UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

DOCKET NUMBER
PROD. & U.T.L. FAC. 50-247

APR 20 1973

Anthony Z. Roisman, Esq.
Berlin, Roisman & Kessler
1712 N Street, N. W.
Washington, D. C. 20036

Re: Consolidated Edison Company of New York, Inc.
Indian Point Unit No. 2, Docket No. 50-247

Dear Mr. Roisman:

I am enclosing herewith the response of the regulatory staff to the interrogatory relative to steam line breaks, which you handed me at last week's evidentiary session in subject proceeding.

Sincerely,

Myron Karman

Myron Karman
Counsel for AEC Regulatory Staff

Enclosure:
As stated above

cc: Samuel W. Jensch, Esq.
Dr. John C. Geyer
Mr. R. B. Briggs
Leonard M. Trosten, Esq.
Angus Macbeth, Esq.
Honorable Louis J. Lefkowitz
J. Bruce MacDonald, Esq.
Atomic Safety and Licensing Board Panel
Atomic Safety and Licensing Appeal Board
Mr. Frank W. Karas

QUESTION:

Using the assumptions in applicant's April 9, 1973 analysis of high-energy lines, what would be the effect on plant safety if the postulated pipe break were to occur during full power operation but prior to the modification being made? Effect on plant safety includes direct safety consequences such as failure of a system as well as reduction in the reliability of a system, degraded performance, etc.

STAFF RESPONSE:

The Regulatory staff, in letters dated December 19, 1972 and January 24, 1973, requested the applicant to provide certain information regarding the capability to shut down and maintain in a safe shutdown condition the Indian Point Unit 2 reactor subsequent to an event involving a postulated rupture, outside containment, of a pipe containing a high-energy fluid. Design criteria in the form of "General Information Required for Consideration of the Effects of a Piping System Break Outside Containment," were enclosed with the letters to serve as a basis for the evaluation.

The applicant submitted a reply entitled "Analysis of High Energy Lines," dated April 9, 1973. This document presents analyses of postulated failures in accordance with the criteria referred to above and also describes a limited number of design changes which are currently being implemented by the applicant.

The question above asks, "Using the assumptions in the applicant's April 9, 1973 analysis of high-energy lines, what would be the effect on plant safety if the postulated pipe break were to occur during full power operation but prior to the modification being made?" The discussion presented below addresses each of the postulated failures and assesses the effect on plant safety in as definitive a way as possible for the plant as designed and constructed before any modifications. With respect to plant safety the Regulatory staff is specifically concerned with the availability of structures, systems, and components necessary to shut down the reactor and maintain it in a safe condition subsequent to the failure of a high-energy line.

A potential failure of a main steam or feedwater line is the principal concern in the study since these lines are large and contain fluid with a high-energy content. In the case of Indian Point Unit 2, additional concern was expressed by the staff because of the proximity of the auxiliary feedwater pumps to the main steam and feedwater line containment penetrations. The applicant has performed analyses to determine the effects of postulated failures in the main steam and feedwater piping in accordance with our criteria and has determined that systems required for safe shutdown of the reactor remain operable following the postulated break in either a main steam or feedwater line.

In particular, all portions of the auxiliary feedwater system remain functional and are available to remove decay heat via the steam generators following a shutdown. Main steam and feedwater piping restraints are adequate as designed and constructed and no changes have been proposed (Section 4.5).

The effects of a rupture of an auxiliary feedwater line have also been examined by the applicant (Section 4.1). An analysis has been made of such a rupture within the enclosure housing the three auxiliary feedwater pumps and associated control and concludes that no damage of the required equipment would result from pipe whip. The resulting environmental conditions of temperature and pressure do not threaten structural integrity of the enclosure and it is believed that the components, including pump motors, controls, and instrumentation within the enclosure, could withstand the resulting environmental conditions. However, since no specific test data are available to substantiate this conclusion, check valves in the auxiliary feedwater lines outside the enclosure are being added to prevent hot feedwater blowdown into this enclosure.

Without these check valves, blowdown from an auxiliary feedwater line could eventually lead to reactor trip. If it is assumed that all the auxiliary feedwater system functional capability

is destroyed by the steam environment, the main feedwater system could be used to shut down and secure the plant if offsite power is available. If offsite power is made unavailable by further assuming that the reactor trip has also tripped the power grid, then adequate capability for plant shutdown could not be assured.

A similar situation could occur from rupture of the steam line to the steam turbine drive of the steam-driven auxiliary feedwater pump (Section 4.1). The proposed change involves the addition of redundant stop valves in this line outside the enclosure which are actuated automatically by a temperature sensor within the enclosure. Without this change the sequence of events as described for the auxiliary feedwater line rupture above could occur and with the same assumptions could lead to a condition where adequate capability for plant shutdown could not be assured.

Analyses of a failure in high-energy lines in areas other than the main steam, feedwater, and auxiliary feedwater lines have been performed by the applicant in Part 2 of its April 9 submittal.

Modifications to auxiliary steam (heating) lines in the turbine building adjacent to the control building wall are being made to control potential pipe whip and the effects of jet impingement. Without these modifications there is a possibility for steam to enter the control building and subsequently into the control room. Under these conditions it might be necessary for personnel to

temporarily vacate the control room until the break could be isolated. It is not expected that any significant damage to the control room equipment would occur. Design provisions had been previously made to be able to shut down the reactor from outside the control room should this be necessary for this or other reasons.

A number of modifications involving principally the installation of pipe restraints and jet impingement shields are being made to various small high-energy lines in the primary auxiliary building. These changes are being made for the letdown line, steam generator blowdown line, sample lines, and auxiliary steam lines. Without these changes some adverse effects on systems or components used in reactor shutdown are possible as a result of pipe rupture, but in each case alternative system(s) are available to shut down the reactor.

Potential environmental effects of steam in the penetration area of the primary auxiliary building might affect primary system instrumentation lines. Although this instrumentation is very useful to the operator it is not essential for safe shutdown of the reactor. The proposed modification of a temperature sensor and alarm in the control room will permit the operator to isolate all high-energy lines in the area immediately, since none of the lines are required for safe shutdown.

A temperature sensor and alarm is also being installed in the cable tunnel area although no damage to the electrical cabling is expected from the rupture of an auxiliary steam line in the tunnel.