James S. Baumstark
Vice President
Nuclear Engineering

Consolidated Edison Company of New York, Inc.
Indian Point 2 Station
Broadway & Bleakley Avenue
Buchanan, New York 10511

Internet: baumstarkj@coned.com
Telephone: (914) 734-5354
Cellular: (914) 391-9005
Pager: (917) 457-9698
Fax: (914) 734-5718

October 3, 2000

Re: Indian Point Unit No. 2
Docket No. 50-247
NL 00-122

Document Control Desk
U. S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D. C. 20555-0001

Subject: Supplemental Information for the Proposed Amendment to the Technical Specifications for Cycle 15 to Allow Extended RPI Deviation Limits and On-Line Calibration of the RPI Channels

Reference: Con Edison Letter (NL 00-108) from J. S. Baumstark to the NRC, subject: "Proposed Amendment to the Technical Specifications for Cycle 15 to Allow Extended RPI Deviation Limits and On-Line Calibration of the RPI Channels," dated August 22, 2000.

Transmitted in the referenced letter was an "Application for Amendment to the Operating License," sworn to on August 22, 2000. This application requested an amendment to the Consolidated Edison Company of New York, Inc. (Con Edison), Indian Point Unit No. 2 Technical Specifications. The submittal sought approval of changes to the Technical Specifications necessary to allow extended Rod Position Indication (RPI) deviation limits and on-line calibration of the RPI channels for Cycle 15.

This letter contains supplemental information to that supplied in the referenced letter. The need for, and required content of this letter was discussed during a telephone conference on September 27 between Con Edison personnel and NRC staff. Attachment A contains proprietary information that further supports the amendment request. This attachment is supported by an affidavit which sets forth the basis on which the information may be withheld from public disclosure by the Commission, and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations. Accordingly, it is requested that the information to which Con Edison asserts proprietary claims be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations. Correspondence with respect to the patented or proprietary aspects of the items listed above or the supporting Con Edison affidavit should reference NET-085-03 and should be addressed to the undersigned. The proprietary affidavit is provided in the Enclosure.

APO1

Attachment B is the non-proprietary version of Attachment A. Only Attachment B will be distributed to those not requiring the proprietary information.

The requested Technical Specification change if approved, would in our judgment result in significant operational benefits and enhanced unit availability, since it provides the ability to calibrate the RPI channels on-line. The calibration process is enhanced while on-line due to the thermal stability of the RPI coil stacks during plant operations. Additionally, the on-line calibration also results in approximately a two-day outage duration reduction in the refueling outage. Performing the calibration off-line requires not only performing the test, but also a temperature "soak" where the reactor temperature must be held steady at the normal operating temperature for several operating shifts prior to the calibration while the RPI coil stacks reach thermal equilibrium. The on-line calibration was found not to involve a significant hazards consideration under 10CFR50.92 at the time it was approved for cycle 13 and for cycle 14. Indian Point 2 is currently scheduled to return to service from the current cycle 14/15 refueling outage in November 2000. Absent approval to perform on-line RPI channel calibration as in the past, and as hereby requested, the return to service would be delayed.

In accordance with 10 CFR 50.91, a copy of this letter and the associated non-proprietary attachment is being submitted to the designated New York State official.

There are no commitments contained in this correspondence.

Should you or your staff have any questions regarding this submittal, please contact Mr. John F. McCann, Manager, Nuclear Safety and Licensing.

BY: [signature]
James S. Baumstark
Vice President - Nuclear Engineering

Subscribed and sworn to
Before me this 3rd day
October 2000.

[signature]
Notary Public

KAREN L. LANCASTER
Notary Public, State of New York
No. 60-4643659
Qualified In Westchester County
Term Expires 9/30/01

Enclosure and Attachments

cc: next page

cc: Mr. Hubert J. Miller
Regional Administrator-Region I
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Patrick D. Milano, Project Manager
Project Directorate I-1
Division of Reactor Projects I/II
US Nuclear Regulatory Commission
Mail Stop O-8-2C
Washington, DC 20555

Senior Resident Inspector
US Nuclear Regulatory Commission
PO Box 38
Buchanan, NY 10511

Mayor, Village of Buchanan (w/o Attachment A)
236 Tate Avenue
Buchanan, NY 10511

Mr. Paul Eddy (w/o Attachment A)
NYS Department of Public Service
3 Empire Plaza
Albany, NY 12223

Mr. William F. Valentino, President (w/o Attachment A)
NYS ERDA
Corporate Plaza West
286 Washington Ave. Extension
Albany, NY 12223-6399

