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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	Docket Nos. 50-247-SP
CONSOLIDATED EDISON COMPANY	)	50-286-SP
OF NEW YORK (Indian Point, Unit 2)	)	
	)	
POWER AUTHORITY OF THE STATE		
OF NEW YORK (Indian Point, Unit 3)	)	

NRC STAFF RESPONSE TO THE COMMISSION'S
ORDER OF JULY 30, 1984

Janice E. Moore
Counsel for NRC Staff

August 13, 1984

DESIGNATED ORIGINAL

Certified By _____

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I. INTRODUCTION

On July 30, 1984, the Commission issued an order in the above-captioned proceeding. That Order directed the Staff of the Nuclear Regulatory Commission (the Staff) to file comments on Judge Gleason's dissent to a portion of the Licensing Board's recommendations. Other parties were invited to submit comments on the dissent. The Staff's comments on that dissent are set forth below.

II. BACKGROUND

As part of this special investigatory proceeding initiated by the Commission, a Licensing Board was appointed to conduct hearings and present recommendations to the Commission. Consolidated Edison Company of New York, Inc., (Indian Point Unit No. 2), Power Authority of the State of New York, (Indian Point Unit No. 3), CLI-81-1, 13 NRC 1 (1981); Consolidated Edison Company of New York Inc. (Indian Point Unit No. 2), Power Authority of the State of New York, (Indian Point Unit No. 3), CLI-81-23, 14 NRC 610 (1981). The Board issued its recommendations on

October 24, 1983. "Recommendations to the Commission", LDP-83-68, 18 NRC 811 (1983). In the Recommendations the Board addressed six of the seven questions posed by the Commission in detail. The first question asked:

> What risk may be posed by serious accidents at Indian Point 2 and 3, including accidents not considered in the plants' design basis pending and after any improvements described in (2) and (4) below?

The Board majority, in responding to this first question, provided a discussion of the societal significance of the risk estimates it had derived, and made a recommendation to the Commission. Board Recommendations at 891-893. The majority recommended that the Commission factor into its decision concerning the future of the Indian Point facilities consideration of those accidents with low probabilities but high consequences. Id. at 893. The basis for this recommendation was the Board's concern that the expected value risk estimates derived by the Board did not paint an adequate picture of the risks posed by Indian Point, although they were the best estimates the Board could derive from the record before it. Id. at 891-892. The Board pointed out that these expected values encompassed many accidents of varying probabilities and that they could lead to a feeling of more certainty about the nature of the risks posed by these plants than is actually appropriate. Id. The majority believed that the Commission might wish to adopt a risk aversion theory, of the type discussed by the Task Force on interim operation of Indian Point, that the risk be required to decrease as the severity of consequences increases. Id. at 893.

In his dissent Judge Gleason disagreed with the majority's recommendation that low-probability high-consequence accidents be factored into the

Commission's decision. Board Recommendations at 1079-1081. He gave a number of reasons for this view including the position that the Indian Point plants should not be singled out along with a few other sites, for such special treatment. Id. His position was based on the Staff's view as presented in the record that, "There is no reason to believe that either individual or societal risks at Indian Point are well outside the range of risks posed by other nuclear power plants licensed to operate by the Nuclear Regulatory Commission. Rowsome-Blond, ff. Tr. 12834 at 33." Id. at 1080.

The majority presented its additional views in response to Judge Gleason's dissent. In these views the majority indicated that it was not urging the Commission to ignore the low probabilities calculated for serious accidents. Board Recommendations at 1081. They stated that they were simply noting that it may not be appropriate to consider only the product of probability and consequences. Id. The majority indicated that they were merely cautioning the Commission against an uncritical interpretation of the expected value risk estimates presented by the Board. Id. at 1083.

It should be noted that Judge Gleason's dissent refers only to a small portion of the Board Recommendations, and only to the recommendation that the Commission factor those accidents with low probabilities but high consequences into its decision. Both the majority and Judge Gleason agree on the conclusion that the Indian Point facilities may continue to operate with reasonable assurance that the public health and safety will be protected. Id. at 1079. They agree on the Board's

Recommendations for the performance of specific studies,[1/] the installation of certain systems, and the implementation of programs recommended by the Board.[2/] They agree that it is not necessary at this time to require a filtered vented containment or a separate containment for the Indian Point facilities. (They assume that, if future studies indicate that such systems are of value, the Commission will reexamine this conclusion.) Id. at 919-920. The disagreement between the majority and Judge Gleason centers about the one rather ambiguous recommendation on page 893.

