

STAFF RESPONSE TO COMMENTS BY NEW YORK STATE  
INDIAN POINT UNIT 3  
DOCKET NUMBER 50-286

The New York State Atomic Energy Council and the State Geological Survey have expressed concern about the adequacy of the seismic design of the Indian Point plants with respect to potential earthquakes on the Ramapo fault, which passes less than one mile from the plant site. The fault is a well known, major structural feature of the region that is postulated on geologic evidence to have been recurrently active throughout the recognizable tectonic development of the area during the last 700 to 800 million years. Two published reports (Woolard, 1958; Page, et al, 1968) propose that historical earthquake activity (both early macroquakes and recent instrumentally recorded microquakes) may be associated with this fault zone. Another report (Sbar, et al, 1970) discusses a swarm of microearthquakes which were centered about twelve miles and north of the Ramapo fault/were found to result in a focal mechanism consistent with a northeast trending fault parallel to the trend of the Ramapo fault. One recent (Oliver, et al, 1969) study has shown many offsets of glacial striations up to one inch in magnitude along the Hudson River. None of these displacements are associated with the Ramapo fault.

This information is cited by the New York State Geological Survey staff as a basis for asserting that the Ramapo fault is a

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"capable" fault within the definition of 10 CFR Part 100 Appendix A and could cause an earthquake to be localized in the vicinity of the Indian Point site resulting in an acceleration higher than the SSE g values for which the Indian Point units are designed. On the latter point, they cite certain recordings of very high accelerations in the source areas of several recent earthquakes in California.

The staff has reviewed the information which the State of New York has brought to our attention. With respect to the central issue, we do not consider the studies cited above to show that the Ramapo fault is "capable." We view the significance of the offsets of glacial striations as unclear. They could be associated with tectonic stresses, but can be equally well explained by glacial unloading, thermal or chemical processes or frost heaving of the rocks. Moreover, we do not view the quakes in question to be sufficiently well located to show that the Ramapo fault is "capable."

Members of the staff visited the fault area on May 21 and found that there is a lack of definitive geologic mapping. We also found that beginning in 1962 several pipe breaks occurred in the vicinity of Mahwah, NJ, near the fault and coincident with an increase in the rate of subsidence along the Atlantic seacoast. The sense of the subsidence is consistent with

movement on the Ramapo fault. However; the subsiding area is of much greater extent than the Ramapo fault. Thus, the subsidence cannot be reasonably associated with that fault.

With respect to the pipe breaks, although they could be indicative of movement in the fault zone, the lack significant concurrent earthquake activity suggests that an alternate explanation such as landsliding is more likely.

At present there appears to be no clear evidence of activity on the Ramapo fault. Each single observation, presented as evidence, is both tenuous and equally well or better explained by other causes. We believe that inactivity of the fault can be conclusively demonstrated and the question raised by New York State resolved with additional high quality seismic and geologic data in the region.

The applicant plans to implement both a microearthquake network and a program of geologic mapping in order to confirm that the fault is not "capable." The network will be operated for about a year, after which the staff will review the information developed by the applicant's investigations. We are confident that the new data will support the earlier conclusions drawn by ourselves and our USGS advisors of lack of earthquake activity on the faults in the vicinity of the Indian Point site.

## REFERENCES

- Oliver, Jack, Tracy Johnson and James Dorman (1969).  
Postglacial Faulting and Seismicity in New York and  
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Recent Crustal Movements, held in Ottawa, Canada  
March 17-18.
- Page, Robert A., Peter H. Molnar, and Jack Oliver (1968).  
Seismicity in the Vicinity of the Ramapo Fault,  
New Jersey - New York, Bull. Seis. Soc. Am., 58,  
p. 681-687.
- Sbar, Marc L., John M. W. Rynn, Frank J. Gumper, and John  
C. Lahr (1970). An Earthquake Sequence and Focal  
Mechanism Solution, Lake Hopatcong, Northern New Jersey,  
Bull. Seis. Soc. Am., 60, p. 1231-1243.
- Woollard, G. P. (1958), Areas of Tectonic Activity in the  
United States as Indicated by Earthquake Epicenters,  
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Docket Nos. 50-3  
50-247  
50-286 ✓

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J. M. Hendrie, Deputy Director for Technical Review, I

TECHNICAL ASSISTANCE REQUEST - INDIAN POINT UNIT NO. 3

Your assistance is requested for the following:

- a. Plant Name: Indian Point Unit No. 3
- b. Licensing Stage: OL
- c. Docket No. 50-286
- d. Responsible Branch: Environmental Projects Branch No. 1
- e. Responsible EPM: Mary Jane Oestmann
- f. Technical Review Branch Involved: Environmental Specialists Branch  
J. Bolen, Environmental Analyst
- g. Target Date for Completion: June 14, 1974
- h. Discription of Request:

Please review the enclosed list of reports (Enclosure I) on ecological studies which have been submitted by Consolidated Edison; assist the ORNL team in the assessment of the data and information presented in the reports and help to prepare testimony on the subject material for the ASLB hearings for Indian Point, Unit No. 3. The information in the reports should be compared with the previous data and information on the Hudson River ecological studies conducted by consultants for Con Ed as discussed and described in the FES for Unit No. 2 and the DES for Unit No. 3.

Consolidated Edison has submitted the enclosed list of ecological survey reports (Enclosure I) partially in compliance with the Environmental Technical Specifications and partially in support of Con Ed's position taken in the IP-2 hearings and also will continue to be taken in the IP-3 hearings. J. Bolen, ESB, has copies of the reports in Enclosure I. Con Ed will also continue to submit additional

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J. M. Hendrie

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ecological reports (Enclosure 2) over the next several years with the purpose to prove that there will be insignificant ecological damage from once-through cooling, and, therefore, cooling towers are not warranted. The Regulatory staff will need to provide testimony for the hearing for IP-3 regarding the staff's position on the significance of the information. Thus, EPB-1 will need supporting assistance in the assessment of the data and coordination with that made by the ORNL team.

Original signed by Daniel R. Muller  
Daniel R. Muller, Assistant Director  
for Environmental Projects  
Directorate of Licensing

Enclosures:  
As stated

OFFICE ➤	EP-1	EP-1	EP			
SURNAME ➤	MJOestmann: mh	GWNighton	DRMuller			
DATE ➤	5/2/74	5/10/74	5/10/74			

CONSOLIDATED EDISON ECOLOGICAL STUDIES

I. Texas Instruments Reports

Hudson River Ecological Study in the Area of Indian Point.

- A. First Semiannual Report, July 1972  
Vol. 1 Biological Sampling  
Vol. 2 Standard Procedures
- B. First Annual Report, April 1973
- C. Second Semiannual Report, November 1973
- D. Vol. I - 1973 Hudson River Program - Fisheries Data Summary,  
May - July (dated Oct. 1973)
- E. Vol. II - 1973 Hudson River Program - Fisheries Data Summary  
July - November (dated Dec. 31, 1973)
- F. Vol. III - Fisheries Survey of the Hudson River - March - July 1973  
(dated November 1973)
- G. Vol. IV - Fisheries Survey of the Hudson River - March - December 1973
- H. Evaluation of High Frequency Sonar for Fish Counting and Relative  
Biomass Estimation in the Lower Hudson Estuary.
- I. NYU - Institute of Environmental Medicine - Hudson River Ecosystem  
Studies - Progress Report for 1971 and 1972 and Appendix Tables  
for 1971 and 1972.

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