Mr. Jack P. Spath, Program Director (w/o Attachment A)
NYS ERDA
Corporate Plaza West
286 Washington Ave. Extension
Albany, NY 12223-6399

ENCLOSURE

PROPRIETARY AFFIDAVIT

EXTENDED RPI DEVIATION LIMITS AND ON-LINE
CALIBRATION OF THE RPI CHANNELS FOR CYCLE 15

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
OCTOBER 2000
NL 00 - 122

James S. Baumstark
Vice President
Nuclear Engineering

Consolidated Edison Company of New York, Inc.
Indian Point 2 Station
Broadway & Bleakley Avenue
Buchanan, New York 10511

Internet: baumstarkj@coned.com
Telephone: (914) 734-5354
Cellular: (914) 391-9005
Pager: (917) 457-9698
Fax: (914) 734-5718

October 3, 2000

Re: Indian Point Unit No. 2
Docket No. 50-247
NET-085-03
NL 00-122

Document Control Desk
U. S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D. C. 20555-0001

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Proposed Amendment to the Technical Specifications for Cycle 15 to Allow Extended RPI Deviation Limits and On-Line Calibration of the RPI Channels

The proprietary information for which withholding is being requested in the above-referenced letter is further identified in Affidavit NET-085-03 signed by the owner of the proprietary information, Con Edison. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b) (4) of 10 CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to the proprietary aspects of the application for withholding or the affidavit should reference this letter, and should be addressed to the undersigned.

Sincerely,

James S. Baumstark
Vice President - Nuclear Engineering

cc: Office of the General Counsel, NRC

NET-085-03

AFFIDAVIT
(NL 00-122)

STATE OF NEW YORK

ss

COUNTY OF WESTCHESTER

Before me, the undersigned authority, personally appeared James S. Baumstark, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this affidavit on behalf of Consolidated Edison Company and that the averments of fact set forth in this affidavit are true and correct to the best of his knowledge, information, and belief:

James S. Baumstark
Vice President - Nuclear Engineering

Subscribed and sworn to
before me this 3rd day
October 2000.

Karen L. Lancaster
Notary Public

KAREN L. LANCASTER
Notary Public, State of New York
No. 60-4643659
Qualified In Westchester County
Term Expires 9/30/01

(1) I am the Vice President - Nuclear Engineering at Consolidated Edison Company of New York, Inc. I have been specifically delegated the function of reviewing proprietary information to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of Consolidated Edison Company.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.790 of the Commission's regulations.

(3) The proprietary information sought to be withheld is the Cycle 15 calculated core power distributions and the Cycle 14 calculated core power distributions, which are transmitted herewith by a Consolidated Edison Company Letter and an Application for Withholding Proprietary Information from Public Disclosure.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following information is furnished for consideration by the Commission in determining whether it should be withheld from public disclosure.

(i) Pursuant to Con Edison approved Corporate procedures; Arthur P. Ginsberg and James P. Mooney obtained US Patent No. 5,011,649 for extended RPI Deviation Limits and the online, at power recalibration procedure of RPI channels in pressurized water reactors.

(ii) The information sought to be withheld from public disclosure comprises the application of the procedures developed in such patent as they pertain to Indian Point Unit 2. Such information is owned and has been held in confidence by Consolidated Edison Company, Arthur P. Ginsberg and James P. Mooney.

(iii) The information is of a type customarily held in confidence by Con Edison and not disclosed to the public. Con Edison has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine whether to hold certain types of information in confidence. Under that system, information is held in confidence if the release may result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals distinguishing aspects of a patented method. The use of such information by others without a license would constitute a loss to Con Edison of a competitive economic advantage over other nuclear utilities, and a direct loss of protected patent rights to Con Edison.

(b) Use of such information by a competitor would reduce his expenditure of resources and improve his competitive position in licensing a similar product.

There are sound policy reasons behind Con Edison's system, which include the following:

(a) As per corporate procedure and policy, Con Edison obtains patents for its employees and encourages them to market them.

(b) The information sought to be protected is valuable and marketable commercial information. The extent that such information is available to others without license would diminish the ability of the individual co-owners to sell products and services involving the use of the in information.

(c) Each piece or component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total package of proprietary information. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle; thereby depriving the owners of the proprietary information of a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.790, it is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources and, to the best of our knowledge and belief, has not been previously employed in the same original manner or method.

This information will enable Con Edison to:

(a) Provide documentation of the analyses and methodology used in extending the RPI deviation limits and performing on-line RPI calibrations.

(b) Obtain NRC approval of the proposed Technical Specification Amendments.

