January 16, 1975

SUPPLEMENT NO. 1

TO THE

SAFETY EVALUATION REPORT

BY THE

DIRECTORATE OF LICENSING

U. S. ATOMIC ENERGY COMMISSION

IN THE MATTER OF

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 3

DOCKET NO. 50-286

TABLE OF CONTENTS

APPENDICES

APPENDIX A	Continuation of Chronology
APPENDIX B	ACRS's Interim Report on Indian Point Nuclear Generating Station Unit No. 3
APPENIDX C	Geologic and Seismic Evaluation of the Indian Point Site
APPENDIX D	Report of Foster Associates on Consolidated Edison Company's Financial Qualifications

1.0 INTRODUCTION

The Atomic Energy Commission's (Commission) Safety Evaluation Report in the matter of the application by the Consolidated Edison Company of New York, Inc. (hereafter also termed the Consolidated Edison Company or the applicant) to operate the Indian Point Nuclear Generating Unit No. 3 (Indian Point 3) was issued on September 21, 1973. In this Safety Evaluation Report the Regulatory staff indicated that additional information involving a number of safety-related issues was required from the applicant to complete the staff's evaluation of Indian Point 3.

The purpose of this Supplement is to update the Safety Evaluation Report by providing the staff's evaluation of additional information submitted by the applicant addressing outstanding technical issues since the issuance of the Safety Evaluation Report, and to address the comments made by the Advisory Committee on Reactor Safeguards (ACRS) in its report of November 14, 1973.

In addition, five sections of the Safety Evaluation Report have been updated by this Supplement as the result of developments since issuance of the Safety Evaluation Report. These sections are Section 2.5, Geology, Seismology, and Foundation Engineering; Section 5.7, Loose Parts Monitor; Section 13.5, Industrial Security; Section 20.0, Financial Qualifications and Section 21.0, Financial Protection and Idemnity Requirements. Each of the sections in this Supplement is numbered the same as the section of the Safety Evaluation Report that is being updated.

Our evaluations of emergency core cooling system (ECCS) performance with regard to conformance with the Commission's new regulations, issued January 4, 1974 and of Anticipated Transients Without Scram (ATWS) have not been completed. These items and our recommendations with regard to limitations on power level, in response to the ACRS recommendation, will be addressed in a future supplement to the Safety Evaluation Report following our evaluation of ECCS performance.

An important development which has occurred since issuance of the Safety Evaluation Report is the Consolidated Edison Company's announced intention to sell the Indian Point 3 facility to the Power Authority of the State of New York (PASNY). Enabling legislation has been enacted by the New York State government that would permit the sale to take place. At this time no applications to amend the existing construction permit or amend the present operating license application have been filed with the Commission for our review. Should the Consolidated Edison Company and PASNY go forth with their plans to effect the transfer, we will conduct the appropriate review and evaluations and report our conclusions at that time.

Appendix A to the Supplement is a continuation of the chronology of the Regulatory staff's principal actions related to the processing of the application. The report of the Advisory Committee on Reactor Safeguards is attached as Appendix B. Appendix C is a report containing the staff's independent evaluation of the geology and seismology of the Indian Point site entitled, Geologic and Seismic Evaluation of the Indian Point site. Appendix D contains a report by our consultant, Foster Associates, with respect to the Consolidated Edison Company's financial qualifications.

2.0 SITE CHARACTERISTICS

2.5 Geology, Seismology, and Foundation Engineering

On April 22, 1974 representatives of the New York State Museum and Science Service and the New York State Atomic Energy Council met with members of the Regulatory staff to discuss concerns that they had with the evaluation of the seismological aspects of the Indian Point site presented in the Indian Point 3 FSAR. Subsequently, on May 24, 1974, the Commission received a petition from the Citizens Committee for Protection of the Environment requesting it to order the Consolidated Edison Company to show cause why the operating authority for Indian Point Units 1 and 2 and the construction permit for Unit 3 should not be revoked, based on essentially the same concerns as raised by the New York State agencies.

As a result of these two events, we conducted a further review of the seismologic and geologic characteristics of the Indian Point site independent of the information contained in the Indian Point Unit 3 FSAR. The results of this review are presented in a report entitled "Geologic and Seismic Evaluation of the Indian Point Site." This report is attached as Appendix C to this Supplement.

We have concluded, based upon our independent review of the seismological and geological characteristics of the Indian Point site, that the 0.15 g value used in the design of the facility as the high frequency limit of the response spectrum to represent the horizontal motion applied at the foundation level during a Safe Shutdown Earthquake is adequately conservative. This conclusion is consistent with and reaffirms the previous conclusion of our consultant, the National Oceanic and Atmospheric Administration, formerly the U. S. Coast and Geodetic Survey as reported in the Safety Evaluation Report.

5.0 REACTOR COOLANT SYSTEM

5.7 Loose Parts Monitor

In the Safety Evaluation Report, we indicated that we would require that the applicant initiate a program, or participate in an ongoing program the objective of which is the development of a functional, loose parts monitoring system within a reasonable period of time.

Recently, prototype loose parts monitoring systems have been developed and are presently in operation or being installed at several plants. Subsequent to issuance of the Safety Evaluation Report and at our request, the applicant has proposed to install a loose parts monitoring system at Indian Point 3. The type of monitoring system selected by the applicant is a Westinghouse metal impact detection system utilizing accelerometers mounted at selected locations on the exterior of the reactor vessel and reactor coolant system. The system will be functional by October 1, 1975.

We have concluded that the system as described in the FSAR will provide a monitoring capability consistent with the state of the art and on that basis is acceptable for monitoring for loose parts during reactor operation.

7.0 INSTRUMENTATION AND CONTROL SYSTEMS

7.3 Initiation and Control of Engineered Safety Feature Systems

We stated in Section 7.3 of the Safety Evaluation Report that the design of the ECCS was modified to prevent the loss of redundant functions due to premature operation of certain switches used to facilitate the transfer of the ECCS from the injection mode of operation to the recirculation mode of operation. We concluded that this design modification was acceptable, subject to confirmation by our review of the electrical drawings that the design modification will be properly implemented.

We have reviewed the schematic diagrams of the engineered safety feature system circuits to be used during the changeover from the injection mode to the recirculation mode of operation. We have concluded that the modified design, together with the Technical Specifications that require removal of the electric power from certain engineered safety feature valves, provides adequate assurance that no single malpositioned switch will disable redundant functions when a safety injection signal is present.

7.4 Systems Required for Safe Shutdown

In Section 7.4 of the Safety Evaluation Report we concluded that the applicant's design criteria for the instrumentation and control of the auxiliary feedwater system were acceptable. Implementation of these criteria was to be reviewed upon receipt of electrical schematics. These schematics have since been received.

We have reviewed the electrical schematics for the auxiliary feedwater system. We find that the applicant's design criteria, which were documented in Supplement No. 21 to the FSAR, have been implemented in the design in an acceptable manner. Therefore, we have concluded that the auxiliary feedwater system is acceptable.

9.0 AUXILIARY SYSTEMS

9.5 Other Auxiliary Systems

9.5.4 Diesel Generator Cooling Water System

We reported in the Safety Evaluation Report that acceptance of the proposed service water system configuration for emergency diesel cooling was dependent upon the applicant providing justification for the method chosen to cope with a postulated service water line break or an inadvertent valve closure in the ten-inch line serving the emergency diesels during the recirculation mode following a postulated LOCA. The method proposed by the applicant for coping with this condition was to switch the diesels from the nuclear service water header to the conventional service water header upon receipt of an alarm in the control room that would be initiated on low service water flow at the discharge of the diesels.

Subsequent to issuance of the Safety Evaluation Report, the applicant proposed an alternative method of coping with postulated service water system line breaks. The applicant proposed to realign the nuclear and conventional service water headers as part of the switchover from the injection mode to the recirculation mode.

The proposed recirculation mode lineup will split the essential and nonessential recirculation loads between the nuclear and conventional service water system headers. The nuclear header will serve diesel generators Nos. 32 and 33, component cooling water heat exchanger No. 31, the containment fan cooler units, the instrument air heat exchangers and one control building air conditioning unit. The conventional header will serve diesel generator No. 31 and component cooling water heat exchanger No. 32 and one control building air conditioning unit. The applicant has postulated a number of break locations in the nuclear and conventional headers in the recirculation mode lineup and calculated the flows to the recirculation loads including the diesel generators. The flows were calculated using the PIPEFLO computer program. For all breaks postulated, the applicant has shown that the flows calculated are adequate to provide cooling to at least one train of the essential loads for an indefinite period of time.

To demonstrate the validity of the PIPEFLO computer program the applicant provided data showing a comparison of predicted and measured values of flow and pressure for an industrial water system. The data showed good agreement between predicted and measured values. In addition, as part of the preoperational test program, the applicant will measure the flow rates at various points in the service water system for the normal and recirculation mode lineups and compare them to values predicted by the PIPEFLO computer program and provided in the FSAR.

We have reviewed the applicant's analysis of postulated breaks in the service water system following a postulated LOCA including a review of the predicted and measured results of the PIPEFLO computer program for an industrial water system. On the basis of our review, we have concluded that with the proposed recirculation mode lineup, the essential loads served by the service water system will receive adequate flow in the event of a service water system pipe break. The applicant's emergency procedures will include the actions necessary to accomplish the lineup of the service water system in the recirculation mode as part of the switchover from the injection mode.

To further validate the PIPEFLO computer code, we will require that the applicant submit a comparison of the functional test results of the service water system and the predicted test results presented in the FSAR following completion of the pre-operational tests of this system. If the results of the pre-operational tests should indicate that further action is necessary, we will take appropriate action at that time.

11.0 RADIOACTIVE WASTE MANAGEMENT

11.2 Liquid Wastes

11.2.3 Steam Generator Blowdown

The steam generator blowdown treatment system is one of three main systems that comprise the liquid waste treatment system. As described in the Safety Evaluation Report, when the steam generator blowdown contains radioactivity above a predetermined value, the untreated discharge from the steam generator blowdown flash tank at Indian Point 3 will be stopped. The blowdown flow from the steam generator will be redirected, by means of an intertie, to the Secondary Boiler Blowdown Purification System located at the Indian Point 1 plant.

In a letter dated August 21, 1973, the applicant stated that this intertie would not be available until the Spring of 1975. In a letter dated November 6, 1973, we advised the applicant that we would require that the steam generator blowdown intertie from Indian Point 3 to Indian Point 1 be installed and functional by May 1, 1975. As a result of delays in the fuel loading date, initial criticality may not be reached until after May 1, 1975. Therefore, in Supplement No. 28 to the FSAR the applicant committed to have the intertie installed and functional by May 1, 1975 or by initial criticality whichever occurs latest.

The applicant's current schedule for fuel loading is such that we estimate that initial criticality at Indian Point 3 will not be reached until after May 1, 1975. In this case, the intertie will be installed and functional prior to initial criticality which is acceptable.

In the event, however, that initial criticality should be reached prior to May 1, 1975 and the intertie is not functional until May 1, 1975, we have concluded that the three units (Indian Point 1, 2 and 3) can be operated without exceeding effluent limits for the reasons which follow. During the short initial period of operation that the intertie might not be available, the fission product inventory in the Indian Point 3 core would be limited. During the same initial period of time, we anticipate that there will be minimal transport of fission products from the fuel elements into the primary coolant system and then from the primary coolant system into the secondary coolant system. Thus, the releases of radioactivity from the Indian Point 3 steam generator blowdown system to the environment through the flash tank vent during this period should be a very small fraction of the calculated annual releases.

Furthermore, the Technical Specifications will limit the releases to assure that they will be kept as low as practicable at all times and will require the capability for continuous monitoring of the effluent from all principal release points, including the Indian Point 3 steam generator blowdown flash tank vent, prior to initial criticality of Indian Point 3. Based on the above, we have concluded that the intertie will be installed and functional in a time frame consistent with its design objective of limiting effluent releases at Indian Point 3 to values that are as low as practicable.

11.3 Gaseous Wastes

11.3.4 Steam Generator Blowdown

In the Safety Evaluation Report we indicated that we had advised the applicant that the capability for continuous monitoring of the blowdown effluent from the flash tank vents at Indian Point 1 and Indian Point 3 would be required prior to initial startup of Indian Point 3.

In Supplements 27 and 28 to the FSAR, the applicant has described the type of monitor that will be installed to meet this requirement. We have reviewed this description and have found the monitoring system as described to be acceptable. Further, the applicant has commited in Supplement 28 to the FSAR to install the monitors prior to reaching initial criticality at Indian Point 3 or by May 1, 1975 whichever occurs latest. We will require that these monitors be functional prior to initial criticality at Indian Point 3.

13.0 CONDUCT OF OPERATIONS

13.5 Industrial Security

In the Safety Evaluation Report, we reported our conclusions regarding the Industrial Security Plan for Indian Point 3. Subsequently, the applicant submitted a revised security plan dated May 1, 1974 for protection of the Indian Point site (Units 1, 2 and 3) from industrial sabotage. The information was submitted as proprietary information pursuant to Section 2.790 of the Commission's regulations. We have reviewed the revised security plan and have concluded that it complies with the Commission's regulations as stated in 10 CFR 50.34(c) and 10 CFR 73.40, conforms to the recommendations of Regulatory Guide 1.17 and is acceptable.

18.0 THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

The ACRS completed an interim review of the application for authorization to operate Indian Point 3 at its 163rd meeting, November 8-10, 1973. A copy of the Committee's report dated November 14, 1973 is attached as Appendix B. We have considered the comments and recommendations made by the ACRS. The actions we have taken or plan to take in response to these comments and recommendations, with the exception of the ACRS recommendation on power level limitation discussed in Section 1.0 of this report, are described in the following paragraphs, or elsewhere in this Supplement.

18.1 Isolation of Low Pressure Systems Connected to the Primary System

The Committee recommended that the matter of testing of the proper positioning of check valves intended to isolate low pressure systems connected to the primary system be resolved in a manner satisfactory to the staff.

Check valves that separate low pressure systems from the primary coolant system will be tested periodically to determine that they are properly positioned. Those check valves that are opened only during the refueling process will be tested at the conclusion of the refueling process to determine that they are in the closed position. Other check valves that isolate low pressure systems from the primary coolant system, such as those in the residual heat removal system, and that open and close between refuelings will be tested more frequently. This second group of check valves will be tested at the conclusion of each refueling outage and once approximately midway between refuelings.

The applicant will provide a list of all check valves in these two groups. A procedure for testing the position of each of these check valves will be written by the applicant and reviewed by the staff.

18.2 Turbine Overspeed

The Committee recommended that the matter of design modifications to reduce the turbine overspeed be resolved in a manner satisfactory to the staff.

Consolidated Edison plans to modify the Indian Point 3 turbine to include a low pressure steam dump system (LPSDS) which will extract steam from the supply lines to the moisture separators and route this steam to the condenser through dump valves. The applicant has submitted information on the design of the LPSDS in Supplements 27 and 28 to the FSAR. The LPSDS has been designed to meet the single failure criterion. The reliability of the system has been considered in the design, primarily through the separation of the actuating signals, the multiplicity of dump valves and steam dump routes and electrical and mechanical component redundancies.

At this time it is doubtful that the LPSDS will be installed and functional by the projected fuel loading date. Consequently, the applicant has proposed Technical Specification limits on the plant's power level and/or turbine trip set points that will keep the turbine within the design overspeed. We will review the bases for these Technical Specifications prior to issuance of an operating license.

After installation, the turbine design modifications will be verified as part of the scheduled 100% load rejection turbine trip test. The turbine will be tripped by the turbine trip solenoid valves which will be triggered by simulation of the loss of load. The design condition for the loss of load is, however, based on the turbine being tripped by one of the two overspeed trips. Therefore, the maximum peak speed resulting from the test will be mathematically corrected to the speed that would have been achieved had the solenoid trip failed. This calculated speed will then be compared to the design overspeed. The Technical Specifications will require that a special report be issued that discusses the results of the turbine trip test upon completion.

Based upon our review of the design criteria to be used in the design of the LPSDS presented in the FSAR, meetings with the applicant, the fact that Technical Specifications will restrict power level as a function of steam dump lines available and overspeed trip set point, and subject to successful completion of the 100% load rejection turbine trip test that will be conducted to verify the design modifications, we have concluded that the modifications proposed by the applicant to prevent turbine overspeeds in excess of design overspeed are acceptable.

18.3 Operating Heatup and Cooldown Pressure-Temperature Curves

The Committee, in its report, recommended further development of the Technical Specifications to include operating heatup and cooldown pressure-temperature curves as conservative as practical with respect to Appendix G of 10 CFR Part 50.

