



Boston Edison

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

L. J. Olivier

Vice President Nuclear Operations
and Station Director

September 12, 1995
BECo Ltr. #95- 095

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Docket No. 50-293
License No. DPR-35

Request for Additional Information Regarding Proposed Technical
Specification Change Affecting Scram Insertion Times and Minimum
Critical Power Ratio (TAC No. M92909)

Enclosure 1, provides our response to your August 21, 1995 request for additional information concerning our proposed change to the PNPS Technical Specifications. Please note that portions of the information we are providing as attachments to Enclosure 2 are considered proprietary by the General Electric Company. An affidavit identifying the proprietary information is included as Enclosure 2. Enclosure 3 provides a list of references included as attachments. If additional information or clarification is required please contact Mr. Alan Shiver at (508) 830-7948.

This letter contains no commitments.

L. J. Olivier

LJO/RAH/nas/Rap95/Scramltr

- Enclosure 1, Response to RAI
- Enclosure 2, General Electric Company Affidavit
- Enclosure 3, List of Attachments

cc: See next page

APD 11
Ltr. Encl.
Change: NEC ADE 1 INP

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PDR ADDCK 05000293
P PDR

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ENCLOSURE 2

GENERAL ELECTRIC COMPANY AFFIDAVIT

General Electric Company

AFFIDAVIT

I, **James F. Klapproth**, being duly sworn, depose and state as follows:

- (1) I am Fuel Licensing Manager, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the letters, J. S. Charnley to H. N. Berkow, "Revised Supplementary Information Regarding Amendment 11 to GE Licensing Topical Report NEDE-24011-P-A," January 16, 1986 and D. C. Serell to B. W. Hagemeyer, "Scram Times versus Notch Position," September 1, 1995.
- (3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), 2.790(a)(4), and 2.790(d)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;
 - b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

- c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of General Electric, its customers, or its suppliers;
- d. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, of potential commercial value to General Electric;
- e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in both paragraphs 4.a and 4.b above.

- (5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.
- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2), above, is classified as proprietary because it would provide other parties, including competitors, with information related to General Electric fuel designs, analysis results and potential commercial offerings which were developed at a considerable expense to General Electric.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

STATE OF NORTH CAROLINA)
) ss:
COUNTY OF NEW HANOVER)

James F. Klapproth, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 5th day of September 1995.

James F. Klapproth
James F. Klapproth
General Electric Company

Subscribed and sworn before me this 5th day of September 1995.

Jean M. Anderson
Notary Public, State of North Carolina

My commission expires: 10/08/96

ENCLOSURE 1
RESPONSE TO RAI

I. Fuel Cladding Integrity - Bases

1. Provide a reference for the GEXL valid range of conditions as given on page B2-2 of Pilgrim Technical Specifications (TSs) for GE11 fuel.

The valid range of conditions for the GE11 critical power correlation (GEXL correlation) is presented in Table 3-4 of General Electric Fuel Bundle Designs, Volume 1, NEDE-31152P, Revision 3, February 1993.

2. How will critical power ratio (CPR) information be generated for the range of reactor vessel pressures from 1300 psia to 1400 psig, where the GEXL correlation is no longer valid for use in calculating CPR values? Why did the upper limit on pressure change? Why were the local and axial peaking factors deleted?

Critical power ratios are required to be calculated for the anticipated operational occurrences (AOOs). For Pilgrim Station the two potentially limiting AOOs are the generator load rejection without bypass and the feedwater controller failure at maximum demand. For the generator load rejection without bypass the minimum CPR occurs within 2 seconds of the start of this event. Within this time frame the peak pressure and subcooling during the generator load rejection without bypass are less than 1210 psia and less than 48 Btu/lbm, respectively. For the feedwater controller failure the minimum CPR occurs within 37 seconds of the start of this event. In this period of time peak pressure and subcooling during the feedwater controller failure at maximum demand are less than 1190 psia and less than 52 Btu/lbm, respectively. The pressures and subcoolings for both these events are well within the valid range of conditions for the GE11 critical power correlation.

The upper limit of 1300 psia for the GE11 critical power correlation was chosen by General Electric to bound pressures expected during periods of minimum CPR for AOOs. The 1400 psig pressure upper limit reflected the upper region of applicability for the earlier fuel types. These fuel types are not limiting in a core loaded with GE 11.

Local and axial peaking factors were deleted to maintain consistency with the General Electric design document referenced in response to Question I.1. These peaking factors do not limit the applicability of the GEXL correlation.