Further, this information has substantial commercial value because:

(a) The method allows a utility to continue operating its nuclear power plant and not shut down completely should the rod position indicators drift beyond their current limits as stated in the proposed Technical Specifications. This will result in significant operational benefits and enhanced unit availability. This also represents substantial savings as the utility would avoid having to purchase replacement power.

(b) The method allows a utility to return to service more quickly following an outage, again avoiding additional replacement power costs.

(c) The method is an alternative to purchasing expensive replacement equipment.

The development of the technology described in the proprietary report is the result of intensive efforts and the expenditure of a considerable sum of money by Con Edison. Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Con Edison because it would enhance the ability of other nuclear utilities to provide similar licensing services for commercial power without incurring commensurate expense. Also, public disclosure of the information would enable other nuclear utilities to utilize the information to meet NRC requirements for licensing documentation to extend RPI deviation limits and perform on-line calibration of the RPI channels without purchasing the right to use the information.

ATTACHMENT B

NON-PROPRIETARY SUPPLEMENT

EXTENDED RPI DEVIATION LIMITS AND ON-LINE CALIBRATION OF THE RPI CHANNELS FOR CYCLE 15

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
OCTOBER 2000
NL 00 - 122

ATTACHMENT B: NON-PROPRIETARY

Introduction

The rod position indicator (RPI) system at Indian Point Unit No. 2 (IP2) provides the reactor operator with knowledge of the actual position (axial elevation) of each rod cluster control assembly (RCCA) relative to the bank demand position. This system is subject to thermal instabilities and drift during reactor startup, particularly from cold conditions. The effect of these instabilities can be the incorrect indication that a particular RCCA(s) is misaligned with respect to the bank demand position. Since Cycle 13, Con Edison has implemented a process of on-line calibration of the RPI channels that allows the associated RPI hardware to come to thermal equilibrium during the hold period at around 30% of rated power. This process is detailed under U.S. Patent No. 5,011,649, granted to two Con Edison employees (Dr. A. Ginsberg and Mr. J. Mooney). On-line calibration of the RPI channels effectively bypasses the problem imposed by thermal instabilities of the RPI hardware.

Calibration of the RPI channels was previously performed with the reactor at hot zero power. Computer simulations and actual on-line calibrations in previous cycles have demonstrated that at-power calibration is permissible at intermediate power levels. Because of the potentially significant savings in startup time leading to escalation to rated power, Con Edison is requesting the required Plant Technical Specifications (PTS) modifications to allow on-line RPI channel calibration again in Cycle 15.

Evaluation of Misalignments

As discussed above, RPI deviations from the bank demand position are generally not actual misalignments, but rather are due to thermally induced instabilities in the instrumentation. To conservatively evaluate the potential impact on core peaking factors and global power distributions, however, it is assumed that a diverse matrix of potential indicated misalignments represent actual rod misalignments. This matrix is shown in Tables 1 and 2 of this attachment.

The results of this misalignment evaluation are summarized in Tables 3 and 4 in this attachment. The tables show the largest fractional change in Node F_Q, fractional change in Pin $F_{\Delta H}$, Quadrant Tilt, and Flux Difference (ΔI, as a deviation from the target value), that result from various misalignment cases. In particular, assumed misalignments of ± 12 steps, as permitted by the current PTS, can be compared to assumed misalignments of ± 24 steps. The largest fractional changes in F_Q and $F_{\Delta H}$ overall are indicated in the tables with an asterisk. The development of these asterisked results is illustrated in Figures 1 and 2 in this attachment. Each figure shows the large number of misalignment simulations that determine the maximum fractional changes in F_Q and $F_{\Delta H}$. The increases in F_Q and $F_{\Delta H}$ shown, less than 7% and 4%, respectively, can be easily accommodated by limiting core power levels per operating limits given in the PTS. Application of these limits demonstrates that limiting core power to less than 70% will conservatively accommodate assumed misalignments of up to ± 24 steps. This power range substantially bounds the power level limit of 50% for allowing the greater misalignment that is requested in this amendment request. This power level limit will easily mitigate any combination of assumed misalignment and uncertainty in the analysis methodology for the cases analyzed.

Evaluation of Recalibration

To evaluate the potential impact of on-line calibration, a calibration exercise for each RCCA was numerically simulated and the resulting impact on core peaking factors and global power distributions computed. When the analysis methodologies were applied to Cycle 11 it was determined that core power would likely be restricted to 50% of rated power by other factors in the PTS, such as core quadrant tilt and/or axial flux difference restrictions. Thus, the analysis for Cycle 15 specifically addresses on-line recalibration from 50% power. The numerical simulations for all 53 RCCAs show that at 50% power the PTS limits on F_Q and $F_{\Delta H}$ are easily met. This power level substantially exceeds the 35% limit requested for performing on-line calibration. This power level limit will easily mitigate any combination of RCCA recalibration and uncertainty in the analysis methodology for the cases analyzed.