Our evaluation, as summarized on pages 5-2 and 5-3 of the Indian Point 3 Safety Evaluation Report, concludes that the limits on pressure and temperature during heatup and cooldown given in the applicant's Technical Specifications are in compliance with Appendix G of 10 CFR Part 50, will provide adequate margins against the possibility of vessel failure and constitute an acceptable basis for meeting the requirements of Criterion 31 of the AEC General Design Criteria. We also have concluded that additional conservatism is inherent in the limits early in plant life, because the limits are based on the assumption that the vessel has already been irradiated.

18.4 In-service Inspection

The Committee discussed augmented in-service inspection during its deliberations and listed in its letter of November 14, 1973 two areas for further consideration in the Techncial Specifications. These areas are baseline inspection and periodic in-service inspection of the steam generator shells and appropriate in-service inspection of the nozzles in the primary head of the steam generator.

Subsequent to the ACRS meeting the applicant initiated a program to investigate the feasibility of augmenting its proposed in-service inspection program. On February 5, 1974, we met the applicant and the Westinghouse Electric Corporation on this matter.

The applicant proposed to augment its in-service inspection of the steam generator shells. Five steam generator seams have been selected for additional periodic in-service inspection by ultrasonic testing methods. The areas to be examined are the shell and head circumferential welds which are gross discontinuities and are therefore, considered the most critical welds. This augmented in-service inspection program includes an initial baseline inspection. We have reviewed the applicant's proposed Technical Specifications for this augmented in-service inspection and find these proposed Technical Specifications acceptable.

With regard to in-service inspection of the nozzles in the primary head of the steam generators, the applicant has attempted to augment this program also. These nozzles are large castings and do not have external welds.

The applicant investigated the feasibility of performing in-service inspection of the internal radii of these nozzles. Because of the poor surface of this casting, it is not feasible to perform ultrasonic testing. Both we and the applicant believe that surface and/or visual inspection of these nozzles would be of no value. Although no practical way of performing a meaningful in-service inspection of these nozzles is known at this time, the applicant has agreed to monitor the advancements in in-service inspection technology. We also share the view that no practical in-service inspection of these nozzles is possible at this time.

18.5 Startup of an Idle Loop at Power

The Committee stated its belief that further considerations should be given to the development of the Technical Specifications related to startup of an idle loop at power.

The startup of an idle loop at power is discussed in Section 14.1.7 of the FSAR. Unlike some other four loop pressurized water reactors, Indian Point 3 does not have isolation valves in its main primary coolant system loops. Consequently, when the pump in one loop is shutdown there would be reverse flow through the inactive loop. This backflow serves to keep the temperatures within the idle loop at a level closer to the temperatures in the active loops when compared to the idle loops in those pressurized water reactors that do have loop isolation valves. This higher average temperature in an Indian Point 3 idle loop minimizes the reactivity insertion should the idle loop be started up while the reactor is at its maximum allowable power.

The idle loop startup transient was calculated using conservative values of the moderator and Doppler coefficients and conservative assumptions of the pump startup time, the system pressure and the system temperature. The analysis assumed 75% of full power as the starting power level for this postulated transient even though administrative procedures require that the plant be brought to a load of less than 25% of full power prior to startup of an idle loop. Based on the above conservative analysis, the calculated departure from nucleate boiling ratio (DNBR) went no lower than 2.20, whereas a DNBR of 1.30 is the design limit.

Because of the design of Indian Point 3 and the favorable results of the conservative analysis discussed above, we have concluded that administrative procedures adequately govern the startup of an idle loop and therefore, the possibility of exceeding design limits in the unlikely event of inadvertent startup of an idle loop will be precluded.

18.6 Acceptable Cumulative Limits on Downtime for Protection Systems and Engineered Safety Features

The Committee expressed the concern that the Technical Specifications allow repetitive failures of protection systems and engineered safety features. A suggestion by the Committee was to set a limit in the Technical Specifications as to the cumulative downtime allowed for a protection system or an engineered safety feature system.

Recent guidance on reporting requirements for operating facilities has been issued by the Commission in Regulatory Guide 1.16, Revision 3, January 1975. The Technical Specifications will require compliance with the reporting requirements of Regulatory Guide 1.16. Section C.2.b(2) of the guide requires that the applicant report as an abnormal occurrence "conditions leading to operation in a degraded mode permitted by a limiting condition for operation." This requirement will mean that all of the failures of the type that were a concern to the Committee will be reported to the Commission on a timely basis (within thirty days of occurrence). Upon receipt of such reports, the Commission can take action to prevent repetitious failures of the protection and engineered safety feature systems.

18.7 Availability of Core Outlet Thermocouples

The Committee expressed its concern with regard to the continuing availability of core outlet thermocouples.

There are 65 core outlet thermocouples in the Indian Point 3 core. We anticipate that these thermocouples will be very reliable and will provide information about the reactor core that will supplement the information provided by the ex-core detectors, the movable in-core detectors, and the rod position monitors. Since we view the information provided by these thermocouples as supplemental, rather than required for the safe operation of the core, we have concluded that continuing availability of these thermocouples is not required. Correspondingly, we do not give credit for the thermocouples as a substitute for a failed core monitoring instrument, such as an ex-core detector.

18.8 Augmented Use of Movable In-Core Detectors

The Committee also expressed its belief that further consideration should be given to augmented use of movable in-core detectors.

The primary purpose of the in-core detectors is to determine the steady state power distribution, which is a slowly varying function of core burnup. The Technical Specifications require monthly in-core mapping to follow this slow change in power distribution.

Continuous surveillance is required, however, to detect any tilted power distribution anomaly. The Technical Specifications will require axial offset and quadrant tilt monitoring. Should a tilted condition exist, the power must be reduced or additional in-core maps must be made with the movable in-core detectors.

In the absence of power distribution anomalies, such as tilts, mapping at more frequent intervals than monthly is not considered necessary and therefore will not be required by the Technical Specifications.

18.9 Administrative Controls to Prevent Overpressurization

The Committee expressed concern with regard to the adequacy of administrative procedures to prevent overpressurization of the reactor vessel below operating temperatures.

The applicant informally submitted a set of administrative procedures for the Indian Point 2 reactor including procedures for plant startup from cold shutdown to the hot, critical, zero power condition; a pre-criticality check-off list; a startup check-off list, and the operating procedure for reactor coolant pump operation. The applicant indicated that the Indian Point 3 operating procedures will be based on the submitted documents. In addition, to reviewing these procedures, we discussed with the applicant the pressure spike incidents that had occured at Indian Point 2 to determine what procedural or plant modifications had been undertaken to prevent such pressure spikes from ocurring at Indian Point 3.

The procedures for Indian Point 2 have been modified where appropriate and have been strengthened by the insertion of additional precautions to be followed by the operator to minimize the possibility of recurrence of the reported incidents. In one instance a design modification was made to the plant instrument air system to prevent recurrence of a specific incident. These modifications will be reflected in the Indian Point 3 procedures and design. In addition, the applicant is developing a new procedure for Indian Point 3 entitled, "Low Pressure Operation Without a Steam Bubble" which will contain further precautions and instructions for operators.

We have concluded, based on the above, that the applicant is giving appropriate attention to the problem of overpressurization when the primary system is water solid in the development of the operating procedures and administrative controls for the Indian Point 3 reactor. In addition, the procedures when finalized will be reviewed by the Directorate of Regulatory Operations prior to the issuance of an operating license.

18.10 Reactor Coolant Pump Overspeed

The consequences of a rupture of a reactor coolant pipe, which in certain locations might result in reactor coolant pump overspeed, are being investigated on a generic basis. If the results of these investigations indicate that additional protective measures are warranted to prevent significant pump overspeed or to limit potential consequences to safety-related equipment, we will determine what modifications to the Indian Point 3 plant design, if any, are necessary to assure that an acceptable level of safety is maintained. If modifications are necessary, we will require the applicant to make them.

20.0 FINANCIAL QUALIFICATIONS

We reported in our Safety Evaluation Report that the applicant was financially qualified to operate Indian Point 3. However, since issuance of the Safety Evaluation Report significant developments in the applicant's financial condition have caused us to update our evaluation to take into account these recent events.

In performing the updated evaluation we retained the services of a consultant, Foster Associates. The report by Foster Associates on the applicant's financial qualifications is attached as Appendix D to this Supplement.

The need for reevaluation was indicated by the Consolidated Edison Company's announcement on April 23, 1974 that the second quarter dividend would be omitted because of "a severe cash shortage and a persistent decline in sales."

In performing our review, we and our consultant reviewed current information requested from the applicant on its financial condition, information from sources normally available to the public such as Moody's Weekly Reports, and information gained in discussions with the applicant at meetings on August 9, 1974 and November 18, 1974.

Based on the report of our consultant, we have concluded that the applicant possesses or can obtain the necessary funds to meet the requirements of 10 CFR Section 50.33(f) to operate Indian Point 3 and, if necessary, to permanently shutdown the facility and maintain it in a safe shutdown condition.

21.0 FINANCIAL PROTECTION AND INDEMNITY REQUIREMENTS

In our Safety Evaluation Report we indicated that pursuant to the Commission's regulations in 10 CFR Part 140, the applicant had furnished to the Commission proof of financial protection in the amount of $95,000,000 in the form of Nuclear Energy Liability Insurance Association Policy No. NF-100 and a Mutual Atomic Energy Liability Underwriters Policy No. MF-29, to cover operations of Indian Point Units 1 and 2. We also indicated that at such time as a license for preoperational fuel storage for Indian Point 3 was issued, that indemnity agreement would be amended to cover the preoperational fuel storage.

Subsequent to issuance of the Safety Evaluation Report, the Commission's regulations in 10 CFR Part 140 were amended to indicate that the maximum amount of financial protection available from private sources, i.e., the combined capacity of the two nuclear liability insurance pools which must be mantained by the applicant, has been increased from $95,000,000 to $110,000,000. Accordingly, the applicant furnished to the Commisssion proof of financial protection in the amount of $110,000,000 to cover operations of Indian Point Units 1 and 2.

In addition, on November 29, 1974, in connection with the issuance of a license for preoperational fuel storage for Indian Point 3 (SNM-1502), the indemnity agreement was amended to cover that preoperational fuel storage. The applicant is, therefore, required to pay the annual indemnity fee applicable to preoperational fuel storage in addition to the indemnity fees it is presently paying.

Further, as reported in the Safety Evaluation Report, no license authorizing operation of Indian Point 3 will be issued until proof of financial protection in the requisite amount (currently $110,000,000) has been received and the requisite indemnity agreement amended.

On the basis of the above considerations, our conclusions remain that the presently applicable requirements of 10 CFR Part 140 have been satisfied and that, prior to issuance of the operating license, the applicant will be required to comply with the provisions of 10 CFR Part 140 applicable to operating licenses, including those as to proof of financial protection in the requisite amount and as to execution of an appropriate indemnity agreement with the Commission.

22.0 CONCLUSIONS

We stated in the Safety Evaluation Report that our conclusions in that report were contingent upon favorable resolution of the outstanding matters described in Section 6.5 (Fuel Densification), Section 9.5.4 (Diesel Generator Cooling Water System), and Section 11.3.4 (Steam Generator Blowdown).

With regard to the matter of fuel densification, we will report our conclusions in another supplement to the Safety Evaluation Report following the completion of our review of emergency core cooling system performance in accordance with the Commission's new regulations.

With regard to diesel generator cooling, we have concluded that with the recirculation lineup proposed by the applicant, the essential loads served by the service water system (including the diesel generators) will receive adequate flow in the event of a service water system pipe break during the recirculation mode of cooling following a postulated LOCA.

With regard to the release and monitoring of effluents from steam generator blowdown, we will require that the applicant install monitors of the type described in the FSAR at the Indian Point 1 and Indian Point 3 blowdown flash tank vents prior to initial criticality of Indian Point 3. In addition, the applicant has committed to complete the installation of the steam generator blowdown treatment intertie from Indian Point 3 to Indian Point 1 by May 1, 1975 or by initial criticality whichever occurs later. Based upon our review, the requirements of the Technical Specifications and the applicant's commitments, we have concluded that the required monitors and the steam generator blowdown treatment intertie will be installed in a time frame acceptable to the staff and in so doing an acceptable system of monitoring for radioactive releases and maintaining effluent releases as low as practicable from the steam generator blowdown system will be provided.

In addition, as the result of developments subsequent to issuance of the Safety Evaluation Report, we have reviewed new information and updated our conclusions regarding the geological and seismological characteristics of the Indian Point site, the applicant's industrial security plan, the applicant's financial qualifications, and financial protection and indemnity requirements. Our conclusions on these matters are consistent with our previous conclusions presented in the Safety Evaluation Report.

APPENDIX A

CONTINUATION OF CHRONOLOGY

REGULATORY RADIOLOGICAL REVIEW OF

INDIAN POINT NUCLEAR GENERATING UNIT NO. 3

August 21, 1973	Letter from applicant concerning effluent releases
September 21, 1973	Issuance of Safety Evaluation Report
September 26, 1973	Letter from applicant in response to request of July 5, 1973
October 3, 1973	Meeting with applicant to discuss technical specifications and diesel cooling problem
October 9, 1973	Letter to applicant concerning Regulatory staff report on anticipated transients without scram
October 10, 1973	Submittal of Amendment No. 6 (Supplement 22), consisting of revised and additional pages
October 10, 1973	ACRS Subcommittee meeting with Regulatory staff and applicant
October 26, 1973	Meeting with applicant to discuss technical specifications and service water system
October 29, 1973	Submittal of Amendment No. 7 (Supplement 23), consisting of revised pages for the proposed technical specifications
October 30, 1973	Meeting with applicant to discuss technical specifications, diesel cooling, and turbine overspeed
November 6, 1973	Letter to applicant regarding August 21, 1973 submittal
November 7, 1973	ACRS Subcommittee meeting with Regualtory staff and applicant

November 9, 1973	ACRS meeting with Regulatory staff and applicant
November 14, 1973	Interim Report by Chairman of the ACRS
November 19, 1973	Letter to applicant stating that proprietary report on fuel densification will be withheld from public disclosure
December 3, 1973	Submittal of Amendment No. 8 (Supplement 24), consisting of revised pages for the proposed technical specifications
January 2, 1974	Letter from applicant, an interim response to request of October 9, 1973
January 9, 1974	Meeting with applicant to discuss technical specifications
January 18, 1974	Applicant's request for extension of construction completion date
January 22, 1974	Letter to applicant requesting information concerning QA organization
January 31, 1974	Letter to applicant concerning response dated January 2, 1974
February 5, 1974	Meeting with applicant to discuss inservice inspection program
February 15, 1974	Letter from applicant in response to request of January 22, 1974
February 19, 1974	Submittal of Amendment No. 9 (Supplement 25), consisting of revised pages
February 25, 1974	Letter to applicant requesting information relative to byproduct, source, and special nuclear material
April 12, 1974	Letter from applicant submitting additional information on the request for CP extension
April 15, 1974	Letter from applicant submitting partial response to request of February 25, 1974.
April 22, 1974	Meeting with representatives of the New York State Museum and the New York State Atomic Energy Council to discuss geology and seismology of the Indian Point site.

April 23, 1974	Applicant submitted a copy of press release concerning Consolidated Edison's financial condition.
April 26, 1974	Meeting with the applicant to discuss geology and seismology of the Indian PoInt site.
May 1, 1974	Letter from the applicant submitting revised Physical Security Plan.
May 15, 1974	Letter to the applicant requesting current financial information.
May 23, 1974	Meeting with PASNY to discuss the sale of Indian Point 3 to PASNY.
May 28, 1974	Letter from the applicant in response to request of May 15, 1974.
May 29, 1974	Meeting with Consolidated Edison and PASNY to discuss the sale of Indian Point 3 to PASNY.
May 29, 1974	Letter from the applicant submitting Amendment No. 10 (Supplement 26) consisting of supplemental, revised and corrected pages.
June 17, 1974	Letter to the applicant requesting additional financial information.
June 28, 1974	Letter from the applicant submitting responses to request of June 17, 1974.
July 2, 1974	Letter to the applicant requesting additional information concerning outstanding technical issues.
July 29, 1974	Letter from the applicant submitting Amendment No. 11 (Supplement 27) consisting of responses to request of July 2, 1974.
August 9, 1974	Meeting with the applicant to discuss financial qualifications.
August 16, 1974	Letter from the applicant submitting financial information requested at the August 9, 1974 meeting.

September 20, 1974	Letter from the applicant submitting a schedule for providing analysis of Anticipated Transients Without Scram (ATWS) in accordance with WASH-1270.
October 31, 1974	Letter to the applicant indicating that the proposed requalification program for licensed and senior operators has been reviewed and found to be acceptable.
November 6, 1974	Meeting with the applicant to discuss low pressure steam dump system and diesel cooling problem.
November 8, 1974	Letter from the applicant referencing Westinghouse topical reports for ATWS analysis.
November 14, 1974	Letter to the applicant confirming the meeting for November 18, 1974 concerning financial qualifications and requesting that specific information be available for discussion at the meeting.
November 15, 1974	Meeting with the New York State Atomic Energy Council and New York State Geological Survey to discuss the staff's evaluation of the geological and seismological aspects of the Indian Point site.
November 18, 1974	Meeting with the applcant to discuss financial qualifications.
January 13, 1975	Letter from the applicant submitting Amendment No. 12 (Supplement 28) consisting of supplemental, revised and corrected pages.