III. DISCUSSION

The Staff agrees with Judge Gleason that no further consideration by the Commission of low probability accidents with severe consequences beyond the consideration given such accidents by the Staff is necessary. As stated in our original comments on the Board's Recommendations, the Staff in its analysis did treat such accidents. The Staff and Licensees presented not only the expectation values for risk, but also the cumulative complementary distribution function (CCDF) curves. The use of such curves acknowledges the existence of such accidents, and presents their place in the risk profile of the Indian Point units. "NRC STAFF'S COMMENTS CONCERNING LICENSING BOARD RECOMMENDATIONS." at 16-17, (February 6, 1984).

1/ The Board recommended that the Commission direct the Staff to investigate whether Indian Point Unit 2 should be required to take appropriate protective action if the National Weather Service issues a tornado watch or tornado warning in the Indian Point area. Board Recommendations at 915.

2/ The Board also recommended that a loose parts monitoring system be installed at Unit 3, that Unit 2 be required to conform its iodine technical specifications to the Standard Technical Specifications, and that a safety assurance program be implemented at both units. Board Recommendations at 928 and 913.

The Staff in reaching its conclusions did not rely only on the numerical risk estimates presented in its analysis. As the Staff indicated, there are also qualitative reasons for its conclusion that the Indian Point plants do not pose risks outside the range of risks posed by other plants. These qualitative considerations concern the design and operational features of the Indian Point units.

The Staff testified that all risk assessments done to date have attempted to predict the likelihood of spontaneous loss of coolant accidents, transients, or loss of off-site power which would result in core melt. Some of these risk assessments have also tried to predict the quantities of radioactive materials released in the event of such accidents. Rowsome-Blond, ff. Tr. 12834 at 10, (April 6, 1983). The Staff determined that the accident sequences which could lead to high risk for pressurized water reactors such as Indian Point are the uncontained interfacing systems loss of coolant accidents, loss of all off-site and on-site power and subsequent failure of the auxiliary feedwater system, and other specific plant vulnerabilities. Based on its knowledge of the plants design, the Staff determined that the Indian Point plants were less susceptible than average to these three classes of accidents. Id.

The interfacing system LOCA was determined by the Staff generally to be a dominant contributor to risk at any plant since, although they are very unlikely, their consequences would be severe. Rowsome-Blond, ff. Tr. 12834 at 11. Such accidents result in a bypass of containment, and the immediate release of fission products into the atmosphere. Id. Staff witnesses testified that Indian Point is less susceptible to such accidents

because each unit only has one pipe outside of containment instead of the three to six pipes found at other plants, and the Indian Point valves are as reliable as any of those in the industry. Id. at 11-12.

In considering the loss of all off-site and on-site power and the failure of the auxiliary feedwater system, the Staff determined that the Indian Point plants were less susceptible to such accidents than other plants. Rowsome-Blond, ff. Tr. 12834 at 12. This determination was based on the Staff's knowledge of the backup power supplies available to the Indian Point units. Id. Staff witnesses testified that there were three gas driven turbine generators available to the units, as well as three emergency diesel generators per unit. Id. The Staff testified that no other plants have as many backup power sources. Id.

As far as specific plant vulnerabilities were concerned, the risk analysis did not indicate the existence of any plant vulnerabilities important to risk from internally initiated events. The analysis did point out some plant vulnerabilities to external events. Such vulnerabilities were corrected by the Licensees. For example, there was a seismic vulnerability at Unit 2 due to the proximity of the Unit 1 Super Heater Building and the Unit 2 Control Room. Licensees inserted padding between the two buildings to reduce this vulnerability. In response to a vulnerability to a severe hurricane at Unit 2 identified by the IPPSS and the Sandia review of IPPSS, a modification was made to the Unit 2 Technical Specifications requiring anticipatory shutdown of the plant in the event a hurricane threatens the plant. Rowsome, ff. Tr. 7597 at 5. Finally, modifications were made to both Unit 2 and Unit 3 to reduce vulnerabilities to fire identified by the IPPSS and the Sandia review of

IPPSS. Id. The Staff concluded that these "fixes" resulted in substantial risk reduction. Id. at Appendix 2.