Evaluation of Calculation Methodology

For both the on-line calibration simulations and the misalignment evaluations, relative changes in core peaking factors and global power distributions were calculated. Because the relative change is used, bias in the calculation method generally factors out. Further, while recalibrations are generally performed during the hold period, typically at 30% of rated power, the analyses conservatively concluded that power levels up to 70% were permissible for misalignments, and up to 50% during recalibrations.

Nonetheless, the bias in the calculational method was examined. Two burnup cases around each of BOC, MOC, and EOC were selected for comparison. Flux maps at every burnup step were reviewed and show that these cases are representative of the rest of the cycle. No outliers were observed in the other burnup steps. Figures 3 through 8 in this attachment compare the measured assembly average power with that predicted by the code NODEP-2 for these burnup steps at IP2 during Cycle 14.

The predicted F_{xy}, measured F_{xy}, and relative percent deviation (relative to the measured value) are shown for each assembly location in the figures. In addition to the individual assembly data, summary data for all assemblies, inner assemblies (encompassing a central nine-by-nine array of assemblies), and outer assemblies are provided. These summary data include maximum, root-mean-square (RMS), minimum, and average percent deviation. The maximum and minimum deviation simply indicate the largest and smallest percent deviation from measured power in the core at that burnup step. The average deviation, whether positive or negative, provides an overall indication of whether NODEP-2 is overpredicting or underpredicting the assembly power in a given region of the core. The RMS deviation gives the absolute magnitude of the deviation in assembly power in a core region. This provides, along with the average deviation, an inference about the adequacy of NODEP-2 in predicting core radial power distributions.

NODEP-2's nodal scheme is based on single energy group diffusion theory. Diffusion theory is known to lose accuracy at interfaces where high flux gradients occur. For example, boundaries between assemblies with large reactivity differences will result in these higher flux gradients, as will boundaries at the core periphery. Such large reactivity differences between assemblies are present in the Cycle 14 core at IP2 because of the transition to a higher energy core starting in Cycle 13. These higher reactivity differences will persist until a steady-state fuel cycle, where all assemblies are of a given fuel type. This is occurring in Cycle 15 as the transition to higher reactivity fuel is completed, and all assemblies are of the same type. Thus, Cycle 15 is expected to show agreement similar to or better than Cycle 14.

Further, a comparison of the Cycle 14 and Cycle 15 core loading patterns, particularly with regard to the initial burnup and enrichment of the assemblies in these patterns, was performed specifically to support this licensing amendment with respect to questions from the NRC. The comparison shows that the reactivity gradients between assemblies in the core and between peripheral assemblies and the core boundary are likely to be smaller in Cycle 15 than they were in Cycle 14. Cycle 15 is also expected to be similarly or less limiting than Cycles 14 or 13. This is demonstrated by Figures 9 and 10 in this attachment. They show how the maximum fractional change in F_Q and $F_{\Delta H}$ due to misalignments of ±24 versus ±12 steps increased in Cycle 13, and have since decreased. Again, this is likely due to the increased reactivity gradients in Cycle 13, which attenuate in subsequent cycles.

In conclusion, the calculational methodology is considered robust and conservative for this analysis.

Table 1

Analyses Matrix for Rod Misalignment Calculations

a,b

Table 2

Analysis Matrix for Asymmetric Rods in C and D Banks Misaligned

a,b

Table 3

Summary of Results: RCCA Misalignment Calculations - Cycle 15

a,b

Table 4

Summary of Results: Worst Case Peaking Factor Increase for Asymmetric Misalignment Calculations - Cycle 15

a,b

Table 5

Predicted Versus Measured Radial Assembly Power – Cycle 14

a,b

Figure 1

Fractional Change in $F_{\Delta H}$,
Rods K-14, P-10, N-13, and K-8 Misaligned +24 Steps, and
the Balance of C and D-Banks Misaligned -24 Steps - Cycle 15

a,b

Figure 2

Fractional Change in Nodal Peaking, F_Q,
D-Bank Misalignment Concurrent with all Rods Misaligned - Cycle 15

a,b

Figure 3

150 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 4

2,000 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 5

6,000 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 6

10,000 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 7

14,000 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 8

18,000 MWD/MTU, HFP Cycle 14 Flux Map

a,b

Figure 9

Maximum Fractional Change in $F_{\Delta H}$ By Operating Cycle
(Asymmetric Misalignment Cases Were Not Studied For Cycle 11)

a,b

Figure 10

Maximum Fractional Change in F_Q By Operating Cycle

a,b