11-13-69

Docket No. 50-247

Consolidated Edison Company of New York, Inc.
4 Irving Place
New York, New York 10003

Attention: Mr. William J. Cahill, Jr.
Vice President

Gentlemen:

In our continuing review of your application for a provisional operating license for the Indian Point Nuclear Generating Unit No. 2, we find that we need additional information to complete our evaluation. The specific information required is listed in the enclosure. We recognize that some of the information requested may be available in the public record in the context of our regulatory review of similar features of other facilities. If such is the case, you may wish to incorporate the information by reference in your application.

The additional information requested has been categorized into groups which correspond directly to sections in your application. Questions have been numbered sequentially as a continuation of our first request for additional information issued on August 4, 1969. You may wish to amend your application by submitting revised pages for the appropriate portions of the Final Safety Analysis Report rather than by submitting separate responses to the questions. For replies to questions involving new pages to the Final Safety Analysis Report, please provide a specific reference to those pages.

Please contact us if you desire any discussion or clarification of the material requested.

Sincerely,

Peter A. Morris, Director
Division of Reactor Licensing

Enclosure:
List of Addl. Info. Required

cc: Arvin E. Upton, Esq.
LeBoeuf, Lamb, Leiby & MacRae
1821 Jefferson Street, N.W.
Washington, D. C. 20036

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Distribution:
AEC Pub. Doc. Room
Docket File
DR Reading
RL Reading
RPB-1 Reading
C. K. Beck
M. M. Mann
P. A. Morris
F. Schroeder
R. S. Boyd
R. C. DeYoung (14)
CO (3)
Branch Chiefs/RP
K. Kniel
M. A. McCoy
N. M. Blunt

OFFICE ▶	RL:RPB-1	RL:RPB-1	RL:RT	RL:RP	RL	RL
SURNAME ▶	McCoy/ Kniel:lm	Muller	DeYoung	Boyd	Schroeder	Morris
DATE ▶	11/4/69	11/5/69	11/5/69	11/6/69	11/6/69	11/8/69

Form AEC-318 (Rev. 9-53) AECM 0240

U.S. GOVERNMENT PRINTING OFFICE : 1968 O—296-617

ADDITIONAL INFORMATION REQUIRED

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

3.0 REACTOR

3.6 We understand that fixed incore neutron instrumentation is to be installed in the Indian Point 2 reactor. Provide a detailed description of this instrumentation and how it will be employed in reactor operation.

4.0 REACTOR COOLANT SYSTEM

4.5 Although it is stated that the reactor coolant system valves, fittings and piping are designed, fabricated, inspected and tested in conformance with the USAS B31.1 Code for Power Piping, we wish to evaluate the degree to which they meet the requirements of USAS B31.7 Code. Accordingly, discuss the following in detail:

1. The quality assurance requirements as implemented compared with those of USAS B31.7 Code for Nuclear Power Piping (tentative subject to revision, dated January, 1969).

2. The design and stress analysis criteria employed in comparison with those of USAS B31.7. For example, how do these criteria assure the absence of a continuing cycle of plastic deformation, i.e., shakedown; how are thermal stresses and thermal discontinuity stresses due to radial and longitudinal temperature gradients considered?

3. The fabrication requirements specified as compared with those of USAS B31.7.

4. Indicate whether this same comparison holds for the balance of the plant; if not, please discuss the remainder of the Class 1 piping in the same manner.

4.6 Table 4.1-8 of the FSAR lists the number of design cycles for certain transient conditions which are stated to be estimates for equipment design purposes (40 year life) and not intended to accurately represent the actual number of transients expected, or to reflect actual operating experience. Discuss the margin between the number of design cycles and the number of operating cycles the plant is expected to experience during its lifetime. In addition, please discuss the number of stress cycles used in the fatigue evaluation as compared with the expected number of operating cycles.

4.7 The FSAR states that vibration loads are considered in the design of the primary system. State the extent, methods and findings of the analyses which have been made. In this statement please include the following:

1. Discuss the normal and emergency modes of operation that have been considered.

2. State the design limits, amplitude and frequency that apply to these conditions.

4.8 With regard to the reactor vessel:

1. Provide a summary description of the reactor vessel stress analysis which includes simple sketches showing the location and geometry of the areas of discontinuity or stress concentration as well as any other areas which were subjected to a detailed analysis.

2. Describe any special requirements in addition to those specified in Section III of the ASME Code which are imposed on the Indian Point 2 reactor vessel designs by local state regulations.

3. Have ring forgings been used for reactor vessel shell sections other than the closure flanges? If so, please provide a list giving the location of these forgings.

4. Discuss those transients, such as loss of flow and loss of load, that cause temperature and pressure excursions influencing the cumulative fatigue of the reactor vessel in a significant manner.

5. Discuss the magnitude of the stress in the reactor vessel membrane induced by gamma-ray heating.

6. Provide a list of pressure or strength bearing stainless steel component parts in the reactor vessel and associated reactor coolant systems that have become furnace sensitized during the fabrication sequence.