In reaching its conclusion concerning the position of Indian Point in relation to other plants the Staff also examined the design features of the Indian Point containments. Rowsome-Blond, ff. Tr. 12834 at 14-26. After its examination the Staff concluded that the Indian Point containments were better than average when compared to the containments of other plants. Id. at 26.

Also, the Staff evaluated the Indian Point site. The Staff concluded that the site is typical with respect to individual risk and about ten times higher than average in population, and hence in site effects on societal risks. Rowsome-Blond, ff. Tr. 12834 at 33. Although the Staff concluded that the net effect of these site characteristics is ambiguous, Staff witnesses were of the opinion that "... individual risks are probably average to well below average. Societal risks are probably average to above average." Id.[3/]

The Staff also considered the types of releases expected for each accident sequence, and looked at the likelihood of such releases. The

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3/ It is important to note that while the Indian Point population is about 10 times higher than the average reactor site, the probability of internal events with severe release categories is substantially lower at Indian Point than at a number of other facilities for which PRAs were prepared. Rowsome-Blond, ff. Tr. 12834 at 9 and Fig.3. Although there was an insufficient base to compare categories involving external events among various plants (see Rowsome-Blond Fig.4), Rowsome notes that when the frequency of severe releases at Indian Point, after external event fixes, are compared with severe release frequency from internal events only at other plants, Indian Point appears to be roughly average. Rowsome-Blond at B-5. Also compare Acharya Table III C.4, Unit 2 after fix, categories A, B and C with Rowsome-Blond Fig.3.

Staff determined that a large part of the after-fix core melt frequency falls into the relatively well mitigated release categories, and thus would result in minor off-site consequences. Rowsome-Blond, ff. Tr. 12834 at B-18. This demonstrates that the Staff has looked carefully in its decision-making process at the importance to risk of a given accident sequence and a given release category.

It was based on such considerations as these, and others mentioned throughout the record of this proceeding that the Staff reached its conclusions that Indian Point need not be shut down, and that no mitigation features need be installed at the plant. The Staff analyzed the potential effects of particular mitigation features on the risk profile of the Indian Point units, as well as their technical advantages and disadvantages.[4/] Meyer, ff. Tr. 6692; Meyer-Pratt, ff. Tr. 12492 at 27-46. The Staff concluded that the installation of such mitigation features was not warranted for Indian Point at this time. Rowsome-Blond ff. Tr. 12834 at C-13-16, Appendix 2 at 32-33.

The Staff also did a thorough analysis of both absolute and comparative risk, and described the uncertainties surrounding those quantitative risk estimates. The Staff did not, in its analysis, rely solely on either the quantitative absolute risk estimates or comparative risk estimates. The Staff believes that many qualitative considerations, including those discussed above, are an essential part of the information which is required to make a decision on a plant involving a PRA.

4/ These mitigation features included a filtered vented containment system, a separate containment structure and a mitigation strategy.

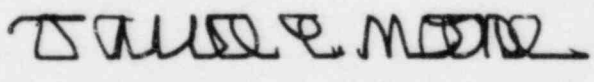
The Staff believes that a combination of the quantitative risk estimates and the qualitative engineering considerations discussed throughout this record result in the conclusion reached by the Staff and espoused by Judge Gleason. While the quantitative estimates, both in the form of expected values and in the form depicted on the CCDF curves play a role in the decision they are not the sole component of that decision.

In short, the low probability high consequence accidents were given attention in this record in a variety of ways: depiction in CCDF curves; comparison of core melt probabilities and severe release category probabilities with other plants; and in engineering assessment of the systems and components at Indian Point. The record in the proceeding does not support any basis for greater emphasis on low probability high consequence events.

IV. CONCLUSION

For the reasons set forth above, the Staff agrees with Judge Gleason that it is not necessary for the Commission to factor low-probability high-consequence accidents into its decision to any greater extent than already appears in the analyses performed by the parties to this proceeding.

Respectfully submitted,



Janice E. Moore
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Dated at Bethesda, Maryland
this 13th day of August, 1984

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S RESPONSE TO THE COMMISSION'S ORDER OF JULY 30, 1984", in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 13th day of August, 1984:

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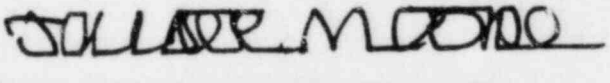

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