APPENDIX B

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

UNITED STATES ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

NOV 14 1973

Honorable Dixy Lee Ray
Chairman
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subject: INTERIM REPORT ON INDIAN POINT NUCLEAR GENERATING STATION UNIT NO. 3

Dear Dr. Ray:

At its 163rd meeting, November 8-10, 1973, the Advisory Committee on Reactor Safeguards completed an interim review of the application of Consolidated Edison Company of New York, Inc., for authorization to operate Indian Point Nuclear Generating Station Unit No. 3. The project has been previously considered at Subcommittee meetings on July 11, 1973, October 10, 1973 and November 7, 1973. A tour of the facility was made by Committee members on November 2, 1973. In this review, the Committee had the benefit of discussions with representatives and consultants of Consolidated Edison, their contractor, and the AEC Regulatory Staff. The Committee also had the benefit of the documents listed. The Committee reported on the application for construction of Indian Point Unit No. 3 on January 15, 1969.

Indian Point Unit No. 3 includes a four-loop Westinghouse nuclear steam supply system with a design power rating of 3025 MW(t). The design is similar to that of Unit No. 2 which has a power rating of 2760 MW(t). The three-unit Indian Point Nuclear Generating Station is located approximately 2-1/2 miles southwest of Peekskill, New York, and 24 miles north of the New York City boundary line.

The Committee's report of January 15, 1969, called attention to various matters including the following: consideration of thermal shock to the pressure vessel in the unlikely event of a loss-of-coolant accident (LOCA); measures to deal with possible hydrogen concentration buildup in the containment following a LOCA; greater independence in the on-site power system; main-coolant-pump flywheels as a potential source of missiles; protection against potential effects of a fuel-handling accident; and the possible effects of systematic or common mode failures. Most of these items are generic, not unique to Indian Point Unit No. 3.

Acceptable measures have been taken on Indian Point Unit No. 3 with regard to the on-site power system, hydrogen concentration buildup, and postulated fuel-handling accidents. Studies are still underway on the potential for missile generation from gross reactor coolant pump overspeed in the event of certain postulated LOCAs; this matter should be resolved in a manner satisfactory to the Regulatory Staff. It is believed that resolution of the thermal shock matter can await the development of further information from the Heavy Section Steel Technology Program and other studies. With regard to anticipated transients without scram, the Committee recommends that the recently announced Regulatory Staff position be implemented for Indian Point Unit No. 3 in timely fashion.

Because there is limited operating experience with very large, high power density reactors, the ACRS believes that initial operation should be limited to power levels no greater than 2760 MW(t) and that further review by the Committee is appropriate before higher power levels are permitted. The Committee believes that, in the consideration of the operation of Unit No. 3 at higher power levels, several factors are pertinent, including the following: satisfactory experience in Unit No. 3 and other similar reactors; adequate knowledge of fuel performance; extent to which an independent confirmation of LOCA-ECCS analysis has been made by the Regulatory Staff; further resolution of relevant generic matters; and consideration of the possibility of improvements in ECCS effectiveness.

The Committee recognizes that re-evaluation of operating limits may be necessary as a result of possible changes in the acceptance criteria for emergency core cooling systems. The Committee wishes to be kept informed.

The Applicant stated that he will apply and utilize suitable equipment to enable periodic testing of the proper positioning of check valves intended to isolate low pressure systems connected to the primary system. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

Studies are underway with regard to the reliability of the service water distribution to the diesel-generators. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The original turbine design has been found by the Applicant to have the possibility of overspeed somewhat beyond the manufacturer's design condition if the turbine should trip at or near the design power. The Applicant is preparing design modifications to eliminate this condition, and will propose appropriate power limitations until acceptable modifications have been made. This matter should be resolved in a manner satisfactory to the Regulatory Staff.

The Committee believes that several considerations are appropriate in the further development of the Technical Specifications, as follows: operating heatup and cooldown pressure-temperature curves as conservative as practical with respect to 10 CFR Part 50, Appendix G; appropriate baseline inspection and periodic in-service inspection of the steam generator shells; startup of an idle loop at power; acceptable cumulative limits on downtime of protection systems and engineered safety features; and continuing availability of core outlet thermocouples.

The Committee also believes that further consideration should be given to augmented use of movable in-core detectors, appropriate in-service inspection of nozzles in the primary head of the steam generators, and to the detailed specification of administrative controls intended to prevent overpressurization of the reactor vessel below operating temperatures.

Generic problems relating to large water reactors have been identified by the Regulatory Staff and the ACRS and discussed in the Committee's report dated December 18, 1972. Those problems and additional generic problems identified in more recent ACRS reports should be dealt with appropriately by the Regulatory Staff and the Applicant.

The Advisory Committee on Reactor Safeguards believes that, if due regard is given to the items mentioned above, and subject to satisfactory completion of construction and pre-operational testing, there is reasonable assurance that Indian Point Nuclear Generating Station Unit No. 3 can be operated without undue risk to the health and safety of the public. The Committee believes that operation should be at power levels no greater than 2760 MW(t) prior to further Committee review.

Sincerely yours,

H. G. Mangelsdorf

H. G. Mangelsdorf
Chairman

References Attached

References

1. Final Facility Description and Safety Analysis Report (FSAR) for Indian Point Nuclear Generating Unit No. 3 dated December 4, 1970 (Amendment No. 13 to the Application for Licenses)

2. Supplements Nos. 1 through 22, dated June 30, 1971 through October 10, 1973, to the Indian Point Nuclear Generating Unit No. 3 FSAR

3. Letter, dated September 21, 1973, Directorate of Licensing, USAEC, to ACRS transmitting the Safety Evaluation Report for Indian Point Nuclear Generating Unit No. 3

4. Proposed Technical Specifications and Bases for Indian Point Nuclear Generating Unit No. 3 transmitted to the ACRS from the Directorate of Licensing, USAEC, on November 1, 1973.

5. Letter, dated September 26, 1973, Consolidated Edison of New York, Inc. (Con Ed) to the Directorate of Licensing, USAEC (DRL) concerning review of tanks at Indian Point Unit No. 3 which contain radioactive liquids

6. Letter, dated September 7, 1973, Con Ed to DRL, transmitting additional information concerning the design of Indian Point Unit No. 3 instrumentation, control and electrical systems

7. Letter, dated July 24, 1973, Con Ed to DRL, regarding results of review of control circuits of safety related equipment at Indian Point Unit No. 3

8. Letter, dated June 28, 1973, Con Ed to DRL, regarding the Indian Point Unit No. 3 Quality Assurance program

9. Letter, dated June 8, 1973, Con Ed to DRL, transmitting a report entitled "Dynamic Analysis of a Postulated Main Steam or Feedwater Line Pipe Break Outside Containment" dated May 8, 1973 applicable to Indian Point Unit No. 3

10. Letter, dated May 25, 1973, Con Ed to DRL, regarding motor-operated valves for isolating the Residual Heat Removal System from the Reactor Coolant System in Indian Point Unit No. 3

11. Letter, dated May 14, 1973; LeBoeuf, Lamb, Leiby and MacRae (LLL&M) to DRL; transmitting a report applicable to Indian Point Unit No. 3 entitled "Analysis of High Energy Lines" dated May 9, 1973

12. Letter, dated April 9, 1973, Con Ed to DRL concerning the electrical and mechanical systems design of Indian Point Unit No. 3

13. Letter, dated April 2, 1973, Con Ed to DRL, regarding modifications to the instrumentation, control and electrical systems in Indian Point Unit No. 3

14. Letter, dated January 23, 1973, Con Ed to DRL, concerning design of non-Category I equipment in Indian Point Unit No. 3

15. Letter, dated January 22, 1973, DRL to Con Ed requesting information needed to complete the Indian Point Unit No. 3 Operating License review

16. Letter, dated January 9, 1973, LLL&M to DRL, regarding fuel densification

17. Letter, dated November 6, 1972, DRL to Con Ed, requesting additional information needed to complete the Indian Point Unit No. 3 Operating License review.

APPENDIX C

GEOLOGIC AND SEISMIC EVALUATION OF THE INDIAN POINT SITE

GEOLOGIC AND SEISMIC EVALUATION

OF THE

INDIAN POINT SITE

NOVEMBER 29, 1974

1.0 Introduction

1.1 Background

On May 24, 1974, the U.S. Atomic Energy Commission received a petition from the Citizen's Committee for Protection of the Environment requesting it to order the Consolidated Edison Company to show cause why the operating authority for Indian Point Nuclear Generating Plant Units 1 and 2 and the construction permit for Unit 3 should not be revoked. As the basis for such action, the petition contends in essence the following:

1. That the seismologic data submitted for Units 1, 2, and 3 indicated that essentially the same data were used to evaluate the seismic design of all three plants;

2. That the design for all three plants is based on three crucial assumptions about earthquakes in the site vicinity which are erroneous or, at a minimum, of doubtful validity. These are: (1) that the maximum historical earthquake is of intensity VI; (2) that a peak ground acceleration associated with intensity VI and for which the plant should be designed is 0.15g; and (3) that the Ramapo Fault is not a capable fault within the meaning of Appendix A, 10 CFR Part 100.

In support of its position the petitioner cited a report prepared by the New York Museum and Science Service, Geological Survey (Davis, et al., 1974), letters from Drs. Jack E. Oliver (Cornell University), Nicholas Ratcliffe (City College of New York), and comments by the New York State Department of Environmental Conservation.

Because of their unique knowledge of the geology of the Indian Point region, the New York State Geological Survey was asked to review the Environmental Statement for Unit 3. That review led to their report questioning the adequacy of the seismic design for the Indian Point units and a subsequent meeting with the AEC staff in which those concerns were discussed at length. The meeting was held on April 22, 1974.

Following that meeting, the AEC staff met with representatives of Consolidated Edison to express the view that the safety concerns raised by the New York State Survey warranted serious attention and indicated the need for more precise knowledge about the geology and seismology of the Indian Point site region. Consolidated Edison responded by initiating additional studies of the structural details of the Ramapo fault system and by installing a dense network of seismograph stations to obtain accurate locations of earthquakes in the region sufficient to permit unambiguous conclusions to be drawn about the relationship between earthquake occurrence and geologic structure.

During the conduct of this investigation, the staff has reviewed the professional literature concerning the seismologic and geologic characteristics of the Indian Point site independently of the information contained in the FSAR. In addition, the staff visited the site area on two occasions, consulted once again with the New York State Geological Survey, consulted with the New Jersey Bureau of Geology and Topography, consulted with its United States Geological Survey (USGS) advisor, and consulted with representatives of Consolidated Edison.

1.2 Requirements of Appendix A to 10 CFR Part 100

The staff's evaluation of the Ramapo fault applied Appendix A to 10 CFR Part 100, "Seismic and Geologic Siting Criteria for Nuclear Power Plants."* Appendix A defines the geologic and seismic hazards that must be investigated for all proposed sites of nuclear power plants and describes the scope and types of investigations required either to demonstrate that the hazard is absent or to determine appropriate design criteria. Section III(g) of the Appendix defines a capable fault (a fault that is deemed capable of causing ground displacement at or near the surface) in terms of (1) age of most recent movement, (2) associated macro-seismicity, and (3) a demonstrated relationship to known capable faults. The definition of a capable fault as it appears in 10 CFR 100, Appendix A, subsection III(g) is as follows:

* Appendix A was not in force at the time the Indian Point units were licensed.

"(g) A 'capable fault' is a fault which has exhibited one or more of the following characteristics:

"(1) Movement at or near the ground surface at least once within the past 35,000 years or movement of a recurring nature within the past 500,000 years.

"(2) Macro-seismicity instrumentally determined with records of sufficient precision to demonstrate a direct relationship with the fault.

"(3) A structural relationship to a capable fault according to characteristics (1) or (2) of this paragraph such that movement on one could be reasonably expected to be accompanied by movement on the other.

"In some cases, the geologic evidence of past activity at or near the ground surface along a particular fault may be obscured at a particular site. This might occur, for example, at a site having a deep overburden. For these cases, evidence may exist elsewhere along the fault from which an evaluation of its characteristics in the vicinity of the site can be reasonably based. Such evidence shall be used in determining the fault is a capable fault within this definition.

"Notwithstanding the foregoing paragraphs III(g)(1), (2) and (3), structural association of a fault with geologic structural features which are geologically old (at least pre-Quaternary) such as many of those found in the Eastern region of the United States shall, in the absence of conflicting evidence, demonstrate that the fault is not a capable fault within this definition."

In addition, the staff addressed the remaining contentions with respect to the adequacy of the Safe Shutdown Earthquake (SSE). The staff's evaluation is again based on Appendix A to 10 CFR Part 100. Section III(c) defines the SSE as that earthquake, which in consideration of the regional and local geology and seismology, produces the maximum vibratory ground motion at the site for which certain systems, structures, and components are designed to remain functional.

Section V(a)(1) specifies the procedure to be applied in determining the SSE. The specified procedure requires the association of maximum historical earthquakes with tectonic provinces and tectonic structures. These earthquakes are postulated to occur at points of their respective tectonic structures or provinces closest to the site. The SSE is then defined by a response spectrum, in consideration of the maximum sustained vibratory accelerations which would occur at the site in consequence of the postulated earthquakes.

1.3 Summary of Conclusions

Based on its review, the staff has concluded that (1) there has been no geologically recent surface movement on the Ramapo fault system, (2) no macroearthquake activity is clearly demonstrated to have had a direct relationship with the Ramapo fault, and (3) there is no demonstrated structural relationship between the Ramapo fault and any known capable fault. Accordingly, it is the staff's conclusion that the Ramapo fault is not capable within the meaning of Appendix A to 10 CFR Part 100.

Regarding the SSE, the staff has determined that (1) the earlier evaluation of the SSE by its United States Coast and Geodetic Survey (now USGS) advisor assumed an intensity of VII rather than VI as the site intensity, (2) a site intensity of VII is an adequate value for the SSE consistent with the requirements of Appendix A to 10 CFR Part 100, and

(3) 0.15g is an adequately conservative value of the reference acceleration for seismic design to be used as the high frequency asymptote of the response spectrum which represents horizontal motion applied at the foundation level.

The seismic design of Units 2 and 3 was based on a sustained maximum ground acceleration of 0.15g using a conservative related response spectrum and damping value. These seismic design practices assure that there is considerable margin in all plant structures, systems and components important to safety to withstand an earthquake having a maximum ground acceleration of 0.15g. Accordingly, the staff finds no reason for changing the earlier conclusion contained in the Safety Evaluation Reports for Indian Point Units 2 and 3 that the site geology, seismic design parameters, and seismic design methods for these plants are satisfactory from a safety standpoint.

Unit 1 was designed on the basis of the seismic practices and codes existing in the mid-fifties, and, as a minimum, would be expected to withstand an earthquake having a ground acceleration of 0.1g without the occurrence of offsite exposures exceeding Part 100. Although it cannot be demonstrated rigorously by calculation, we would expect that many of the redundant plant safety features such as the steel containment sphere and the surrounding biological shield would remain at least partially functional and continue to provide protection to the public in the event of a ground acceleration in the 0.1 to 0.15g range. Unit 1 will be shut down on October 31, 1974, for either decommissioning or the accomplishment of safety modifications. The adequacy of the seismic design of Unit 1 for continued long-term operation will be reconsidered during the extended shutdown which will be needed if the licensee proposes to later resume operation. Due to the low probability of occurrence of an earthquake with a maximum ground acceleration in the 0.1 to 0.15g range during the short period of time prior to plant shutdown on October 31, 1974, we believe Unit 1 can be operated until that time without undue risk to the public health and safety.[1/]

[1/] This conclusion was reached prior to the shutdown of Indian Point Unit 1 on October 31, 1974.

2.0 Geology and Seismology of the Indian Point Site

2.1 Introduction

In considering the contention that the Safe Shutdown Earthquakes for Indian Point Units 1-3 are not adequately conservative, the staff has reviewed the geology and seismology of the Indian Point site and vicinity. This review has been conducted in accordance with the requirements of Appendix A to 10 CFR Part 100, "Seismic and Geologic Siting Criteria" and independently of the information contained in the Final Safety Analysis Reports on these units.

According to Appendix A, the Safe Shutdown Earthquake is to be evaluated by a procedure which entails the determination of (1) tectonic provinces, (2) a maximum earthquake associated with each such province, (3) within these provinces reasonable correlations of earthquakes with tectonic structures, and (4) within these provinces the existence and characteristics of capable faults. These determinations are to be made on the basis of geologic and seismic history as well as characteristic of tectonic structure and seismicity and are discussed in the sections which follow.