7. Provide a summary of results of Charpy V-Notch and drop weight tests for the reactor vessel plates and forgings.

4.9 With regard to reactor internals:

1. Discuss the extent, methods and results of the analysis of the thermal stresses in the core barrel and support structure due to the occurrance of loss-of-coolant and subsequent operation of emergency core cooling equipment.

2. Discuss the methods by which the seismic stresses were determined for the reactor internals. Give sufficient detail to show the development of the seismic loadings from the ground motion inputs to the final input used for the analysis of the internals structural members. Identify the methods of analysis employed and their interfaces, e.g., dynamic to static, elastic to plastic.

4.10 To which edition of the ASME Boiler and Pressure Vessel Code Section III and addenda, are applicable Class I components designed and fabricated?

4.11 Discuss the extent to which electroslag welding was used in the fabrication of Class I components. If electroslag welding was used, describe the process, its variables, and the quality control procedures employed.

5.0 CONTAINMENT SYSTEM

Containment Structural Design

5.16 The reactor pressure vessel is enclosed by the vessel cavity. This cavity incorporates the structural support for the vessel and provides missile shielding against the highly unlikely failure of the reactor vessel.

5.16.1 Present and discuss the structural design provisions for the cavity as they relate to potential pressure vessel failure.

5.16.2 Discuss the ability of the cavity to provide missile protection for the containment structure and liner in the event of reactor vessel failure by longitudinal splitting or various modes of circumferential cracking.

5.16.3 Discuss the ability of the cavity to sustain the internal pressure in the event of reactor vessel failure without jeopardizing the integrity of the vessel support.

6.0 ENGINEERED SAFETY FEATURES

6.7 Identify electrically operated equipment located in the containment that should be operable following a loss-of-coolant accident. For each item of equipment describe the anticipated operating cycle and the length of time the equipment must be operable.

6.8 We understand that installation of the Westinghouse flame recombiner system is being considered for the Indian Point II plant as an engineered safety feature in order to control hydrogen evolved within the containment following a loss-of-coolant accident.

a. Please clarify your intentions in regard to the above and provide information relating to the detailed design arrangement of the recombiner system in the Indian Point 2 plant.

b. Provide suitable discussion and analyses to support the adequacy of the design bases for operation of the recombiner system. This should include, but not be limited to the following:

(1) Sampling procedures (liquid, gas), time to sample, location where measurements are taken, sampling errors, and stratification considerations.

(2) Systems failure mode analyses including the built-in protective and failure mitigating devices.

(3) Fuel system supply; the handling arrangements, logistics, and availability requirements.

(4) Post-installation checkout and evaluation of the recombiner system, including the planned processing setpoints.

(5) System testing procedures and frequency.

c. Discuss the capability of the various components of the recombiner system, e.g., motors, valves, ignitors, and instrumentation, to withstand the post-accident environment (i.e., pressure, temperature, moisture, radioactivity, and corrosive chemical conditions) and remain functional. Identify the various system components subject to such environmental conditions which must remain functional for satisfactory recombiner initiation and operation. Indicate for these components, the test data or other applicable evidence to support the expected functional capability. Discuss the expected operating lifetime requirements and the design lifetime of the recombiner system.

d. How soon following the loss-of-coolant accident might the flame recombiner system be capable of being initiated, given the unlikely occurrence of greater than predicted hydrogen levels in the containment? Discuss those features and/or operating characteristics of the recombiner system which form the limiting time-to-initiate considerations. This discussion should include considerations of time to sample and measure, time to acquire and connect fuel supplies, time and exposure restriction regarding control station manning, and the restrictions imposed by recombiner design (e.g., blower rating, or processing setpoints).

6.9 Prior to and in conjunction with the long-term operation of the flame recombiner system, it may be necessary or desirable to continue operation of certain other engineered safety features such as the containment spray systems and/or the fan recirculation systems. This may be desirable from the viewpoint of providing good mixing of containment gases in order to minimize the potential for stratification and pocketing. Given the design basis loss-of-coolant accident, please provide a discussion of the expected long-term operating modes of such other engineered safety features. Relate the period of operation of these systems to the various time phases of the accident, i.e., fission product reduction phase, heat removal phase, and mixing and circulation phase, in order that the integrated functional requirements over the long-term period may be more completely understood.

6.10 We understand that in selecting a proposed combustible gas control system, alternative measures were studied for feasibility. Provide a discussion of those alternatives studied and the favorable/unfavorable features and technical considerations which led to the final selection of the flame recombiner system.

6.11 Since controlled containment purging could provide a backup to the flame recombiner system, please provide an evaluation of controlled purging for the Indian Point II plant.

6.12 We note that the refueling water storage tank has been designed and fabricated to the code requirements of AWWA D100-65 (Table 6.2-1). However, quality standards for this component were not included in Table 6.2-13 "Quality Standards of Safety Injection System Components". State what inspections, non-destructive testing, and special quality control procedures were used in tank fabrication.

6.13 Specify which other Class I systems' components, valves, and piping are designed to the same quality standards as described for the safety injection system in Table 6.2-3?. Identify the exceptions and discuss the bases for the differences.

