JCP&L GPU

Jersey Central Power & Light Company
Madison Avenue at Punchbowl Road
Morristown New Jersey 07960
201 539-6111

September 30, 1981

Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: Oyster Creek Nuclear Generating Station,
Docket No. 50-219, SEP Topic III-5.B,
Pipe Break Outside Containment

U. S. NRC letter, dated April 16, 1981, to Jersey Central Power & Light Company requested additional information regarding the proposed installation of a leak detection system on emergency condenser piping on the 75-foot elevation at Oyster Creek. This proposed plant modification is described in JCP&L letter, dated October 6, 1980, to the U. S. NRC.

Enclosure 1 to this letter provides the information which was requested.

Sincerely,

J. T. Carroll, Jr.

J. T. Carroll, Jr.
Acting Director
Oyster Creek

lr

Enclosure

A095 S1/1

Enclosure 1

RESPONSE TO NRC REQUEST FOR INFORMATION
HIGH ENERGY LINE BREAK OUTSIDE CONTAINMENT
SEP TOPIC III-5.B

Responses to NRC request for additional information in NRC letter (D. M. Crutchfield) to JCP&L (I. R. Finfrock, Jr.), dated April 16, 1981, are given below. The request for information is repeated below with each response.

1. Request for Information

Provide justification for not proposing barriers, separation, and/or installation of an isolation valve inside containment on the steam supply lines as methods for mitigating the effects of high energy line breaks for this piping.

Response

As reported in JCP&L letter, dated February, 1980, and in a meeting with the NRC on March 25, 1981, engineering design studies (and some component procurement) have been undertaken to determine practical and effective methods to provide protection against the adverse consequences of a postulated break in the emergency condenser piping on the 75-foot level of the reactor building outside primary containment. These studies included evaluation of the feasibility and effectiveness of (1) adding pipe whip restraints and jet impingement barriers to protect the isolation valves outside containment and (2) installing a third isolation valve in the steam line of the emergency condenser piping just inside the containment. The results of these evaluations showed that neither of these modifications could reasonably be accomplished on a retrofit basis in a manner which would effectively resolve all of the potential areas of concern and also not impose other significant limitations on access for in-service inspection and maintenance. The main results of the evaluations which lead to this conclusion are summarized below:

A. Evaluation of Installing Isolation Valves Inside Containment

This alternative method of providing isolation capability in the event the damage to the valves and piping outside containment is not practical or desirable for the following reasons:

1. Insufficient space exists inside containment to install these motor-operated valves without significant modification to existing piping and structures inside containment. The reason for this is the limited annular space between the drywell and reactor vessel at the 75-foot elevation.

2. The location of the valves, high in the containment in the small annular space between the vessel and the drywell, would make disassembly and maintenance of the valves extremely difficult and hazardous.

3. Installation of additional isolation valves inside containment would

not provide a complete solution to the consequences of damage to the isolation valves outside containment in that it would not meet the single-active-failure criterion of NUREG/CR/75/087.

B. Installation of Pipe Whip Restraints and Barriers Outside Containment

The feasibility of adding pipe whip restraints and barriers to protect the emergency condenser isolation valves outside containment from the consequences of postulated breaks in the numerous runs of emergency condenser steam and return piping on the 75-foot elevation was evaluated by determining applicable pipe whip and jet impingement design loads, performing onsite inspections to determine access conditions and availability of supports for a restraint system, and preparing preliminary design studies. The conclusions of this work are as follows:

1. Because of the magnitude of the design loads (approximately 250 kips in any direction) due to pipe whip or jet impingement. single restraint/barrier structure would be massive, involving use of structural frame assemblies made up of about 16"-deep beams. Further, since all of the emergency condenser steam and return lines penetrate the containment in the same general area, restraining all of the lines at the isolation valves would probably require a restraint structure which is of the order of 8'x15' in overall size. The practical problems and interfaces which would be encountered in installing and supporting such a structure in the existing space are judged to be significant.

2. An effective restraint system is required to not only react direct pipe whip and jet impingement loads, but also to carry any bending or torsional moments resulting from pipe breaks remote from the isolation valves. This requirement would necessitate the installation of multiple restraint systems, each of which is similar to that described above, on the 75-foot level. The feasibility of accomplishing this in the space available and using the adjacent floor as the supporting structure for all restraints has not been determined but would be extremely difficult, if possible.

3. The containment shell and emergency condenser piping penetrations are calculated to grow due to thermal expansion by up to about 1-3/4" relative to the adjacent reactor building floor at the 75-foot level. This would normally be accomodated by providing gaps of up to 1-3/4" between the piping and the restraints to prevent over-stressing of the piping in the event of a pressurization event in the drywell. In this case, however, because of the stiffness of the piping and the relatively short lengths involved, such gaps would prevent the restraints from limiting the loads and moments imposed on the isolation valve-to-piping welds to acceptable values. This problem would require the design and development of very large snubbers with capacities in the 250 kip range, each, and it is not considered likely that if this were done, the required number of snubbers could be accomodated with their supporting structures in the space available.

4. Finally, the installation of a restraint system, such as described above, would impose severe limitations on access to the valves, their operators, the emergency condenser piping and fittings, and connecting welds and would thus limit in-service inspections and maintenance of these components.

For the above reasons, JCP&L has ruled out as undesirable and impractical the installation of pipe whip restraints and barriers to protect the emergency condenser isolation valves and piping from the effects of postulated pipe breaks in this area.

As a result of the evaluations summarized above, JCP&L has proposed the installation of a local leakage monitoring system to detect any leakage due to small cracks in these lines before a significant pipe break can occur.

2. Request for Information

Provide a schedule for submitting analyses to demonstrate that if this piping does fail, "leak before break" would be the expected failure mode.

Response

Analyses to demonstrate that the emergency condenser piping on the 75-foot level will leak before a significant break could occur will be performed and the results transmitted to the NRC by December, 1981.

3. Request for Information

The NRC staff position is that an augmented inservice inspection program must be instituted for those lines that rely on a leakage detection system to detect through wall leakage. Provide a schedule for submitting a proposed inservice inspection program.

Response

In addition to the installation of a local leakage monitoring system as described in JCP&L submittal, dated October 6, 1980, JCP&L proposes to augment the required in-service inspection of piping welds in the emergency condenser system on the 75-foot level as follows:

Visual examinations for evidence of leakage will be made with the system pressurized prior to or during each refueling shutdown.

The frequency of in-service in[illegible]ons presently required by the Oyster Creek Technical Specifications will be doubled; that is, the welds in the system on the 75-foot level will be inspected on a schedule which will cover all of the welds in each 5-year period.