2.2 Tectonic Provinces

The Indian Point site is located within the Appalachian Highlands. Within 200 miles of the site, this larger division is subdivided into four physiographic or geologic provinces. From northwest to southeast these are the Appalachian Plateaus, Valley and Ridge, New England, and Piedmont provinces. A fifth province, the Atlantic Coastal Plain, lies to the southeast of the Appalachian Highlands and at its closest is about 25 miles from the site.

Earthquakes characteristic of the Valley and Ridge and Appalachian Plateaus provinces are not of significance in determining the SSE because earthquakes characteristic of those provinces are sufficiently small and distant that they can be expected to affect the site with less severity than would earthquakes of the Piedmont and New England provinces. Accordingly, the Appalachian Plateaus and Valley and Ridge provinces will be given no further consideration in this report.

On the basis of geologic structure and depositional and deformational history, two tectonic provinces are recognizable in the remaining region of interest. The first, the Piedmont-New England tectonic province, is geographically composed of the Piedmont and New England physiographic provinces, while the second consists of the Atlantic Coastal Plain physiographic province.

In the Piedmont-New England tectonic province, several episodes of deformation are recognized during late Precambrian (570 million years before present [m.y.]) to near the close of the Paleozoic Era (225 m.y.).

As a consequence of these deformations, the province as a whole is characterized by en-echelon anticlinoria and synclinoria paralleling the trend of the province and associated with metamorphism and plutonic intrusion.

The geologic history of the Piedmont is less well known than that of New England. However, it is known that the principal Paleozoic deformations affecting the two regions were not simultaneous. The extensive faulting and folding of New England appears to have occurred during the mid-Paleozoic Acadian orogeny (380 m.y.) while that of the Piedmont seems to have occurred in late Paleozoic (225 m.y.).

A final orogenic episode affected the Piedmont-New England tectonic province as a whole in the Triassic Period (225-190 m.y.). In contrast to the strongly compressional Paleozoic orogenic episodes, the Triassic phase reflects tensional forces. The Triassic deformation resulted in the formation of a series of northeast-southwest trending basins over the entire extent of the Piedmont-New England tectonic province. These basins are faulted on one or both sides, and their sedimentary histories indicate that faulting accompanied sedimentation in them. The final regional tectonic event recorded in the geologic record of the region is the widespread intrusion of diabase dikes that are considered to be of Triassic to Jurassic age (190-136 m.y.). Since the formation of the Triassic basins, the Piedmont-New England tectonic province as a whole may have undergone differential uplift; however, there is no geologic evidence of orogenic activity nor regional faulting.

An explanation of the tectonic stability of this region since Jurassic (136 m.y.) may be provided by the hypothesis of plate tectonics. The period from Jurassic to Cretaceous (190-65 m.y.) marks the beginning of ocean ridge spreading and the formation of the lithospheric plates that now characterize the global tectonic pattern. Since that time the Appalachian region has moved on the tail of North American Plate.

Rock types and structures characteristic of the Piedmont-New England tectonic province disappear eastward beneath the deposits of the Atlantic Coastal Plain so that no structurally significant eastern boundary is shown. However, because it has been a region of active sedimentation since the Jurassic Period (190-136 m.y.) (Owens, 1970), we recognize the Atlantic Coastal Plain as a distinct tectonic province.

Several major structural features within the Coastal Plain (the Salisbury embayment, the Cape Fear arch, and the Southeast Georgia embayment) have major axes trending normal to the trend of Coastal Plain, in sharp contrast to the structural grain in the Piedmont-New England province which is parallel to the northeast-southwest trend of the province.

For the most part Atlantic Coastal Plain subsidence began in the Mesozoic (225-65 m.y.) and continued throughout most of the Tertiary (2 m.y.), although the rate and amount has varied both in time and from place to place. Little faulting is known in the Atlantic Coastal Plain. Those few faults exibiting tectonic movement that have been reported have displaced strata ranging in age from Cretaceous (65 m.y.) to no younger than Miocene (10 m.y.).

The historic record of earthquakes in the Appalachian region reveals significant differences in the seismic characteristics of its tectonic provinces. The Piedmont-New England tectonic province shows the greatest rate of earthquake occurrence. There appears to be a tendency for the geographic clustering of activity in an east-west trending zone in central Virginia (Bollinger, 1973) and a southeast-northwest trending zone in New England and Canada (Diment, et al., 1972).

Bollinger (1973) has named the Virginia cluster the Central Virginia Seismic Zone. Within this zone the largest historic earthquakes were two events of maximum intensity VII.* These occurred near Richmond, Virginia, in 1774 and 1875.

Sbar and Sykes (1973) referred to the New England zone as the Boston-Ottawa Seismic Belt and suggested that it may be associated with a

* Intensity as measured on the Modified Mercalli Scale.

paleofracture zone. Within this belt earthquakes occur at about the same rate as in the Central Virginia Seismic Zone. The historical activity has included events of about maximum intensity VIII. Two of these occurred off the northern Massachusetts-New Hampshire coast in 1727 and 1755. A third shock, which may have been slightly larger, occurred at Montreal in 1732. Because of the association of this activity with geologic structure, future occurrences of similar shocks are expected to be within the Boston-Ottawa Seismic Belt.

Several damaging earthquakes have also occurred in the tectonic province which are not associated with the above zones. These include the 1791 East Haddam, Connecticut earthquake. Following Heck and Eppley (1958), Coffman and Von Hake (1973) list the intensity of this shock as VIII; however, after reviewing the historical records, Linehan (1964) concluded that the intensity was no greater than V-VI. The staff has reviewed Linehan's data and concurs that an intensity of VIII overestimates the severity of this earthquake. The remaining damaging shocks have been of intensity VII and have no known association with tectonic structure. Accordingly, the staff considers the occurrence of an intensity VII equally probable (a low order of probability) at any place within the Piedmont-New England tectonic province that is not also within the Central Virginia Seismic Zone or Boston-Ottawa Seismic Belt.

Most historical earthquakes in the Atlantic Coastal Plain have occurred in recognizable geographic clusters. Although it has no generally accepted association with a known geologic structure, one such cluster of activity is located within the Southeast Georgia embayment in the vicinity of Charleston, South Carolina. Included in this cluster of more than 400 events is the 1886 Charleston, South Carolina earthquake which had a maximum intensity of X. A second more diffuse cluster is located within the Salisbury embayment in Delaware. Like the Charleston cluster, it has no generally accepted association with a known geologic structure.

The two largest Coastal Plain earthquakes to have occurred outside these clusters have been of intensity VII. Both of these are of interest with respect to the Indian Point site because they occurred near New York City. One, an 1884 shock, had its maximum intensity at Jamaica and Amityville on southern Long Island, while the other occurred in the vicinity of nearby Asbury Park, New Jersey in 1927. Because of the spatial clustering exhibited by historical events and the correlation of these clusters with the coastal embayments, we have accepted that near future earthquakes in the Coastal Plain will occur according to a similar pattern. Since the Charleston earthquake occurred in a distant cluster, an earthquake in the Coastal Plain Province is not expected to result in an intensity at the Indian Point site that will exceed approximately intensity VI. Such a site intensity could result from the occurrence of an intensity VII earthquake at the Coastal Plain-Piedmont boundary, some 25 miles from the site.

2.3 Earthquake-Tectonic Structure Correlations

Studies of the relationships between earthquake occurrence and geologic structure is an important means of assessing the likelihood of movement of faults and, when this relationship is known, an accurate assessment of the seismic hazard at a site can usually be made. Unfortunately, historic earthquakes in the eastern United States have not been well enough located to permit detailed studies of earthquake-structure relationships. During the most recent 10 to 15 years we have reasonably accurate epicenter locations; however, depths at which movements occur remain poorly known. Some general observations can be made, however, from the geographic distribution and relative frequency of historic earthquakes and their relation to major regional structure.

A series of faulted basins, extends from South Carolina to Nova Scotia. These Triassic basins contain sedimentary rocks of Triassic to Jurassic (190-136 m.y.) age (Cornet, et al., 1973) and can be considered a unifying geologic feature of the Piedmont and New England geologic provinces. They also underlie parts of the Coastal Plain. Because sedimentary rocks in these basins are little deformed and rest unconformably on the older rocks affected by the various Appalachian orogenies, they provide terminal dates for major rock deformation in these two provinces.

Igneous rocks of basaltic composition form flows, sills, and stocks within the basins. Basaltic dikes following normal faults and cutting across older structures are commonly found both within and outside the basins and crop out as far south as the Alabama Piedmont. These cross-cutting features serve to date the various faulting events. De Boer (1968) has suggested a northwestward displacement of volcanic activity in the Triassic basins during late Triassic to Jurassic (190-136 m.y.). This would indicate a progressive northeastward expansion of the broad geanticlinal arching of the Appalachians in early Mesozoic time (190 m.y.), which may correspond to the early opening and development of the North Atlantic as described by LePichon and Fox (1971).

Data concerning the border faults and some faults within the basins have been interpreted in several different ways. Bain (1932) first thought them to be thrust faults, and later to be wrench faults (Bain, 1957). Sanders (1963) also considered wrench faulting to be a possibility. However, most exposures of fault surfaces support the favored hypothesis mentioned by Eardley (1962) of normal faulting for major displacements along the border faults.

With respect to the Indian Point site, two Triassic basins are of interest. The Newark Basin, the largest of these sedimentary basins, extends from its northernmost terminus near the site southwestward to Charlottesville, Virginia, about 300 miles away and is customarily divided into several sub-basins. In western New Jersey and eastern Pennsylvania the width of this basin reaches a maximum of about 30 miles. Strata of the basin dip northwest away from its southeastern margin and toward the bordering Ramapo fault system. The northwestern margin of the basin is thought to have formed against mountain fronts which resulted from movement along the en-echelon faults of this fault system.

The Connecticut Basin to the north is very similar in dimensions and structure to the Newark Basin, but the structural elements are reversed (beds dip eastward toward an eastern border fault). It has been proposed by Sanders (1963) that the Newark and Connecticut basins were connected during deposition; however, Klein (1969) presented evidence to the contrary based on the volcanics and sediments of the basins.

Several recent seismicity studies in the Eastern United States have suggested seismic zones transverse to the structural grain of the region. Bollinger (1973) has reviewed the seismicity of the southeastern United States. The spatial pattern of earthquakes together with the orientation of major axes of their isoseismal areas causes him to postulate seismic trends both parallel (Southern Appalachian region) and transverse (central Virginia and South Carolina-Georgia) to the structural trend of the Piedmont.

Geological support for a transverse earthquake trend in central Virginia was given in a paper by Dennison and Johnson (1971), in which they describe a zone of igneous intrusives that extends from Highland County, Virginia southeastward into the Piedmont. Rocks in this intrusive zone, which are progressively older from the northwest toward the southeast, range in age from Eocene (38 m.y.) to Precambrian (570 m.y.). They suggest that these intrusives represent a zone of weakness in the earth's crust. As such, it could act as a zone of stress concentration in the North American plate. However, detailed investigations needed to clearly determine whether or not the central Virginia seismic zone is structurally related to this transverse intrusive zone have not been made.

Several lines of geological and geophysical evidence indicate the existence of a structural basis for the Boston-Ottawa Seismic Belt. Fletcher, et al. (1972) describe a zone of significant P-wave travel time anomalies relative to adjacent areas. This zone, which is coincident with the seismic belt, indicates a local crustal or upper mantle structural or petrologic anomaly. Sbar and Sykes (1973) point out that the seismic belt is subparallel to and partly within the

Ottawa-Bonnechere graben and that the Monteregian Hills and the White Mountain intrusives are contained within this belt as well. All three of these features are of Mesozoic or Tertiary age (Kay and Colbert, 1965; Fairbairn, et al., 1963; Foland, et al., 1970). Diment, et al. (1972) hypothesize that the seismic belt may be located along an extension of the Kelvin seamount chain. LePichon and Fox (1971) suggest that this seamount chain formed along a zone of crustal weakness, which may have been a fracture zone during the early opening of the North Atlantic in the Jurassic and Cretaceous (136-65 m.y.). In fact, both the seismic belt and Kelvin seamounts are approximately on a small circle about the center of rotation that LePichon and Fox propose for plate movement during this period.

In only one instance, the Newark Basin in New York and New Jersey, has it been suggested that instrumentally located earthquakes are associated with Triassic Basin faults (Page, et al., 1968; Davis, et al., 1974). These proposed microearthquake associations are given detailed consideration in subsection 3.2 below. Similar correlations have not been recognized elsewhere and no macroearthquake activity is known on these structures.

The absence of definitive earthquake-structure correlations, together with the absence of geologically young movements on the Triassic Basin faults, causes the staff to conclude that the Triassic Basin faults are not currently active sources of earthquakes.

2.4 Summary

The major structures of the Piedmont-New England tectonic province were formed in the mid to late Paleozoic Era (380-225 m.y.). They are dominantly large anticlinoria and synclinoria. Faulting is also regionally associated with these fold structures. The final episode of regional tectonism, which formed a series of faulted basins, occurred during the Triassic-Jurassic Periods (225-136 m.y.). Seismic activity is not known to be associated with specific tectonic structures. The two zones of most frequent earthquake activity, the Boston-Ottawa Seismic Belt and the Central Virginia Seismic Belt, may reflect instability along paleofracture zones. Even within these rather wide zones, however, no historic earthquakes have been associated with specific structures. No surface displacement has been observed in association with historical earthquakes in the Piedmont-New England tectonic province. With respect to seismicity, low orders of probability apply to the occurrence of earthquakes of maximum intensity VII anywhere in the Piedmont-New England tectonic province outside of the two above seismic belts.

3.0 The Ramapo Fault System

3.1 Geologic Evidence for Age of Last Movement

The Ramapo Fault as defined by Ratcliffe (1971) extends from Stony Point, New York, southwest to Peapack, New Jersey, a distance of about 50 miles. The Ramapo Fracture System as defined by Ratcliffe (1971) includes the Ramapo Fault proper plus the distance from Tomkins Cove, New York, northeast through Canopus Hollow to about the latitude of Newburgh, New York, or an additional 20 miles. The Ramapo Fault proper lies then essentially along the northwestern margin of the Newark basin, while the Ramapo Fracture system extends into the area between the Reading and Manhattan Prongs. Ratcliffe (1970, 1971) indicated that differential movement and igneous activity appeared to have occurred here in pre-Triassic (225 m.y.) time, specifically in the late Precambrian (570 m.y.) and early Paleozoic (380 m.y.). He also indicated that there is no direct evidence for Triassic (190 m.y.) or younger movement east of the Hudson River on the strands of the fault system that pass closest to the Indian Point Site. Southwest of the Hudson River it appeared to him that Triassic (190 m.y.) movements were rather limited along the northern trace of the Ramapo Fault and were confined to the previously formed Precambrian (570 m.y.) and Paleozoic (380 m.y.) areas of weakness. Ratcliffe (1971) believed the Ramapo Fault to be hinged at a point north of Tomkins Cove, New York, with an increasingly greater displacement to the southwest. This hinge hypothesis accounts for the different times of movement seen along the fracture system.

Direct field evidence for movements younger than Triassic (190 m.y.) along the Ramapo Fault has not been found to date.

Members of the AEC staff made an extensive field examination of the Ramapo Fault zone from Canopus Creek, New York, to Boonton, New Jersey. No evidence indicating that movement at or near the ground surface had occurred since Triassic time (190 m.y.) was observed in any of the examined areas. Within the meaning of item (1) 10 CFR 100, Appendix A, subsection III(g), the Ramapo Fault system is considered not capable.

3.2 Seismic Activity

The staff has also reviewed the studies in the seismological literature related to the Ramapo fault which Davis, et al. (1974) cited. An early study of earthquake activity in the vicinity of the Ramapo fault was conducted by Isacks and Oliver (1964). Their data base consisted of earthquakes with non-instrumentally determined epicenters reported by Heck and Eppley (1958), Smith (1962) and United States Earthquakes (1935-1960), instrumental epicenters reported by Leet (1938) and Linehan and Leet (1941), and microearthquake epicenters determined by the authors. These earthquakes occurred within a 300 kilometer radius of Ogdensburg, New Jersey.

Geographically, the pattern of microearthquake epicenters found by Isacks and Oliver conforms to the broad northeast trending band defined by the previously reported macroearthquake epicenters. This band roughly follows the regional northeast-southwest structural grain.

The Ramapo and numerous other faults of ancient origin lie within it. In consideration of a hypothesis posed by Woollard (1958) that eastern United States earthquakes result from movement on old planes of weakness, Isacks and Oliver suggested that these epicenters may be associated with Triassic and older faulting. They also suggested that one microearthquake of Richter magnitude 2.0 originated on the Ramapo fault. In drawing upon this earlier work and two additional microquakes, Page, et al. (1968) suggested that, within the uncertainty of the data, four microearthquakes and seven macroearthquakes may have occurred on the Ramapo fault.

