assemblies to the lower sparger. These clamp assemblies are the same in concept, material, and cross-section as the repair clamp installed in 1978.

The requested Technical Specification change would require that an inspection of both core spray spargers and of the repair assemblies be performed at each of the future refueling outages, starting in 1981.

3.0 EVALUATION

The analysis, design and installation of the repair bracket assemblies are in accordance with currently accepted engineering practices. The analyses of the structural loads imposed by static, seismic and thermal loading demonstrate the bracket assembly's ability to limit the crack opening to within an acceptable range should an existing crack propagate around the pipe circumference.

Although the stresses from the normal operating loads in the core spray sparger are well below the yield stress of the stainless steel material, the analysis does not show that those stresses are at or below the K_{ISCC} (stress intensity, below which a crack will not propagate by stress corrosion) for the material-environment combination in question.

The analysis suggests that the relatively high residual stresses that resulted from forcing the pipe into position during installation together with some sensitization of the material due to welding, cold work, local heating etc., could conceivably cause the cracking observed, which is believed to be stress corrosion cracking. The analysis also suggests that, because the opening of cracks relieves stresses in other locations in the sparger, the susceptibility to stress corrosion cracking in those locations is reduced.

We concur with the licensee that high installation stresses, material sensitization, cold work, local heating etc. are all probable causes for the initiation of stress corrosion cracking and we agree that crack opening could relieve stresses and therefore reduce the susceptibility of stress corrosion cracking in other locations. However, there is insufficient basis to conclude that stress corrosion crack initiation and propagation has been eliminated completely.

4.0 SUMMARY

We have evaluated the Repair Proposed No. 475-01, "Oyster Creek Nuclear Generating Station Core Spray System Sparger Repair" and have met with the licensee and his contractors regarding this matter. We conclude that the proposed interim repair of the Oyster Creek spargers is adequate for the present condition of the spargers and does not represent a significant change in safety margin from that of the original design, nor will the installation of the repair hardware increase the probability of an accident. Thus, there is reasonable assurance that the health and safety of the general public will not be jeopardized by continued operation of the as-repaired facility for the next fuel cycle. Concern over significant amounts of additional cracking over the long term remain.

The licensee is proceeding with the design of replacement core spray spargers and has stated that they will be installed at the next refueling outage if the design is completed and the hardware can be procured. We conclude that this effort should be accelerated and that the existing spargers should be replaced during the 1981 refueling outage. We have discussed this requirement with the licensee's representative and he has agreed to this replacement schedule. The licensee also agreed that the requested Technical Specification change for augmented inservice inspection of the core spray spargers and repair assemblies is no longer appropriate because the spargers will be replaced in 1981.

5.0 ENVIRONMENTAL CONSIDERATION

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.

6.0 CONCLUSION

We have concluded, 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 15, 1980