9.0 AUXILIARY AND EMERGENCY SYSTEMS

9.1 Describe the temperature detectors, alarm and control systems, and electrical power requirements and sources for heat tracing used to keep the boric acid piping and tanks at temperatures well above the precipitation point. Evaluate single failures in the controller/alarm units as well as loss of one source of power to instrumentation, tank heaters and electrical heat tracing.

9.2 Describe the instrumentation and/or methods used to monitor the concentration and level in the concentrated boric acid storage tanks.

9.3 Describe the instrumentation used to verify injection of concentrated boric acid flow into the primary system.

9.4 Describe the provisions for analyzing the primary coolant for boron concentration. What is the normal frequency of sampling and analysis for boron content? Is this capability available at the plant site at all times?

9.5 The FSAR on page 14.2.1-3 states that "Crane facilities do not permit the handling of heavy objects, such as a spent fuel shipping container, above the fuel racks." Please describe how this objective is implemented in the facility layout.

9.6 Discuss the provisions that will be made to prevent dropping the spent fuel element cask into the spent fuel storage pool. If the spent fuel element cask must be moved over the spent fuel storage pool, analyze the consequences of dropping the cask into the pool. Consider the possibility of (1) loss-of-pool water and ability to continue cooling the spent fuel, and (2) damage to other equipment by flooding if the integrity of the pool liner is lost.

9.7 List the seismic design classification of the various components of the fire protection system. Indicate to what extent this system can function with any single failure. To facilitate understanding, provide a diagram of the system. Identify those portions of the fire protection systems designed to Class 2 seismic standards whose failure could damage Class 1 structures and components. Would failure of a Class 2 portion of the system prevent fire protection to any Class 1 structures or components?

13.0 INITIAL TESTS AND OPERATIONS

13.1 Provide a description of the primary coolant system vibration tests which will be performed for Indian Point 2. Include the number, type, and location of the instruments for each test and state flow conditions for each test. Discuss the need for any such instrumentation to remain available during plant operation.

13.2 Discuss the possible means of inservice monitoring for vibration and the presence of loose parts in the reactor pressure vessel and other portions of the primary system, and your plans to implement such means as are found practical and appropriate.

13.3 We understand that preoperational tests are to be performed to verify the stability of the reactor with respect to potential Xenon oscillations in the XY plane. Please describe these tests in detail. What inservice testing, monitoring, or surveillance is to be performed to assure continued X-Y stability during the reactor lifetime?

13.4 With regard to the startup organization:

1. Identify chains of responsibility and authority for all groups participating in the initial tests and operation of the facility, including Westinghouse support groups.

2. Submit personnel resumes for Westinghouse personnel participating in or acting as support during the initial tests and operation of the reactor.

3. Submit personnel resumes for Con Edison personnel participating in the initial tests and operation of the facility such as Shift Supervisors and Assistant to the General Superintendent.

4. Who will analyze test results and give final approval as to the acceptability of plant components, systems and operating characteristics of the facility?

14.0 ACCIDENT ANALYSIS

14.6 Based on our evaluation of the fuel handling accident, we have concluded that the design bases for equipment in the fuel handling area should consider that all rods in an assembly could be perforated by dropping a fuel assembly during refueling. In calculating resulting offsite exposures we assume that 20% of the noble gas and 10% of the halogen would be released and that 90% of the halogens would be retained in the fuel storage pool. The resulting thyroid dose at the site boundary is in excess of 10 CFR 100 guidelines. Please state what corrective measures or design changes will be made to insure that offsite doses resulting from this accident will be less than the 10 CFR 100 guidelines.

14.7 With respect to reactor protection for anticipated plant transients please state the applicability of the report WCAP 7306 "Reactor Protection System Diversity in Westinghouse Pressurized Water Reactors" to Indian Point 2.

Provide an analysis of the loss-of-load transient for Indian Point 2 assuming the reactor does not scram on any of the successive trip signals.

Provide an analysis of the loss-of-flow transient for Indian Point 2 assuming that the reactor does not scram on any of the three levels of trip protection provided.

14.8 Your analyses of the potential hydrogen evolution over the post loss-of-coolant period neglects certain potential hydrogen sources such as the clad-water reaction and the chemical reaction of materials subject to corrosive attack in the post-accident environment. In addition, we understand that more refined calculations regarding coolant energy deposition would indicate that the predicted evolution of hydrogen by coolant radiolysis, as shown in the FSAR, may be conservative. Please update your FSAR analyses to include all potential hydrogen sources and to factor in the more refined calculations for coolant radiolysis.

14.9 We understand that Westinghouse has conducted dynamic loop testing in order to simulate and explore the influence that certain post-accident parameters (e.g., core coolant flow, coolant temperature, radiation doses) may have on coolant radiolysis. Provide a discussion of the results from these tests in order that we may acquire a better understanding of the degree of conservatism included in your analyses of the post-accident hydrogen evolution.

14.10 We understand that additional testing regarding the effectiveness of methyl iodide adsorption by impregnated charcoal filters in 100% humidity environment has been completed. Provide a summary of the results of these tests.

14.11 State what primer and finishing coatings were used on the inner surfaces of the containment. Provide technical data and/or references which indicate the stability of the paint under loss-of-coolant accident conditions.