Davis, et al. (1974) compiled a list of sixty-six earthquakes which have occurred within fifty miles of the Indian Point Site since 1768. Thirty-two of these events occurred within twenty miles of the Ramapo fault. These include the data of Page, et al. (1968) and consist of five instrumentally determined macroshocks, five microshocks, and twenty-two events which were not instrumentally located. Focal mechanism solutions and depth determinations were not available for any of the earthquakes considered in the above studies.

Sbar, et al. (1970) investigated a microearthquake swarm which occurred at Lake Hopatcong, N. J., a man-made reservoir, in 1969. Lake Hopatcong is located in the New Jersey highlands about twelve miles northwest of the Ramapo fault. The earthquakes, all of magnitude less than about 1.5, were well located and were evidently very shallow. A composite focal mechanism solution for the swarm indicates N 12°E normal faulting with a dip of 60° to the southeast. Although no surface faults have been mapped at the reservoir, there is a known fault, five miles to the northeast. If extended southwest along its strike, this fault intersects the location of the microearthquake swarm. Moreover, such an extension would be compatible with the trend of the fault indicated by the focal mechanism solution. Davis, et al. suggested that this focal mechanism solution could be interpreted as indicating a regional stress condition which could cause movement on the Ramapo fault.

The staff has considered these studies in the context of subparagraph III(g)(2) of Appendix A to 10 CFR Part 100. Microearthquakes have become increasingly valuable for seismo-tectonic studies with the development of high gain, high frequency seismographs. While many such studies have been reported in the literature, a general relationship between microearthquake activity and the occurrence of larger earthquakes significant to engineering design has not yet been established. Furthermore, it is not certain how microearthquake observations should be interpreted relative to tectonic processes. It has been verified by many observations that tectonic structures which generate macroearthquake activity also generate microearthquake activity. Indeed, many characteristics of the observed micro-activity are similar to those of the macro-activity. However, the converse has not been shown to be true and would almost certainly not hold for microearthquake activity at the lower energy levels presently observable. Thus the degree of seismic risk implied by microearthquake data obtained in a given study must be interpreted largely in terms of those specific data. Accordingly, subparagraph III(g)(2) does not recognize microearthquake activity as evidence that a fault is to be considered capable.

The macroearthquakes of the above studies have been located by using either non-instrumental or limited instrumental data. Consequently, the uncertainty of location of these events is typically greater than 10 miles. In fact, Smith (1966) estimates that the location uncertainty of one of the better recorded macroshocks, the September 3, 1951 Rockland County, NY, event of intensity V, is of the order of 15 miles. Moreover, no depths or focal mechanisms have been determined. In view of the above, the density of mapped surface faults in the region of interest and the sparse earthquake data sample, the staff feels that a direct relationship between macroearthquakes and the Ramapo fault has not been demonstrated as required by subparagraph III(g)(2).

On the basis of the above considerations, we have concluded that the Ramapo fault is not capable as defined in subparagraph III(g)(2) of Appendix A to 10 CFR Part 100.

3.3 Structural Relationship to Capable Faults

The staff has also considered possible structural relationship between the Ramapo fault system and capable faults which would imply that faults of the Ramapo system are also capable according to subparagraph III(g)(3) of Appendix A to 10 CFR Part 100. In this context, the staff has found that no fault in the Piedmont or New England provinces is reported in the literature to have experienced movement either at or near the ground surface during the past 500,000 years. In fact, according to the weight of evidence in the literature, the last significant age of tectonism occurred during the Mesozoic (more than 65 m.y. ago and probably more than 136 m.y. ago). Moreover, there are no correlations of well determined macroearthquakes with any faults that are structurally related to the Ramapo fault system. The staff has, therefore, concluded that the faults of the Ramapo system have no structural relationship with other capable faults which would imply that they, too, are capable under subparagraph III(g)(3).

3.4 Summary

There is no evidence of movement of faults of the Ramapo system, at or near the ground surface, during the past 500,000 years. In fact, the weight of the geologic evidence indicates that no such movements have occurred since Jurassic (136 m.y.) at the latest and east of the Hudson River, possibly not since the Paleozoic (225 m.y.). No macroearthquake activity can be demonstrated to have a direct relation with the Ramapo fault system and there is no evidence of any capable faults structurally related to the Ramapo fault system. Accordingly, the staff has concluded that the faults of the Ramapo system are not capable in the meaning of subparagraph III(g) of Appendix A to 10 CFR Part 100.

4.0 Safe Shutdown Earthquake (SSE)

4.1 Maximum Earthquake

The SSE at the Indian Point Site is based on the following findings of our review of the geology and seismicity of the region according to the requirements of Appendix A to 10 CFR Part 100:

1. There are no capable faults in the vicinity of the site.
2. The major earthquakes in the Atlantic Coastal Plain have occurred within geographic clusters which correlate with the Southeast Georgia and Salisbury embayments. Near future earthquakes will follow the pattern that has shown stability for more than 200 years of historical record.
3. The maximum earthquake in the Piedmont-New England tectonic province will have a maximum intensity of VII and will affect the site with that intensity.

The first of the above implies that the Safe Shutdown Earthquake intensity can be appropriately determined by subsections V(a)(1)(ii)-(iii) of Appendix A to 10 CFR Part 100. The second results in a site intensity no greater than VI in consequence of a postulated occurrence no closer than 25 miles to the site of an earthquake similar to the 1884 New York earthquake which had a maximum intensity of VII on Long Island. The third results in a site intensity of VII in consequence of a postulated random occurrence of an earthquake similar to the 1871 Wilmington, Delaware earthquake of maximum intensity VII. Accordingly, we consider a Safe Shutdown Earthquake intensity of VII to be an adequately conservative representation of the seismicity of the region. The SSE is specified in terms of an acceleration which serves as a value for the high frequency asymptote of the response spectrum representing horizontal motion at the foundations of Category I structures and for which those structures are designed.

With respect to determination of the SSE acceleration, Davis, et al. (1974) point out the necessity of considering the fact that (1) high peak accelerations have recently been recorded in the source regions of relatively low magnitude earthquakes, (2) a study by Nuttli (1973) shows that attenuation of seismic waves in the eastern United States may be as low as 1/10 that in western United States, and (3) the only strong motion record which exists for an earthquake in the eastern part of the nation, the Blue Mountain Lake (New York) record of August 3, 1973, exhibits a rich high frequency content.

Consideration of these points has been implicit in the staff's review. Davis, et al. cite several examples of high accelerations which have been recorded during low magnitude earthquakes. These high accelerations were recorded near the earthquake source (i.e., in the near field) where amplitudes of higher frequency vibrations had not been attenuated.

Such recordings are consistent with a now widely accepted model of the earthquake source mechanism which predicts accelerations in the near field to be proportional to the effective stress (Brune, 1970). Accordingly, high accelerations at high frequency are to be expected in the near field of earthquakes and would be observed in recordings like that obtained at Blue Mountain Lake. Moreover, seismic waves of high frequency are subject to local amplification by topographic features of relatively small dimension (Davis and West, 1973). The effect of local amplification on the Blue Mountain Lake recording is uncertain, although it is not believed to have been significant.

With increasing distance from the earthquake source, the high frequency amplitudes of seismic waves are reduced by rapid attenuation as well as by several wave optical effects attributable to the finite dimensions of the source (Brune, 1970). The reference acceleration for seismic design is considered to be the far field acceleration of sustained duration.

The absence of capable faults in the vicinity of the Indian Point site means that there is no geologic reason to consider that structures there are unusually subjected to near field accelerations. Moreover, the fact that the units are founded on high density bedrock rather than overburden of low density and seismic velocity means that wave amplification need not be considered. Accordingly, the staff considers far field acceleration data to be appropriate in determining the SSE acceleration.

The staff has accepted that attenuation of seismic waves in the eastern United States is lower than that in the west. It has also recognized that eastern earthquakes of a given magnitude generally result in damage over a greater distance from the epicenter than do similar shocks in the west. Accordingly, were the staff to base its determination of the SSE acceleration on the magnitude and location of the causitive earthquake, it would be necessary to give explicit consideration to the effects of attenuation; however, because the staff has instead based its evaluation on intensity at the site, no such consideration is needed.

Intensity is a site specific measure of degree of damage, independent of geographic location, so that it implicitly accounts for attenuation effects. Similarly, by virtue of its site specific nature and its dependence on degree of damage alone, empirical relationships between intensity and acceleration are independent of the geographic source of the data used in establishing those relationships. Thus, the staff considers far field intensity versus acceleration correlations, based on western United States data, to be appropriate for determining SSE accelerations anywhere in the United States.

Accordingly, the staff considers a value of 0.15g, which is consistent with available bedrock acceleration (Coulter, Waldren and Devine; 1973) an adequately conservative value for the high frequency asymptote of the design response spectrum for the Indian Point Units 2 and 3.

4.2 Summary

A maximum site intensity of VII is in accord with the interpretation of the geology and seismicity as required by Appendix A to 10 CFR Part 100 and is a conservative Safe Shutdown Earthquake intensity. We do not consider the low attenuation of seismic energy observed in the eastern United States to be an indication that western United States earthquake intensity-acceleration data is inappropriate for the eastern United States. The staff, therefore, concludes that an SSE using a value of 0.15g as the high frequency asymptote of the design response spectra, is adequately conservative for Indian Point Units 2 and 3.

REFERENCES

Bollinger, G. A., 1973. Seismicity of the Southeastern United States, Bull. Seis. Soc. Amer., 83, p. 1785.

Brune, James N., 1970. Tectonic Stress and the Spectra of Seismic Shear Waves from Earthquakes, Jour. Geophys. Res., 75, pp. 4997-5009.

Bain, G. W., 1932. The Northern Area of Connecticut Valley Triassic, Am. Jour. Sci., 5th ser., V. 23, pp. 57-77.

Bain, G. W., 1957. Triassic Age Rift Structure in Eastern North America, New York Acad. Sci. Trans., ser. 2, V. 19, pp. 489-502.

Coffman, J. L., and C. A. Von Hake, 1973. Earthquake History of the United States, U.S. Department of Commerce, 41-1 (revised edition), U.S. Government Printing Office, Washington, D.C.

Cornet, B., A. Traverse, and N. G. McDonald, 1973. Fossil Spores, Pollen, and Fishes from Connecticut Indicate Early Jurassic Age for Part of the Newark Group, Science, 182, pp. 1243-1246.

Coulter, H. W., H. H. Waldron and J. F. Devine, 1973. Seismic and Geologic Siting Considerations for Nuclear Facilities, Fifth World Conference on Earthquake Engineering, Rome.

Davis, James F., Paul W. Pomeroy, and Robert H. Fakundiny, 1974. Statement: Geological Survey - New York State Museum and Science Service Regarding Licensing of Indian Point Reactor #3 and Discussion of the Final Safety Analysis Report Sections 2.7 (Geology) and 2.8 (Seismology), Report to New York State Atomic Energy Council, Albany, N.Y., April 19.

Davis, Lawrence L., and Lewis R. West, 1973. Observed Effects of Topography on Ground Motion, Bull. Seis. Soc. Amer., 63, pp. 283-298.

De Boer, J., 1968. Paleomagnetic Differentiation and Correlation of the Late Triassic Volcanic Rocks in the Central Appalachians (with Special Reference to the Connecticut Valley), Geol. Soc. Am. Bull. 79, pp. 609-626.

Dennison, John N. and Robert W. Johnson, Jr., 1971. Tertiary Intrusions and Associated Phenomena Near the 38th Parallel Fracture Zone in Virginia and West Virginia, Bull. Geol. Soc. Amer., 82, pp. 501-508.

Diment, W. H., T. C. Urban, and R. A. Revetta, 1972. Some Geophysical Anomalies in the Eastern United States, in Robertson, E. C., ed., The Nature of the Solid Earth, McGraw-Hill, New York, pp. 544-574.

Eardley, A. J., 1962. Structural Geology of North America, Harper and Row, New York.

Fairbairn, H. W., F. Faure, W. H. Pinson, P. M. Hurley, and J. L. Powell, 1963. Initial Ratios of Strontium 87 to Strontium 86, Whole Rock Age, and Discordant Biotite in the Monteregian Igneous Province, Quebec, Jour. Geophys. Res., 68, pp. 6515-6522.

Fletcher, P. J., Marc L. Sbar, and Lynn R. Sykes, 1972. Tectonic Implications of P-Travel Time Residuals of the Cannikin Explosion Observed in Northeastern United States, Geol. Soc. Am. Abs. with Programs (Cordilleran Sec.), V. 4, no. 3, pp. 158.

Foland, K. A., A. W. Quinn, and B. J. Gillette, 1970. Jurassic and Cretaceous Isotopic Ages of the White Mountain Magma Series, Geol. Soc. Am. Abs. with Programs (Northeastern Sec.), V. 2, no. 1, pp. 19-20.

Heck, N. H., and R. A. Epply, 1958. Earthquake History of the United States, Part 1, U.S. Coast and Geodetic Survey, 41-1, U.S. Government Printing Office, Washington, D.C.

Isacks, Bryan, and Jack Oliver, 1964. Seismic Waves with Freauencies from 1 to 100 Cycles per Second Recorded in a Deep Mine in Northern New Jersey. Bull. Seism. Soc. Am., 54, pp. 1941-1979.

Kay, M. and E. H. Colbert, 1965. Stratigraphy and Life History, John Wiley & Sons, Inc., New York, p. 736.

Klein, G., 1969. Deposition of Triassic Sedimentary Rocks in Separate Basins, Eastern North America, Geol. Soc. Am. Bull., 80, pp. 1825-1832.

Leet, L. D., 1938. Earthquakes in N. E. America, July-December, 1937, Bull. Seism. Soc. Am., 28, pp. 169-176.

Le Pichon, X., and P. J. Fox, 1971. Marginal Offsets, Fracture Zones, and the Early Opening of the North Atlantic, Jour. Geophys. Res., 76, pp. 6294-6308.

Linehan, D., and L. D. Leet, 1941. Earthquakes of N. E. U. S. A. and Eastern Canada, 1938, 1939 and 1940, Bull. Seism. Soc. Am., 31, pp. 11-17.

Linehan, D., 1964. Report on the Seismicity of the East Haddam-Moodus Area of Connecticut, Weston Geophysical Research, Inc., Weston, Mass.

Nuttli, O., 1973. Seismic Wave Attenuation and Magnitude Relations for Eastern North America, Jour. Geophys. Res., 78, pp. 876-885.

Owens, J. P., 1970. Post Triassic Tectonic Movements in the Central and Southern Appalachians as Recorded by Sediments of the Atlantic Coastal Plain; in Fisher, G. W., F. J. Pettijohn, J. C. Reed, Jr., and K. W. Weaver, eds., Studies of Appalachian Geology: Central and Southern, Interscience, New York.

Page, Robert A., Peter H. Molnar, and Jack Oliver, 1968. Seismicity in the Vicinity of the Ramapo Fault, New Jersey - New York, Bull, Seism. Soc. Am., 58, pp. 681-687.

Ratcliffe, N. M., 1970. Ancient Strike-Slip Fault Tectonics in the Hudson Highlands & Manhattan Prong, Trans. New York Acad. Sci., 32, ser. 11, pp. 1009-1021.

Ratcliffe, N. M., 1971. The Ramapo Fault System in New York and Adjacent Northern New Jersey: A Case of Tectonic Heredity, Geol. Soc. Am. Bull., 82, pp. 125-142.

Sanders, John E., 1963. Late Triassic Tectonic History of Northeastern United States, Am. Jour. Sci., 261 pp. 501-524.

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. Seism. Soc. Am., 60, pp. 1231-1243.

Sbar, Marc L., and Lynn R. Sykes, 1963. Contemporary Compressive Stress and Seismicity in Eastern North America: An Example of Intra-Plate Tectonics, Geol. Soc. Am. Bull., 84, pp. 1861-1882.

Smith, W. E. T., 1962. Earthquakes of Eastern Canada and Adjacent Areas, 1534-1927. Publ. Dom. Obs., V. 26, n. 5, Ottawa.

Smith, W. E. T., 1966. Earthquakes of Eastern Canada and Adjacent Areas, 1928-1959, Publ. Dom. Obs., V. 32, n. 3, Ottawa.

United States Earthquakes, 1935-1960. Annual publication of U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C.

Woollard, G. P., 1958. Areas of Tectonic Activity in the United States as Indicated by Earthquake Epicenters, Trans. Am. Geophys. Un., 39, pp. 1135-1150.

APPENDIX D

REPORT OF FOSTER ASSOCIATES ON CONSOLIDATED EDISON COMPANY'S FINANCIAL QUALIFICATIONS

FOSTER ASSOCIATES, INC.