3. The revised valid range of conditions for the GEXL correlation included a reduced range for inlet subcooling from 0-100 Btu/lb to 0-70 Btu/lb. Why was this parameter changed? Respond to the potential for operation outside GEXL for Final Safety Analysis Report events resulting in a decrease in core coolant temperature.

The range of applicability for core inlet subcooling for the GE11 critical power correlation was chosen by General Electric to bound conditions expected during periods of minimum CPR for AOOs.

The two AOOs that result in the greatest decrease in core inlet temperature are a loss of feedwater heating (LFWH) and an inadvertent start of the high-pressure coolant injection (HPCI) pump. However, the increase in core inlet subcooling for these events is still about 10 Btu/lbm less than that of the feedwater controller failure event discussed in question 1.2 above. The increased subcooling of the feedwater controller failure is a consequence of the reactor pressurization that accompanies this event.

For both the LFWH and the HPCI events the CPRs are not limiting when compared to the CPR of the limiting pressurization AOOs. This result is documented in the Supplemental Reload Licensing Report for Pilgrim Nuclear Power Station Reload 10/ Cycle 11, 24A5172, Revision 0, February 1995. A copy of the Supplemental Reload Licensing Report is provided as Attachment 1.

II. Scram Insertion Times

1. Provide information on calculation of adjustment factors for switch dimensions and magnetic hysteresis. Confirm that these adjustment factors will not be modified or eliminated when using notch-based limits. Provide a reference for the fax (dated 7/31/74) submitted during the telecon and provide a copy of this document. Are any new adjustment factors necessary for the notch-based limits'?

The methodology used to calculate scram times as a function of notch position, including an allowance for uncertainty in the physical location at which the reed switch opens, is demonstrated in the Enclosure 2 GE proprietary letter from D. C. Serell to B. W. Hagemeyer dated September 1, 1995.

Confirmation that these adjustment factors have been properly applied to the notch-based limits in the proposed Pilgrim Technical Specification amendment is provided in the GE letter from G.A. Watford to E.L. Heinlein, dated February 3, 1992. This letter is provided as Attachment 2. These limits are based on the assumption that the control rod switch positions are at the minimum tolerance.

The actual notch-based limits for Pilgrim are documented in the letter from S.J. Peters to E.L. Heinlein, dated September 3, 1993, and in BECo Calculation S&SA 088, Revision 0, *Scram Times for Technical Specification 3.3.C.1*, dated June 28, 1995. Both these documents are provided as Attachments 3 and 4, respectively. These limits remove the conservative assumption that the control rod reed switch is at the minimum tolerance. This best-estimate approach is reasonable when averaging multiple control rod drives and, in fact, has no observable impact on MCPR operating limits.

The fax dated July 31, 1974, is a BECo Office Memorandum from J.A. Seery to Mr. F.A. Mulcahy. This memorandum does not serve as a technical basis for the proposed Technical Specification amendment and was only intended for use as an example, during the August 7 conference call, of the method used previously to derive scram time correction factors for Pilgrim Station. A copy of this memorandum is included as Attachment 5.

No new adjustment factors are necessary for notch-based limits.

2. Provide information on calculation of uncertainty in location of the position indication probes and position of the control rods at drop out. Explain the TS bases which state that an allowance is made for this uncertainty in the notch based limits. Confirm that no new sources of uncertainty are created in measuring the notch-based limits.

These requests are addressed in response to Question II.1. As explained in our response and the associated referenced attachments, no new sources of uncertainty are created in measuring the notch-based limits.

3. TS Sections 3.3.C.1, 3.3.C.2 and 3.3.C.3 are revised to state that scram timing begins upon de-energization of the scram pilot valve solenoids. What is the reason for this change, and does it represent a change in scram time testing procedures?

Technical Specification 3.3.C.1 previously stated that scram times were measured based on deenergization of the scram pilot valve solenoids as time zero. This convention was used in demonstrating compliance with Technical Specifications 3.3.C.2 and 3.3.C.3 as well. The addition of this wording to the proposed amendment of Technical Specifications 3.3.C.2 and 3.3.C.3 was made in the interest of recognizing current practice at Pilgrim Station as well promoting consistency with Technical Specification 3.3.C.1 and Standard Technical Specifications.

The proposed wording clarifies the way scram times are measured at Pilgrim Station. It does not represent a change in the scram time testing procedures.

4. Provide a copy of the document submitted for the telecon which lists current TS limits and "delta times" used to convert from percent based to notch based limits. Explain the differences the calculation of the first "delta times" column and the four values listed in row 10 on the 7/31/74 letter.

