William E. Caldwell, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-5181

February 28, 1972

Re: Indian Point No. 2
Docket No. 50-247

Dr. Peter A. Morris, Director
Division of Reactor Licensing
U.S. Atomic Energy Commission
Washington, D. C. 20545

Dear Dr. Morris

In accordance with the requirements of Section 6.6.1.B of the Technical Specifications to Facility Operating License No. DPR-26, the following report is submitted:

On Wednesday, February 16, 1972, final preparations were being made to perform a hydrostatic pressure test of the Reactor Coolant System (RCS) at 2500 psig. As required by Section 3.1.B of the Technical Specifications, measures were being taken to increase the coolant temperature to 220^{o}F prior to bringing system pressure above 500 psig.

At approximately 1600 hours, three reactor coolant pumps were placed in service to begin the warmup and the residual heat removal pump was shut down. In addition, the return line from the residual heat exchanger to the RCS was secured by closing the butterfly valve provided for this purpose. The hot leg of the Residual Heat Removal System was left open, however, to maintain a letdown flow from that system of about 75 gpm which in conjunction with regulation of the charging flow to the RCS, would be used to regulate pressure during the warmup. The RCS was solidly filled with water at about 420 psig at this time.

At approximately 1645 hours, or two to three minutes after having closed a second isolation valve in the cold leg of the Residual Heat Removal System to assure complete isolation, a pressure surge within the RCS was observed to be occurring. Operator response was proper in that the charging flow-rate was immediately reduced and the letdown flow-rate was immediately increased.

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As evidenced by the recording pressure instrument in the control room, RCS pressure was in excess of 500 psig for something in the order of two minutes, and the peak pressure attained during the transient was 670 psig. A maximum pressure (drag) indicating gauge connected to one of the RCS loops showed that a high pressure of 650 psig had been reached. Coolant temperature during the surge was 140^{o}F.

On Thursday, February 17, 1972, a second pressure surge of approximately the same magnitude was experienced. In this instance, the hydrostatic pressure test of the RCS had just been completed and system pressure and temperature had been reduced to 420 psig and 180^{o}F, respectively. Pressure control of the solidly filled system was being accomplished primarily by regulation of the charging flow-rate. Letdown flow was at an essentially fixed rate through the orifices provided in the normal and excess letdown paths from the RCS. In accordance with procedure, instructions were issued to open the isolation valves that connect the hot leg of the RCS to the Residual Heat Removal System so that its letdown path could be used in lieu of the normal paths, the capacities of which are somewhat limited at reduced RCS pressure. It was during the change-over of letdown paths, at 0820 hours, that the pressure transient occurred. As had been the case the previous day, operator reaction limited the time that the pressure was in excess of 500 psig to about two minutes and the peak pressure to about 650 psig.

While the cause of the pressure surge that occurred on February 16, 1972 has not yet been identified, we have established the cause of the pressure transient of February 17, 1972. When the operator opened the control valve in the letdown path from the Residual Heat Removal System, and observed a resultant indication of increased flow-rate within the purification system, he assumed that the isolation valves connecting the Residual Heat Removal System to the RCS had been opened, as per the instructions given field operators, and thereupon secured the normal letdown system. Investigation revealed however, that the Residual Heat Removal System had not been tied into the RCS, and that the increased purification system flow indication which the operator observed, although authentic, did not eminate from the RCS but rather from the Refueling Water Storage Tank. This tank

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had been valved into the suction of the recirculating residual heat removal pump to provide a backup source of borated water to the RCS. Momentarily then, the water-filled RCS was being fed by a high-head charging pump without comparable letdown from the system. It was this condition that resulted in the pressure surge.

As indicated in the basis provided for Technical Specification 3.B.1, the requirement of a minimum reactor outlet temperature of 200°F during prssurization of the RCS above 500 psig is based upon consideration of the fracture toughness of the vessel material. Accordingly, a study was conducted for the purpose of determining what effect the two pressure surges to 650 psig, at 140°F and 180°F might have had on the integrity of the vessel.

It is estimated that the maximum stress that existed in the vessel material at 650 psig was 7000 psi. This is about 14% of the minimum yield strength of SA302 Grade B steel. As further discussed in the basis of the specification, brittle fracture may be precluded by limiting the material stress to 20% of yield whenever the temperature of the material is at the design transition temperature. In this particular case, the DTT is 80°F, i.e., NDTT + 60°F. On our Unit No. 1 facility, it has been demonstrated that the temperature lag between coolant and vessel is about 10°F at the prescribed warmup rate. Even if this lag was higher by a factor of six in the Unit No. 2 facility, the vessel temperature would still have been at least 80°F in each instance. Since the temperature lag is more likely comparable to that of Unit No. 1, or at the most not greater than 20°F, it can be concluded that the integrity of the vessel has not been impaired by the subject pressure transients. Moreover, it is pertinent to note that the RCS had been maintained at temperatures in excess of 80°F for several days prior to the warmup which was initiated on February 16, 1972.

It is recognized that the pressure limitation of 500 psig at coolant temperatures less than 220°F was imposed as a means for providing additional conservatism in the application of fracture toughness concepts, pending the results of studies currently being made in the industry. It is worth noting however, that the aforementioned pressure-temperature relationship was arbitrarily chosen and that it was meant to include the effect of fast neutron exposure over a two year period of operation. Inasmuch as the Unit No. 2 reactor vessel had not yet been used at power, we do not consider our unintentional momentary non-compliance with the subject specification in these two instances to be of any significant consequence from a safety point of view.

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The Chairman of our Nuclear Facilities Safety Committee, as well as Mr. G. Madson of the Commission's Compliance Division, were promptly informed of the occurrences discussed above. In addition, the Director of the Region I Compliance Division was provided with an initial written report, by telegram dated February 17, 1972, as required by Section 6.6.1.B of the Facility Technical Specifications.

We intend to continue our study into the cause of the pressure surge that occurred on February 16, 1972, as well as continue our current study of what changes might be made, in either facility design or operation, to preclude recurrence of these incidents. You will be informed of the progress of these investigations as significant changes in status develop.

Very truly yours

FROM: Consolidated Edison Company of N.Y.
New York, N.Y. 10003
William E. Caldwell, Jr.

DATE OF DOCUMENT: Feb. 28, 1972

DATE RECEIVED: Mar. 1, 1972

NO.: 1 5

LTR.: X MEMO: REPORT: OTHER:

TO: Dr. Peter A. Morris

ORIG.: CC: OTHER:
3 signed & 20 conf'd

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ENCLOSURES:

REMARKS:
1 CY LOCAL PDR MONTROSE, N.Y.

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