1101 SEVENTEENTH STREET, N.W., WASHINGTON, D.C., 20036. TEL. 296-2380
600 SIXTH AVENUE, S.W., CALGARY, ALBERTA, CANADA. TEL. 263-1790
WASHINGTON

DEC 1 ? 1974

Mr. Donald J. Skovholt
Assistant Director for Quality Assurance
and Operations
Directorate of Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Skovholt:

Attached is our review of the financial qualifications of Consolidated Edison Company of New York with respect to their operation of Indian Point Units 1 and 2 and their completion of construction and operation of Indian Point Unit 3.

We appreciate the opportunity to have worked with the AEC on this matter and hope we may be of service in the future.

Sincerely,

Tim Jackson

Tim Jackson

Enclosure:
As stated

FINANCIAL QUALIFICATIONS

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. - INDIAN POINT NO. 1, 2, AND 3

I. Financial Qualifications Summary

The Atomic Energy Commission's regulations regarding financial data and information required to establish financial qualifications for applicants for operating licenses are Paragraph 50.33(f) of 10 CFR Part 50 and Appendix C to 10 CFR Part 50. I have reviewed the financial information presented in the application, the amendments thereto and the amended and substituted application regarding financial qualifications. I have also reviewed additional information bearing on the financial capabilities of Consolidated Edison. This information includes newspaper articles (New York Times, Wall Street Journal, and Washington Star News), Moody's Weekly Reports, and information submitted to the Atomic Energy Commission by Consolidated Edison, including quarterly financial reports, the most recent prospectus and recent estimates of operating expenses for Indian Point No. 3.

In addition to the printed information, I have also discussed the financial condition of the applicant with the applicant's Chief Financial Officer.

Based on this review, I have concluded that Consolidated Edison Company of New York, Inc. possesses or can obtain the necessary funds to meet the requirements of 10 CFR 50.33(f) to complete and operate Indian Point Nuclear Generating Unit No. 3, and, if necessary, permanently shutdown the facility and maintain it in a safe shutdown condition and to operate Indian Point No. 1 and Indian Point No. 2, and, if necessary, permanently shutdown these facilities and maintain them in a safe shutdown condition.

II. Capital Costs and Expenses

A. Plant Completion

At September 30, 1974, approximately $201 million had been spent on Indian Point No. 3 with estimated expenditures of approximately $210 million remaining. Of the $210 million, approximately $107 million was paid on November 1, 1974 leaving approximately $110 million of expenditures to complete the plant. Funds are expected to be provided from internal cash, additional bank borrowings under the $425 million line of credit and from funds from the sale of Astoria No. 6.

B. Operating Expenses - Nuclear Units

The attached schedule shows that Consolidated Edison for the first nine months of 1974 operated Indian Point 1 and 2 such that revenues from the sale of power generated exceeded direct and allocated expenses. Although Unit 1 will be shutdown for an estimated two-year period for major modifications including installment of an emergency core cooling system, there is no reason to believe Unit 1 and 2 will not continue to operate in the future such that revenues associated with power generated exceed expenses. Both Indian Point 1 and 2 are in Consolidated Edison's rate base and the company is allowed to earn a return on these facilities. Since scheduled and nonscheduled downtime of generating plants is one of the basis for a reserve margin, a maintenance and repair shutdown of Indian Point No. 1 is something already allowed for to some extent in the electric rates charged by Consolidated Edison. Table I which follows, provides the estimated annual operating costs for operating Indian Point No. 3 for the first five years. The average operating cost for the five years is projected to be 14.57 mills per KWH.

Table I

INDIAN POINT NO. 3 ESTIMATED OPERATING COSTS

Year	Plant* Factor	Fuel* Expense	Operating &* Maintenance	Other Costs (1)*	Total* Costs	Mills Per KWH (2)(3)
1975	45.0%	$12,400	$1,900	$55,600	$69,900	18.38
1976	67.8	17,000	3,960	55,600	76,560	13.36
1977	67.1	16,600	4,360	55,600	76,560	13.56
1978	66.6	17,300	4,790	55,600	77,690	13.80
1979	66.6	17,000	5,270	55,600	77,870	13.83

*Source: Consolidated Edison Company

(1) Includes capital costs, taxes, depreciation and insurance costs. Represents 13.9% of $400 million.

(2) Based on 965 MWe plant for 1975-1979.

(3) 1973 revenue per KWH was 42.71 mills.

C. Shutdown Expenses - Indian Point 3*

The applicant estimates that decommissioning of Indian Point No. 3 will require nine months to complete, and will cost approximately $3,000,000 in 1973 dollars, based on 1973 technology. The precise nature of the shutdown process is difficult to determine at present, in view of the likelihood of regulatory and technological changes in the coming years. However, the process will probably involve removal of all spent fuel from the facility and shipment offsite; decontamination of the facility through appropriate chemical cleaning and flushing; treatment and disposal of any contaminated water; disposal of resins, filters, and miscellaneous radioactive materials; sealing of the containment and adjustments to alarm systems in anticipation of post-shutdown security monitoring; and completion of a final post-shutdown radiation check. During these procedures, security forces at the facility will be maintained at or near fuel operational levels because Indian Point 1 and 2 are assumed to be operating.

Following the shutdown process, the applicant will conduct, in perpetuity, if necessary, a security and radiological monitoring program. This will involve a round-the-clock guard to insure against intruders. An alarm system, telephone communications, locked doors and windows, a lighting system, and a perimeter fence will be maintained for this purpose. In addition, periodic

*Assumes Indian Point 1 and 2 continue to operate.

monitoring of radioactivity in the vicinity of the facility will be performed.

The applicant estimates the annual cost of such a program, in 1973 dollars and using 1973 technology, to be approximately $300,000.

D. Extraordinary Expenses

In addition to the estimated operating expenses previously discussed, Consolidated Edison may have additional capital expenditures and annual operating expenses as outlined below.

In October 1973, the AEC staff issued a Draft Environmental Statement relating to Indian Point No. 3 which recommends operation with its presently planned cooling system be permitted until May 1, 1978 and thereafter, a closed-cycle cooling system be required. Consolidated Edison estimates that the cost of installing such a system for Indian Point No. 3 would at least equal the cost estimated for Indian Point No. 2. The AEC has not yet issued a Final Environmental Statement on Indian Point No. 3.

Consolidated Edison estimates that the capital cost of installing a closed-cycle cooling system for Indian Point No. 2 in 1978 would be $84,000,000 and that a closed-cycle cooling system, together with associated costs, would cost more than $35,000,000 per year (including amortization of capital costs) over the life of this unit as compared to the cost of the unit without such a system.

Consolidated Edison appealed the imposition of this condition for Indian Point No. 2 to the Atomic Safety and Licensing Appeal Board. The applicant urged that the May 1, 1978 date be deferred until September 1, 1981 to allow it to complete long-term environmental studies now in progress as to the effect of operation of the unit on the environment of the Hudson River and that a closed-cycle cooling system not be required if such studies indicate that such a system is not necessary or desirable. In April 1974, the Atomic Safety and Licensing Appeal Board ruled that once through cooling must be terminated by May 1, 1979 rather than May 1, 1978.

In addition to the cooling system expenses, additional expenses may be required to meet EPA water requirements. To implement the 1972 amendments to the Federal Water Pollution Control Act, the Federal Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation have each proposed amendments to the New York State water quality standards. The EPA was also required by the 1972 amendments to publish effluent limitation guidelines for, among other things, steam electric plants. A consulting firm retained by the EPA submitted to the EPA draft guidelines for such limitations. Consolidated Edison estimated that compliance with certain of such proposed water quality standards and effluent limitations, if adopted as proposed, could have required the applicant to make capital outlays of more than $850,000,000 and to incur additional annual expenses of approximately $170,000,000. On October 8, 1974, the EPA published final guidelines for such limitations. The applicant has not yet completed its analysis of the cost of compliance with the guidelines set forth by the EPA.

Section 402 of the Federal Water Pollution Control Act requires Consolidated Edison to obtain a discharge permit from the EPA for each of its existing plants prior to December 31, 1974 and for each new plant thereafter prior to commencement of operations. such plants may not be operated after December 31, 1974 without such permits. The applicant has applied for these permits and received a draft 402 permit in June 1974. The EPA has required cooling towers for Indian Point Unit 1 by 1983 and Unit 2 by July 1978. The conflict between this data and the Atomic Safety and Licensing Appeal Board date has yet to be resolved.

The amount and timing of the capital and operating costs referred to in this section are dependent upon the actions taken or to be taken by agencies, etc., the timing and effect of which cannot be forecasted with certainty at this time. There is no reason apparent at this time that would prevent Consolidated Edison from recovering these costs through appropriate rate action. The length of time involved for these capital expenditures should allow Consolidated Edison to raise the necessary funds as part of its normal financing program.

III. <u>Proceeds and Revenues</u>

A. Sale of Plants

The Power Authority of the State of New York (PASNY) was authorized by the New York legislature to purchase two plants, Astoria No. 6 and Indian Point No. 3 from Consolidated Edison, at Consolidated Edison's request. PASNY has received a favorable IRS ruling on the purchase of both plants and is proceeding to purchase both plants, completing the purchase of Astoria No. 6 in December, 1974. The expected sales price is approximately $212 million. It is anticipated that upon the completion of this transaction, that PASNY will proceed with the purchase of Indian Point No. 3 in the spring of 1975 at a price of approximately $350 million. Consolidated Edison expects no legal or financial restrictions to prevent these sales and has adequate unmortgaged or unbonded property to substitute for that part of these plants which are already covered. There is no information available at this time as to whether the sale of either plant will result in an extraordinary gain or loss to Consolidated Edison. Any gain or loss would be expected to be small. An independent auditing firm, acting for PASNY, has prepared reports on the investments in the plants and the auditors reported figures close to

Consolidated Edison's. There is no reason to believe that the sale of the plants will not be completed in a timely manner.

B. Estimated Revenues

Revenues to cover expenses of Indian Point Units 1, 2, and 3 will come from systemwide sales of electrical output. Consolidated Edison is subject to the jurisdiction of the New York Public Service Commission (NYPSC) which regulates its electric rates and issuance of its securities.

Indian Point 1 and 2 have been included in Consolidated Edison's rate base, however, Indian Point 3 has not been included. In its most recent rate order, the NYPSC stated it had not included Indian Point 3 in Consolidated Edison's rate base since Consolidated Edison planned to sell the plant to PASNY. It is reasonable to assume that should the plant not be sold, that Consolidated Edison would request NYPSC to include it in the rate base and that the NYPSC would allow recovery of expenses and costs of Indian Point No. 3 and allow Consolidated Edison to earn a return on this investment.

The applicant has projected sales of electrical power by year from Indian Point No. 3. I have projected the revenue based on the average sales price of 4.27 cents/KWhour which is what was actually experienced in 1973 and does not include the recent rate increase. This estimated revenue is the final retail rate for power sold and assumes there are no additional losses of power from the plant to the customer. This revenue must be sufficient not only to cover generating costs but also the associated transmission and distribution costs. Table II below depicts this and compares it to the total annual operating and capital costs.

Table II

Indian Point No. 3 Estimated Revenues and Expenses*

Year	Energy MWhr	Estimated Annual Revenue	Estimated Plant Costs
1975	6,187,000	$264,184,900	$69,900,000
1976	6,432,000	$274,646,400	$76,560,000
1977	5,946,000	$253,894,200	$76,560,000
1978	5,946,000	$253,894,200	$77,690,000
1979	5,946,000	$253,894,200	$77,870,000

*Revenues are calculated as explained in the preceeding paragraph and expenses were provided by the applicant.

The relationship between estimated plant costs compared to estimated revenues for Indian Point No. 3 is similar to what has already been experienced on Indian Point No. 1 and 2. However, this unit is an integrated unit in the entire Consolidated Edison system and cash revenues come only from sales to consumers and this unit also incurs a portion of allocated costs from the rest of the system. Funds to cover expenses associated with a shutdown are expected to come first from funds generated from other continued operations and second, if necessary, from the equity portions of funds obtained through the sale of assets. The applicant's retained earnings totaled $704 million at the end of the 3rd Quarter of 1974. With the benefit of future operating revenues, retained earnings are expected to be considerably greater at the time of permanent shutdown. At present, there are no plans to designate a specific fund to cover decommissioning costs, nor does applicant anticipate the need to seek funds from external sources in connection with permanently shutting down the facility.

Consolidated Edison has sought higher electric rates several times over the last few years. Table III which follows sets forth increases in electric rates which became effective during the years 1968 - 1973. This table does not include the most recent rate increase.

In late 1973, Consolidated Edison filed an electric rate increase for some $423 million. A temporary increase of approximately $175 million was granted in February, 1974. The final rate order, issued November 12, 1974 granted an increase in rates of $164 million annually in addition to the temporary increase granted in February, 1974. The total rate increase which was granted is approximately $339 million compared with the request which was approximately $423 million. The rate order stated that the company should be given the opportunity to earn 13.5% on its equity.

The 13.5% return on equity allowed by the New York Public Service Commission is higher than previously allowed Consolidated Edison. This plus an additional allowance of .2% for attrition which was allowed by the Commission are expected to result in achievement of a higher return on equity by Consolidated Edison.

Table III

Consolidated Edison Electric Rate Increases

Effective Date	Estimated Increase in Annual Revenues*
September 8, 1970	$90,000,000(1)
October 1, 1970	$11,700,000(2)
June 15, 1971	$ 4,400,000(3)
	$55,000,000(1)
April 14, 1972	$39,600,000(1)(4)
January 10, 1973	$95,300,000(1)
September 22, 1973	$69,200,000(1)(5)(6)

NOTES: *In each case estimated at time of grant on basis of test period employed. Does not reflect collections under fuel riders.

(1) Including amounts designed to cover a major portion of related revenue taxes.

(2) Granted to cover certain increases in local and state tax rates and in water rates.

(3) Granted to cover certain increases in the rates of revenue taxes.

(4) Amount by which the permanent rate increase exceeded the temporary increase which went into effect on June 15, 1971.

(5) Amount by which the permanent rate increase exceeded the temporary increase which went into effect on January 10, 1973 for this class of service.

(6) In addition, under Consolidated Edison's electric service contract with the City of New York and by virtue of the Commission's finding that revenues under that contract were deficient, Consolidated Edison estimates that over the life of the contract it will be entitled to approximately an additional $6,500,000 in revenues from the City. The City's position is that the deficiency should amount to about $750,000.

The City of New York requested rehearing with respect to the Commission's funding as to the revenue deficiency under Consolidated Edison's contract with the City. The Urban Development Corporation requested rehearing with respect to the Commission's decision as it concerned rates authorized for electric space heating in Urban Development Corporation sponsored housing developments. Consolidated Edison requested rehearing with respect to the Commission's modification of its fuel adjustment clause which excluded purchased power (with the exception of economy purchases) from the determination of fuel adjustment recoveries and with respect to the amount of the Commission's adjustment to the basic cost of fuel to offset the loss of revenues resulting from the adoption of the modified fuel clause.

By order issued November 9, 1973, the Commission denied the petitions for rehearing of the City of New York and the Urban Development Corporation. By order on rehearing issued January 14, 1974, the Commission denied Consolidated Edison's request for reconsideration. The Commission on January 7, 1974, permitted Consolidated Edison to include most of its power purchases in the determination of its fuel adjustment recoveries.

In granting the September 22, 1973 rate increase, the Commission ordered Consolidated Edison to make refunds to certain customers in instances in which the temporary rates allowed were higher than the permanent rates authorized. The amount of such refunds, approximately $2,947,000, including interest, was reflected in Consolidated Edison's income statement for the year 1973.

In mid-December, 1974, Consolidated Edison announced that they planned to file a request for higher electric rates probably in the spring of 1975.

IV. Applicants Financial Status

A. History

The attached schedules provide Consolidated Edison's Income Statements for the 9 and 12 months ending September 30, 1974 and Balance Sheet for the 12 months ending September 30, 1974 and Changes in Financial Position for the nine months ending 1974.

Indian Point No. 3's completed cost represents 6% of the total utility plant at September 30, 1974 and its estimated operating and capital costs represents approximately 5% of the revenues for the most recent 12 month period.

Consolidated Edison is one of the largest electric utilities in the country in terms of assets, although its profitability has not been as large as others relative to its size primarily due to the service areas with its restrictions and limitations.

B. Recent Events

Consolidated Edison's financial position over the past several months has received National press coverage. Short term financial difficulties were deepened by Consolidated Edison's announcement in April, 1974 of an omission of a dividend on its common stock.

Because the widespread publicity, the psychological effect on the market of recent financial events and the conditions which caused the various actions and events at Consolidated Edison affect financing capabilities, a thorough review of the current financial condition of Consolidated Edison is necessary. Although they must be considered, spot conditions are not a proper single basis for a finding on the long term financial qualifications of Consolidated Edison.