The fax dated July 31, 1974, is a BECo Office Memorandum from J.A. Seery to Mr. F.A. Mulcahy and does not serve as a technical basis for the Technical Specification amendment proposed here. This memorandum was intended only as an example of the method used previously to derive scram time correction factors for Pilgrim Station

Similarly, the figures provided by fax during our telecon of August 7, 1995, were only provided for illustration. As requested, these figures are provided as Attachment 6. Note these figures do not include the scram time limits in our proposed Technical Specification amendment.

5. Provide a copy of the 2/5/92 letter providing the results of General Electric scram time analysis for Pilgrim faxed during the telecon.

A copy of the requested letter is provided as Attachment 2 to this response. (Note, the date of this memo is 2/3/92, not 2/5/92.)

III. MCPR Calculation Method

1. Provide a reference for the GEMINI methodology used in the calculation of μ , σ , τ , τ_{ave} , and τ_B , and show calculation of the μ and σ values specific to Pilgrim. With regard to TS Surveillance Requirement 4.11.C, explain how the switch from 30% insertion position to dropout at Notch 34 is considered conservative. Explain the significant change in the value of σ .

The GEMINI methodology was approved for use for reload core design by Amendment 11 to GESTAR, NEDE-24011-P-A. Attachment 7 represents a copy of the NRC safety evaluation report for Amendment 11. Additional supplemental information provided to the NRC regarding this methodology is presented in the Enclosure 2 (proprietary) letter, J. S. Charnley to USNRC dated January 16, 1986.

The design-verified μ and σ values specific to Pilgrim are documented in Attachment 2. The actual calculation of these values is documented by General Electric in the design record file (DRF) indicated on Attachment 2. DRFs are available for inspection at the GE site but are not generally released by GE. Discussions with GE indicate the Pilgrim-specific numbers are based on linear interpolation of the μ and σ values presented in Table 3-3 of the Enclosure 2 (proprietary) letter, J. S. Charnley to USNRC dated January 16, 1986.

The σ values presented in Table 3-3 reflect specific BWR scram speed data. As indicated in Attachment 7 and the Enclosure 2 (proprietary) letter, both the μ and σ values have been reviewed and approved by the NRC as part of Amendment 11 to GESTAR, NEDE-24011-P-A.

With regard to TS Surveillance Requirement 4.11.C the switch from 30% insertion to dropout at Notch 34 does not reflect a change in the position of the actual measurement. All scram time measurements are based on the same physical reed switch positions. In the existing Technical Specification, the dropout measurement at Notch 34 would have been corrected to reflect the 30% insertion position before being used to calculate τ_{ave} . The μ and σ used to calculate τ_B and τ were consistent with this 30% insertion position. In the proposed Technical Specification amendment, the dropout measurement at Notch 34 is used directly to calculate τ_{ave} . The μ and σ used to calculate the τ_B and τ in the proposed Technical Specification amendment are, therefore, changed to be consistent with the actual position of the dropout measurement at Notch 34. Because there has been no change to the actual physical measurement point, and because μ and σ are used consistent with this point, this change does not decrease the ability of Technical Specification 4.11.C to detect a reduction in scram time performance and determine an appropriate adjustment for the MCPR operating limit.

ENCLOSURE 3

LIST OF ATTACHMENTS

Attachment 1

Supplemental Reload Licensing Report for Pilgrim Nuclear Power Station Reload 10
Cycle 11 - 24A5172, Rev. 0

Attachment 2

Memo to E.L. Heinlein from G. A. Watford dated February 3, 1992; Subject: PNPS
Technical Specification Scram Time Requirements - DP: A12 - 00038 - 2

Attachment 3

Memo to E.L. Heinlein from S. J. Peters dated September 3, 1993; Subject: Time to
Notch 34, 24, and 04 Dropout for Pilgrim - RNE93-260

Attachment 4

S&SA Calculation 088 dated 6/28/95; Subject: Scram times for Tech Spec 3.3.C.1

Attachment 5

Memo to F. A. Mulcahy from J. A. Seery dated July 31, 1974; Subject: Tech Spec
Scram Times

Attachment 6

Figures 1&2, Comparison of Old and New Scram Times for TS 3.3.C.1 and Comparison
of Old and New Scram Times for TS 3.3.C.2, respectively

Attachment 7

Letter to J. S. Charnley from G. C. Lainas dated March 22, 1986; Subject: Acceptance
for Referencing of Licensing Topical Report NEDE-23011-P-A, "GE Generic Licensing
Reload Report, " Supplement to Amendment 11 - MFN - 029-086

Attachment 1
Supplemental Reload Licensing Report for Pilgrim Nuclear Power Station Reload 10
Cycle 11 - 24A5172, Rev. 0