Consolidated Edison's 1973 Annual Report gave indications of possible cash problems in 1974. Accounts receivable at December 31, 1973 were up considerably over the previous year and higher fuel costs had already produced a sizable deferred fuel cost. Also at year end 1973, Consolidated Edison had filed for a very large rate increase including an adjustment due to lower electric sales during the energy crises.

In March 1974, Consolidated Edison, in its prospectus, reported in more detail than previously made public, the causes and effects of the energy crises on its cash and current asset position. They also explained that outages at the two operating Indian Point Plants caused higher than normal purchases of power from other utilities.

In April 1974, Consolidated Edison announced the omission of its second quarter dividend due to a "severe cash shortage and a persistent decline in sales." This move by Consolidated Edison was primarily a cash conservation move. Earnings for the first quarter of 1974 were $29,553,623 or $.48 per share. In order to improve its cash position, Consolidated Edison proposed that the Power Authority of the State of New York purchase both Indian Point No. 3 and Astoria No. 6.

By April 1974, developments which occurred earlier in 1974, were already having a positive impact on the financial position of Consolidated Edison. The New York Public Service Commission had approved more rapid billing of higher fuels costs and deferment for expense purposes of unbilled fuel costs. Also, the New York Public Service Commission granted an interim rate increase of $174 million.

By July 1974, Consolidated Edison had resumed a quarterly dividend at approximately 45% of the amount paid prior to the dividend omission. Also, by then, fuel costs had leveled off somewhat, Indian Point 2 was back in operation thereby reducing purchase power requirements, the decline in sales leveled off and a special collection task force had reduced accounts receivable from customers. All these items point toward a return to a more normal financial condition. However, in order to raise cash to reduce borrowings which existed earlier in the year and to restore cash working capital used up by the higher dollar values of fuel inventory and deferred fuel costs, Consolidated Edison has continued with its plan to sell Astoria No. 6 and Indian Point No. 3. In the interim, Consolidated Edison arranged to increase its bank lines of credit to $425 million in order to obtain funds for working capital until the plants are sold.

For the nine months ending September 30, 1974, net income available for common shareholders was approximately $139 million compared to approximately $124 million for the comparable period a year earlier. This is a significant improvement particularly since electric, gas and steam sales in KWhrs, cubic feet and pounds were all lower for the current 9 months' period compared to the similar period a year ago.

Also, the same of internal cash generation and the equity portion of the allowance for funds used during construction, according to financial statements of the applicant totaled approximately $309 million for the 9 months ended September 30, 1974 compared with $247 million for the comparable period a year earlier. Allowance for funds used during construction has remained about the same level in 1974 compared to 1973 and for the 12 months ending September 30, 1974 represented only 30.4% of net income.

Financial results measured in terms of cash flow and earnings are expected to continue their improvement throughout the remainder of 1974 and in 1975 particularly due to the approval of higher electric rates in November, 1974. These higher rates should increase revenues by approximately $168 million annually over the interim rates previously implemented.

Receivables, which had been reduced during the second quarter, were held at about that same level through the third quarter. Due to a leveling off in the price of oil, fossil fuel inventory costs leveled off and there was no change in working capital required to carry these inventories.

I have reviewed the historical financial information of Consolidated Edison including the income statements, balance sheets, changes in financial position and various financial ratios including, but not limited, to the debt-equity ratio, the ratio of current assets to current liabilities, the coverage figures, the dividend payout ratio, and return on equity. I have concluded that the current financial condition of Consolidated Edison is unusual and is the result, in part, of a unique set of conditions. Consolidated Edison's historical financial position was reasonably sound, and it should return closer to its historical financial position over the near term future.

C. Management

The financial position of a firm is in part attributable to its management. Consolidated Edison's Management has been repeatedly sought rate relief and other regulatory changes in order to obtain the necessary funds to provide reasonable services and to provide a reasonable return for investors. They have considerable experience with regulatory agencies in New York and with external restraints, such as environmental restraints, and their financial strength in the future will depend on continued efforts on their part to seek satisfactory resolution of rates, approval of generating stations and any other approvals necessary in order to maintain service.

D. Regulatory Climate

Revenues which are high enough to cover expenses and to allow for a reasonable return to the investors are primarily dependent on satisfactory rate relief. The New York State Public Service Commission is responsible for establishing rates that are "just and reasonable". The Commission has granted Consolidated Edison higher rates in the past, based on justifiable needs and requests and there is no reason to believe the Commission will not continue in this regard.

E. Financing Capability

The continued financial strength of Consolidated Edison depends in part on their capability to obtain external funds. External funds are required for the capital expenditures budget but it should be noted that external funds are not for operating purposes and that most of the construction is complete on Indian Point No. 3. However, financial strength does have a bearing on the long term growth and operations so it must be considered.

Due to larger construction expenditures, higher interest rates and a lag in obtaining approval of higher customer rates, coverage of interest expense has declined over the past few year for Consolidated Edison. This has had two effects (1) the bond ratings of Consolidated Edision have been suspended by Moody's and lowered to BB by Standard and Poors, and (2) the lower coverage has restricted the amount of new bond financing available to Consolidated Edison. At June 30, 1974, Consolidated Edison had the capability to sell approximately $200 million of new bonds. Although neither rating agency has changed its rating as of this date, the rate increase and the pending plant sales are expected to result in an upward revision of these ratings.

In order to obtain interim funds prior to any external financing and completion of the sale of the two power plants, Consolidated Edison, as previously stated, has increased it bank lines of credit to a level of $425 million. However, Consolidated Edison is expected to repay loans under this line of credit from proceeds from the sale of the two plants. Also, Consolidated Edison is expected to sell bonds during the first half of 1975.

V. Summary and Conclusions

In summary

(1) Consolidated Edison is recovering from a working capital shortage and further improvement is expected. It has achieved a higher level of earnings and cash flow for the 9 months ending September 30, 1974 than in the previous comparable period.

(2) The New York State Public Service Commission, subsequent to a Consolidated Edison request, has allowed higher electric rates which is expected to further improve the financial condition of Consolidated Edison.

(3) The sale of one or both power plants (Astoria No. 6 - Indian Point No. 3) will further improve Consolidated Edison's financial condition.

(4) Potential capital requirements for cooling towers and any potential EPA water control standards are not significant in comparison to estimated capital expenditures and also because of uncertain time constraints should not be considered at this time, and

(5) If, and when, Consolidated Edison requests Indian Point No. 3 be included in its rate base, there is no reason to believe that the New York State Public Service Commission would not approve

such request.

Therefore, I conclude that Consolidated Edison Company of New York, Inc. possesses or has reasonable assurance it can obtain the necessary funds to meet the requirements of 10 CFR 50.33(f) to complete and operate Indian Point No. 3 and, if necessary, to permanently shutdown the facility and maintain it in a safe shutdown condition and to operate Indian Point Nos. 1 and 2 and, if necessary, to permanently shutdown these facilities and maintain them in a safe shutdown condition.

A P P E N D I X

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC

Statement showing certain statistics for Indian Point Units Nos 1 and 2

Nine Months ended September 30, 1974

		Indian Pt. Unit No 1	Indian Pt. Unit No 2	Total
Book Cost at June 30, 1974		$ 134 480 143	$ 206 611 275	$ 341 092 123
Less Accumulated Depreciation		53 823 142	7 012 094	60 835 [illegible]
Book Value		$ [illegible] 657 700	$ 199 5[illegible] 181	$ [illegible]
Revenues				
Kwhrs Generated - Net		1 091 730 000	1 998 729 000	3 090 459 000
Less: Distribution Efficiency Factor	(A)	103 823 523	190 079 127	293 902 [illegible]
Kwhrs Sold		987 906 477	1 808 649 873	[illegible]
Base Sales Revenues @ 4.48¢ per kwhr	(B)	$ 44 268 039	$ 81 045 601	$ 125 313 640
Fuel Rider Revenues - I.P #1 .6108, IP #2 (.[illegible])		6 034 133	(1 195 513)	4 838 [illegible]
Total Revenues		$ 50 30[illegible]	$ 79 850 088	$ 130 15[illegible]
Production Expenses		$ 16 623 032	$ 10 184 720	$ 26 807 75[illegible]
Deferred Fuel Costs		(239 810)	(439 038)	(678 8[illegible])
Transmission Expenses	(D)	7 500	1 050 000	1 057 500
Administration Expenses	(D)	636 000	426 000	1 062 000
Total Operation and Maintenance				
Depreciation	(D)	4 652 000	6 685 000	11 337 000
Property Taxes	(D)	2 150 250	2 282 250	4 432 500
Revenue Taxes	(E)	3 055 357	4 150 694	7 905 [illegible]
Operating Rev Deductions before Fed Inc Tax		26 834 331	25 039 026	51 [illegible]
Operating Income before Fed. Income Tax		$ 23 417 [illegible]	$ 54 811 057	$ 7[illegible]
Percent of Book Value		29.03 %	27.46 %	27.91 %

(A) 12 Months ended 9/30/74 (9.51%)

(B) 9 Months ended 9/30/74 (See Attached)

(C) 9 Months ended 9/30/74 (See Attached)

(D) 9/12 of Annual Amount previously submitted

(E) 9 Months ended 9/30/74 Rate .6074

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

Support for Notes (B) and (C) re:
Indian Point Statistics - Nine Mos ended 9/30/74

	Amount	Kwhrs Sold	Cents Per Kwhr
Note (B)			
Electric Department			
Revenue from Sales -	$ 1 500 694 556	24 329 196 353	6.415
Less Fuel Rider Revenue	470 419 381	24 329 196 353	1.934
Total (Base Revenues)	$ 1 030 275 175	24 329 196 353	4.481
Note C	**Amount**	**Kwhrs Generated**	**Cents Per Kwhr**
Indian Point No. 1			
Total Fuel Costs	$ 10 660 785	1 091 730 000	.9765
Less Base Fuel Costs	4 374 562	1 091 730 000	.4007
	6 286 223	1 091 730 000	.5758
Indian Pt No 2			
Total Fuel Costs	6 772 224	1 998 729 000	.3388
Less Base Fuel Costs	8 008 837	1 998 729 000	.4007
	(1 236 613)	1 998 729 000	(.0619)

I.P. #1 Fuel Rider Rate (.5758 plus revenue tax (6.074) = .6108

I.P. #2 Fuel Rider Rate (.0619) plus revenue tax (6.074) = .0661

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
SELECTED FINANCIAL RATIOS

	12 mos. ended Sept. 30, 1974	(dollars in millions) Calendar Year Ended December 31 1973	1972	1971	1970	1969
Long-term debt	$3,034.4	$2,843.0	$2,543.1	$2,408.1	$2,256.6	$1,981.6
Utility plant (net)	5,707.4	5,404.7	4,840.6	4,424.8	4,106.8	3,793.3
Ratio - debt to fixed plant	.53	.53	.53	.54	.55	.52
Utility plant (net)	5,707.4	5,404.7	4,840.6	4,424.8	4,106.8	3,793.3
Capitalization	5,793.8	5,503.4	4,999.3	4,657.6	4,242.1	3,818.4
Ratio of net plant to capitalization	.99	.98	.97	.95	.97	.99
Stockholders' equity	2,759.4	2,660.4	2,456.2	2,249.5	1,985.5	1,836.7
Total assets	6,395.1	5,968.2	5,262.0	4,888.2	4,448.9	4,069.6
Proprietary ratio	.43	.45	.47	.46	.45	.45
Earnings available to common equity	152.0	163.4	108.4	160.4	94.2	93.1
Common equity	2,008.5	1,909.5	1,705.2	1,573.3	1,309.1	1,210.2
Rate of earnings on common equity	7.6	8.6	6.4	10.2	7.2	7.7
Net income	196.3	181.6	148.1	198.6	128.4	127.2
Stockholders' equity	2,759.4	2,660.4	2,456.2	2,249.5	1,985.4	1,836.7
Rate of earnings on stockholders' equity	7.11	6.8	6.0	8.8	6.5	6.9
Net income before interest	380.9	338.1	284.3	317.9	234.6	212.5
Liabilities and capital	6,395.1	5,968.2	5,262.0	4,888.2	4,448.9	4,069.6
Rate of earnings on total investment	6.0	5.7	5.4	6.5	5.3	5.2
Net income before interest	--	338.1	284.3	317.9	234.6	212.5
Interest on long-term debt	N.A.	155.1	134.7	118.6	105.5	84.3
No. of times long-term interest earned	--	2.18	2.11	2.68	2.22	2.52
Net income	196.3	181.6	148.1	198.6	128.4	127.2
Operating Revenues	2,258.3	1,736.2	1,479.9	1,313.9	1,128.5	1,028.3
Net income ratio	.08	.10	.10	.15	.11	.12
Total utility operating expenses	1,924.5	1,451.3	1,244.6	1,085.4	917.9	830.5
Total utility operating revenues	2,258.3	1,736.2	1,479.9	1,313.9	1,128.5	1,028.3
Operating ratio	.85	.84	.84	.83	.81	.81
Utility plant (gross)	6,945.0	6,561.1	5,918.2	5,480.2	5,093.2	4,701.7
Utility operating revenues	2,258.3	1,736.2	1,479.9	1,313.9	1,128.5	1,028.3
Ratio of plant investment to revenues	3.07	3.78	4.00	4.17	4.51	4.6

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC
CAPITALIZATION RATIOS

Capitalization:	Sept. 30, 1974 Amount	Sept. 30, 1974 % of Total	1973 Amount	1973 % of Total	1972 Amount	1972 % of Total	1971 Amount	1971 % of Total	1970 Amount	1970 % of Total
Long-term debt	$3,034.4	52.4%	$2,843.0	51.7%	$2,543.1	50.9%	$2,408.1	51.7%	$2,256.6	53.2%
Preferred stock	750.9	13.0%	750.9	13.6%	751.0	15.0%	676.2	14.5%	676.3	15.9
Common stock & surplus	2,008.5	34.6%	1,909.5	34.7%	1,705.2	34.1%	1,573.3	33.8%	1,309.1	30.9%
Total	$5,793.8	100.0%	$5,503.4	100.0%	$4,999.3	100.0%	$4,657.6	100.0%	$4,242.0	100.0%

CONSOLIDATED [illegible]

SELECTED FINANCIAL RATIOS OF NEW YORK [illegible]

	1973	1972	1971	1970	1969
Per Cent Return Earned on Rate Base					
Central Hudson Gas & Electric		8.86	8.01	6.04	6.90
Consolidated Edison		6.00	6.11	5.77	5.71
Long Island Lighting		7.86	7.67	7.35	7.34
New York State Electric & Gas		7.39	6.84	6.66	7.04
Niagara Mohawk Power		6.92	6.07	5.48	5.70
Orange and Rockland		6.26	6.38	7.40	8.47
Rochester Gas & Electric		7.18	7.10	7.83	8.36
Average		7.21	6.88	6.65	7.07
Rate of Return on Common Equity					
Central Hudson Gas & Electric		14.6	12.7	8.2	11.6
Consolidated Edison		6.6	11.1	7.4	7.9
Long Island Lighting		12.8	12.8	12.5	12.9
New York State Electric & Gas		10.7	9.2	10.4	11.9
Niagara Mohawk Power		11.1	9.6	9.4	9.9
Orange and Rockland		8.8	7.9	13.8	14.3
Rochester Gas & Electric		10.3	9.9	11.1	12.3
Average		10.7	10.5	10.4	11.5
Times Interest Earned - Before Taxes					
Central Hudson Gas & Electric		2.81	2.60	2.02	3.10
Consolidated Edison		2.10	2.20	2.05	2.64
Long Island Lighting		2.84	3.21	3.12	3.51
New York State Electric & Gas		2.50	2.33	2.55	2.71
Niagara Mohawk Power		2.49	2.44	2.43	2.74
Orange and Rockland		2.06	1.78	2.27	2.11
Rochester Gas & Electric		2.41	2.34	2.30	2.75
Average		2.46	2.41	2.39	2.79
Times Interest Earned - After Taxes					
Central Hudson Gas & Electric		2.48	2.30	1.92	2.59
Consolidated Edison		2.11	2.20	2.05	2.46
Long Island Lighting		2.66	2.69	2.54	2.70
New York State Electric & Gas		2.31	2.22	2.31	2.54
Niagara Mohawk Power		2.35	2.31	2.28	2.47
Orange and Rockland		2.07	1.78	2.13	2.11
Rochester Gas & Electric		2.29	2.22	2.41	2.67
Average		2.32	2.25	2.56	2.51

Source Statistics of Privately Owned Electric Utilitie in the United States, Federal Power Commission

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
SELECTED FINANCIAL INFORMATION

	9 months ended Sept. 30, 1973	1973	1972	1971	1970	1969
Total Funds Used	586.9	832.4	672.1	632.3	618.8	424.2
Internal Funds	309.0	328.1	258.1	302.8	228.3	230.1
%	52.6	39.4	38.4	47.9	36.9	54.2

		December 31				
	Sept. 30, 1974	1973	1972	1971	1970	1969
Current Assets	544.5	439.8	373.1	415.9	298.9	246.9
Current Liabilities	542.6	438.0	234.0	200.8	180.1	224.3
Current Ratio	1.00	1.00	1.59	2.07	1.66	1.10

		12 months ended				
	12 months ended Sept. 30, 1974	1973	1972	1971	1970	1969
Net Income (After Pref.Dividends)	152.0	163.4	108.4	160.4	942.2	93.1
Average Common Equity	1946.9	1807.4	1639.2	1441.2	1259.6	1172.1
Return on Average Common Equity	7.81	9.04	6.61	11.13	7.48	7.94
Net Income before Pref. Stock	196.3	207.7	148.1	198.6	128.4	135.1
Total Assets	6395.1	5968.2	5262.0	4888.2	4448.0	4069.6
Return on Total Assets	3.07	3.48	2.81	4.06	2.89	3.32
Earnings Per Share	2.48	2.07	2.35	2.30	2.68	2.57
Common Dividends	1.10	1.80	1.80	1.80	1.80	1.80
Dividend Pay out Ratio 2÷3	44.4%	87.0%	76.6%	78.3%	67.2%	70.0%
Allowance For Funds Used during Construction	46,241	47,770	44,564	31,663	23,454	14,683
Net Income (After Pref.Dividends)	152,047	163,409	108,426	160,362	94,187	100,989
6÷8	30.4%	29.2%	41.1%	19.7%	24.9%	14.5%
Ratio of Earnings before extraordinary item and cumulative effect on Prior years of Change in Accounting for Fuel Costs to Fixed Charges		2.07	2.00	2.10	2.02	2.60

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INCOME STATEMENT

FOR THE TWELVE MONTHS ENDED SEPTEMBER 30, 1974 AND 1973

	1974	1973*
Operating revenues:		
Sales of electricity	$ 1,944,150,815	$ 1,420,257,815
Sales of gas	161,215,924	150,031,096
Sales of steam	144,998,284	93,501,746
Other operating revenues	7,918,829	5,002,307
	2,258,283,852	1,668,792,964
Operating revenue deductions:		
Fuel and purchased power	828,246,912	449,337,825
Other operations	363,349,152	313,320,261
Maintenance	167,131,953	152,826,379
Depreciation	139,969,890	119,840,126
Taxes, other than Federal income	406,595,016	351,104,091
Federal income tax	(4,015,000)	(1,091,000)
Federal income tax deferred	23,269,000	1,016,000
	1,924,546,923	1,386,353,682
Operating income	333,736,929	282,439,282
Allowance for funds used during construction	46,240,903	48,069,880
Other income	1,669,085	5,828,257
Total	381,646,917	336,337,419
Interest charges and income deductions:		
Interest on long-term debt and other interest	184,580,249	149,290,327
Miscellaneous deductions	5,845,725	1,710,995
	190,425,974	151,001,322
Income before cumulative effect on prior years of changes in accounting for fuel costs	191,220,943	185,336,097
Cumulative effect on prior years of changes in accounting for fuel costs:		
Steam - to December 31, 1973	5,120,644	-
Electric - to December 31, 1972	-	26,143,747
Net income	196,341,587	211,479,844
Preferred stock dividend requirements	44,295,031	44,266,329
Net income for common stock	$ 152,046,556	$ 167,213,515
Common shares outstanding - weighted average	61,547,902	57,060,929
Earnings per share on average number of shares		
Before cumulative effect on prior years of changes in accounting for fuel costs	$ 2.39	$ 2.47
Changes in accounting for fuel costs - prior years:		
Steam	.08	-
Electric	-	.46
Net income	$ 2.47	$ 2.93
Pro forma amounts, assuming effect of changes in accounting for fuel costs are applied retroactively		
Net income for common stock	$ 152,392,293	$ 145,862,836
Earnings per share	$2.48	$2.56
Sales of electricity - Kwhrs	32,681,063,303	34,645,587,735
Sales of gas - Cubic feet	71,581,824,400	74,611,728,600
Sales of steam - Pounds	35,585,298,000	40,184,102,000

* Restated for changes in accounting for Electric Fuel Costs adopted in November and December 1973.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INCOME STATEMENT

FOR THE NINE MONTHS ENDED SEPTEMBER 30, 1974 AND 1973

	1974	1973*
Operating revenues:		
Sales of electricity	$ 1,560,694,556	$ 1,099,905,754
Sales of gas	122,507,158	114,007,648
Sales of steam	121,535,300	72,267,581
Other operating revenues	6,597,925	3,109,233
	1,811,334,939	1,289,290,216
Operating revenue deductions:		
Fuel and purchased power	693,624,522	343,239,861
Other operations	271,093,889	239,511,469
Maintenance	119,427,729	113,890,532
Depreciation	106,794,358	90,866,079
Taxes, other than Federal income	315,429,350	269,237,728
Federal income tax	-	-
Federal income tax deferred	25,220,000	1,579,000
	1,531,589,848	1,058,324,669
Operating income	279,745,091	230,965,547
Allowance for funds used during construction	35,351,975	36,880,846
Other income	813,164	4,511,393
Total	315,910,230	272,357,786
Interest charges and income deductions:		
Interest on long-term debt and other interest	143,253,062	113,805,875
Miscellaneous deductions	5,482,777	1,035,456
	148,735,839	114,841,331
Income before cumulative effect on prior years of a change in accounting for Steam fuel costs	167,174,391	157,516,455
Cumulative effect on prior years (to December 31, 1973) of a change in accounting for Steam fuel costs, less related deferred federal income tax	5,120,644	-
Net income	172,295,035	157,516,455
Preferred stock dividend requirements	33,221,122	33,224,306
Net income for common stock	$ 139,073,913	$ 124,292,149
Common shares outstanding - weighted average	61,548,070	57,666,244
Earnings per share on average number of shares		
Before cumulative effect on prior years of a change in accounting for Steam fuel costs	$ 2.18	$ 2.16
Change in accounting for Steam fuel costs-prior years	.08	-
Net income	$ 2.26	$ 2.16
Pro forma amounts, assuming effect of change in accounting for steam fuel cost is applied retroactively		
Net income for common stock	$ 133,953,269	$ 124,230,013
Earnings per share	$ 2.18	$ 2.15
Sales of electricity - Kwhrs	24,329,896,353	26,381,469,150
Sales of gas - Cubic feet	54,189,178,700	55,495,714,200
Sales of steam - Pounds	27,474,148,000	30,749,412,000

* Restated for change in accounting for Electric Fuel Costs adopted in November and December 1973.

I. COMPARATIVE BALANCE SHEET

Assets and Other Debits

Line No.	Account Title (a)	Balance at Beginning of Twelve-Month Period † (b)	Balance at End of Quarter (c)	Increase or (Decrease) (d)
1.	UTILITY PLANT	$	$	$
2.	Utility Plant (101-107, 114, 117, 118.1, 118.2, 120)	6,299,162,336	6,945,003,840*	645,841,504
3.	Less Accumulated Provision for Depreciation, Amortization	1,147,639,237	1,237,606,279	89,967,042
4.	and Depletion (108-113, 115, 119.1, 119.2, 120.5)			
5.	Total Net Utility Plant	5,151,523,099	5,707,397,561	555,874,462
6.	OTHER PROPERTY AND INVESTMENTS			
7.	Nonutility Property (121)	7,222,317	6,152,409	(1,069,908)
8.	Less: Accumulated Provision for Depreciation & Amortization (122)	-	-	-
9.	Investment in Associated Companies (123)	-	-	-
10.	Investment in Subsidiary Companies (123.1)	-	-	-
11.	Other Investments (124)	3,787,403	3,407,477	(379,926)
12.	Sinking Funds (125)	-	-	-
13.	Depreciation Fund (126)	-	-	-
14.	Other Special Funds (128)	263,323	207,002	(56,321)
15.	Total Other Property and Investments	11,273,043	9,766,888	(1,506,155)
16.	CURRENT AND ACCRUED ASSETS			
17.	Cash (131)	11,155,459	48,296,943	37,141,484
18.	Interest Special Deposits (132)	258,873	10,746,602	10,487,729
19.	Dividend Special Deposits (133)	-	-	-
20.	Other Special Deposits (134)	751,522	712,091	(39,431)
21.	Working Funds (135)	1,250,235	1,175,489	(74,746)
22.	Temporary Cash Investments (136)	-	-	-
23.	Notes Receivable (141)	-	-	-
24.	Accounts Receivable (142, 143)	306,605,764	342,798,799	36,193,035
25.	Less: Accumulated Provision for Uncollectible Accts. - Cr. (144)	(6,692,987)	(17,103,674)	(10,410,687)
26.	Notes Receivable from Associated Companies (145)	-	-	-
27.	Accounts Receivable from Associated Companies (146)	-	-	-
28.	Materials and Supplies (150)	88,700,942	143,100,969	54,400,027
29.	Gas Stored Underground - Current (164.1)	219,190	877,245	658,055
30.	Liquefied Natural Gas in Storage (164.2)	-	175,700	175,700
31.	Prepayments (165)	10,068,092	13,340,601	3,272,509
32.	Interest and Dividends Receivable (171)	23,383	21,784	(1,599)
33.	Rents Receivable (172)	253,453	313,647	60,194
34.	Accrued Utility Revenues (173)	-	-	-
35.	Miscellaneous Current and Accrued Assets (174)	-	-	-
36.	Total Current and Accrued Assets	412,593,926	544,456,196	131,862,270
37.	DEFERRED DEBITS			
38.	Unamortized Debt Discount and Expense (181)	19,893,907	25,319,526	5,425,619
39.	Extraordinary Property Losses (182)	9,801,835	9,792,659	(9,176)
40.	Preliminary Survey and Investigation Charges (183)	-	-	-
41.	Clearing Accounts (184)	265,698	(2,236,044)	(2,501,742)
42.	Temporary Facilities (185)	-	-	-
43.	Miscellaneous Deferred Debits (186)	12,335,871	(A) 100,603,341	88,267,470
44.	Deferred Losses from Disposition of Utility Plant (187)	-	-	-
45.	Research and Development (188)	242,354	-	(242,354)
46.	Total Deferred Debits	42,539,665	133,479,482	90,939,817
47.	Total Assets and Other Debits	5,617,929,733	6,395,100,127	777,170,394

*See * on page 3.

(A) Includes Recoverable Fuel Charges Deferred of $87,234,740.

† Beginning balance twelve-months prior to the end of the quarter for which the report is made.

I COMPARATIVE BALANCE SHEET

Liabilities and Other Credits

Line No.	Account Title (a)	Balance at Beginning of Twelve-Month Period† (b)	Balance at End of Quarter (c)	Increase or (Decrease) (d)
1.	**PROPRIETARY CAPITAL**	$	$	$
2.	Common Stock Issued (201)	615,530,160	615,540,820	10,660
3.	Preferred Stock Issued (204)	750,942,127	750,909,327	(32,800)
4.	Capital Stock Subscribed (202, 205)	-	-	-
5.	Stock Liability for Conversion (203, 206)	-	-	-
6.	Premium on Capital Stock (207)	722,685,379	722,907,519	22,140
7.	Other Paid-in Capital (208-211)	-	-	-
8.	Installments Received on Capital Stock (212)	-	-	-
9.	Capital Stock Expense (214)	(33,999,933)	(34,164,211)	(164,278)
10.	Appropriated Retained Earnings (215)	-	-	-
11.	Unappropriated Retained Earnings (216)	581,085,259	704,424,406	123,339,147
12.	Unappropriated Undistributed Subsidiary Earnings (216.1)	-	-	-
13.	Reacquired Capital Stock (217)	(199,323)	(199,323)	-
14.	Total Proprietary Capital	2,636,243,669	2,759,418,538	123,174,869
15.	**LONG-TERM DEBT**			
16.	Bonds (221)	2,691,639,500	2,991,639,500	300,000,000
17.	Reacquired Bonds (222)	-	-	-
18.	Advances from Assoc. Companies (223)	-	-	-
19.	Other Long-term Debt (224)	1,370,262	42,754,142	41,383,880
20.	Total Long-term Debt	2,693,009,762	3,034,393,642	341,383,880
21.	**CURRENT AND ACCRUED LIABILITIES**			
22.	Notes Payable (231)	37,000,000	195,000,000	158,000,000
23.	Accounts Payable (232)	68,900,539	59,962,972	(8,937,567)
24.	Notes Payable to Associated Companies (233)	-	-	-
25.	Accounts Payable to Associated Companies (234)	-	-	-
26.	Customer Deposits (235)	30,208,510	32,349,598	2,141,088
27.	Taxes Accrued (236)	23,432,742	27,848,148	4,415,406
28.	Interest Accrued (237)	44,034,409	51,019,819	6,985,410
29.	Dividends Declared (238)	11,074,191	11,072,911	(1,280)
30.	Matured Long-term Debt (239)	149,395	106,055	(43,340)
31.	Matured Interest (240)	218,100	187,578	(30,522)
32.	Tax Collections Payable (241)	11,782,169	17,473,408	5,691,239
33.	Misc. Current and Accrued Liabilities (242)	34,908,752	* 147,531,755	112,623,003
34.	Total Current and Accrued Liabilities	261,708,807	542,552,244	280,843,437
35.	**DEFERRED CREDITS**			
36.	Unamortized Premium on Debt (251)	2,415,765	2,208,111	(207,654)
37.	Customer Advances for Construction (252)	439,918	361,416	(78,502)
38.	Other Deferred Credits (253)	6,693,549	9,887,817	3,194,268
39.	Accumulated Deferred Investment Tax Credits (255)	-	-	-
40.	Deferred Gains from Disposition of Utility Plant (256)	-	-	-
41.	Total Deferred Credits	9,549,232	12,457,344	2,908,112
42.	**OPERATING RESERVES**			
43.	Property Insurance Reserve (261)	-	-	-
44.	Injuries and Damages Reserve (262)	3,252,136	3,518,232	266,096
45.	Pensions and Benefits Reserve (263)	-	-	-
46.	Miscellaneous Operating Reserves (265)	-	-	-
47.	Total Operating Reserves	3,252,136	3,518,232	266,096
48.	**ACCUMULATED DEFERRED INCOME TAXES**			
49.	Accumulated Deferred Income Taxes.			
50.	Accelerated Amortization (281)	10,328,627	9,428,627	(900,000)
51.	Liberalized Depreciation (282)	-	-	-
52.	Other (283)	3,837,500	33,331,500	29,494,000
53.	Total Accumulated Deferred Income Taxes	14,166,127	42,760,127	28,594,000
54.	Total Liabilities and Other Credits	5,617,929,733	6,395,100,127	777,170,394

† Beginning balance twelve months prior to the end of the quarter for which the report is made.

* Includes accruals of $107,395,200 on Westinghouse Contract Indian Point Unit No. 3 of which $88,760,000 was accrued for in 1973 and $18,635,200 in 1974. These accruals will be paid November 1, 1974.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

STATEMENT OF CHANGES IN FINANCIAL POSITION

Nine MONTHS ENDED September 30, 1974 and 1973

	NINE MONTHS ENDED SEPTEMBER 30, 1974	NINE MONTHS ENDED SEPTEMBER 30, 1973
Financial Resources Were Provided By		
Internal Sources		
Income before cumulative effect on prior years of a change in accounting for steam fuel costs	$167,174,391	$157,516,456**
Items not requiring an outlay of working capital		
Depreciation	106,794,358	90,866,079
Deferred federal income tax	25,220,000	(1,692,000)
Total from internal sources, exclusive of cumulative effect on prior years of a change in accounting for steam fuel costs	299,188,749	246,690,535
Cumulative effect on prior years (to December 31, 1973) of a change in accounting for steam fuel costs, less related deferred federal income tax	5,120,644	-
Provision for deferred federal income taxes applicable to change in accounting for steam fuel costs	4,720,000	-
Total from internal sources	309,029,393	246,690,535
External Sources		
Common Stock	-	145,791,750
Sales of bonds		
Series "MM"	-	147,848,875
Series "OO"	146,887,650	-
Net increase in short-term debt	131,000,000	37,000,000
Total from external sources	277,887,650	330,640,625
Total financial resources provided	$586,917,043	$577,331,160
Financial Resources Were Used For		
Construction expenditures *	$368,683,388	$399,794,211
Dividends	73,227,345	110,459,821
Increase (decrease) in working capital (excluding short term debt)	130,571,685	48,379,572
Increase (decrease) in other assets and liabilities	14,434,625	18,697,556
Total financial resources used	$586,917,043	$577,331,160

*Includes allowance for funds used during construction

**Restated