Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

March 22, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Dresden Station Unit 3
Response to Request for
Additional Information Concerning
the Cycle 8 Reload With Exxon Fuel
NRC Docket No. 50-249

References (a): T. J. Rausch letter to H. R. Denton
dated January 11, 1982.

(b): J. Hegner letter to T. J. Rausch
dated March 5, 1982.

Dear Mr. Denton:

In Reference (b), Commonwealth Edison received an advanced copy of questions from the Core Performance Branch concerning the Dresden 3 Cycle 8 Reload. Our response to these questions is provided in Attachment 2 to this letter.

Attachment 2 contains information which is proprietary to Exxon Nuclear Co. (ENC), and is accompanied by an affidavit (Attachment 1) signed by ENC, the owner of the information. The affidavit 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 Secton 2.790 of the Commission's regulations.

It is, therefore, respectfully requested that the information which is proprietary to Exxon Nuclear Company, Inc. be withheld fom public disclosure in accordance with Section 2.790 of the Commission's regulations. Correspondence with respect to the proprietary aspects of this application for withholding or the supporting ENC affidavit should be addressed to G. F. Owsley, Manager of Reload Fuel Licensing, Exxon Nuclear Company, 2101 Horn Rapids Road, P.O.Box 130, Richland, Washington 99352.

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Rec'd w/out
Attach. II

One (1) signed original and thirty-nine (39) copies of this transmittal letter (including the non-proprietary Attachment 3 response) are provided for your use. In addition, six (6) copies of this letter with proprietary Attachment 2 and the affidavit of Attachment 1 are also being provided at this time.

If you have any questions concerning this matter, please contact this office.

Very truly yours,

Thomas J. Rausch

Thomas J. Rausch
Nuclear Licensing Administrator

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cc: Region III Inspector - Dresden (w/o Att)

Attachments: (1) Affidavit of James M. Morgan dated March 17, 1982

(2) Proprietary Response to Question 492.1 - 492.4

(3) Non-proprietary Response to Questions 492.1 - 492.4

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A F F I D A V I T

STATE OF Washington)
ss.
COUNTY OF Benton)

I, James N. Morgan, being duly sworn, hereby say and depose:

1. I am Manager, Licensing and Safety Engineering, for Exxon Nuclear Company, Inc. ("ENC"), and as such I am authorized to execute this Affidavit.

2. I am familiar with ENC's detailed document control system and policies which govern the protection and control of information.

3. I am familiar with the document entitled "Responses to NRC Staff Questions on the Dresden 3 Cycle 8 Reload dated March 5, 1982," referred to as "Document." Information contained in this Document has been classified by ENC as proprietary in accordance with the control system and policies established by ENC for the control and protection of information.

4. The Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by ENC and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in the Document as being proprietary and confidential.

5. The Document has been made available to the United States Nuclear Regulatory Commission in confidence, with the request that the information contained in the Document not be disclosed or divulged.

6. The Document contains information which is vital to a competitive advantage of ENC and would be helpful to competitors of ENC when competing with ENC.

7. The information contained in the Document is considered to be proprietary by ENC because it reveals certain distinguishing aspects of BWR thermal hydraulic methodology which secure competitive economic advantage to ENC for fuel design optimization and improved marketability, and includes information utilized by ENC in its business which affords ENC an opportunity to obtain a competitive advantage over its competitors who do not or may not know or use the information contained in the Document.

8. The disclosure of the proprietary information contained in the Document to a competitor would permit the competitor to reduce its expenditure of money and manpower and to improve its competitive position by giving it extremely valuable insights into ENC's thermal hydraulic methodology, and would result in substantial harm to the competitive position of ENC.

9. The Document contains proprietary information which is held in confidence by ENC and is not available in public sources.

10. In accordance with ENC's policies governing the protection and control of information, proprietary information contained in the Document has been made available, on a limited basis, to others outside ENC only as required and under suitable agreement providing for non-disclosure and limited use of the information.

11. ENC policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

12. This Document provides information which reveals BWR thermal hydraulic methodology developed by ENC over the past several years. ENC has invested hundreds of thousands of dollars and many man-years of effort in the related data and modeling development. Assuming a competitor had available the same background data and incentives as ENC, the competitor might, at a minimum, develop the information for the same expenditure of manpower and money as ENC.

13. Based on my experience in the industry, I do not believe that the background data and incentives of ENC's competitors are sufficiently similar to the corresponding background data and incentives of ENC to reasonably expect such competitors would be in a position to duplicate ENC's proprietary information contained in the Document.

THAT the statements made hereinabove are, to the best of my knowledge, information, and belief, truthful and complete.

FURTHER AFFIANT SAYETH NOT.

James N. Morgan

SWORN TO AND SUBSCRIBED
before me this 17 day of
March, 1982.

Susan L. Backus
NOTARY PUBLIC

RESPONSES TO NRC STAFF QUESTIONS

ON THE DRESDEN 3 CYCLE 8 RELOAD

DATED MARCH 5, 1982

Question 492.1, Item 1

Supply the data used to generate the uncertainties employed in the methodoloy (i.e. distributions, means, standard deviations, and histograms).

Response

The uncertainties employed in the generation of the MCPR safety limit are given in Table 3.5 of XN-NF-81-76, Rev. 1. The feedwater flow rate, feedwater temperature, core pressure total core flow rate, and core inlet enthalpy uncertainties are input values to the NSSS vendor's bounding statistical analyses(1) which were generically applicable to Dresden Unit 3. Those values are conservative estimates of the uncertainties in those parameters for ENC's safety limit calculation.

The XN-3 correlation uncertainty, as listed in Table 3.5 of XN-NF-81-76, Rev. 1, was given in XN-NF-512, Rev. 1. The data used to develop the XN-3 correlation and to estimate its uncertainty are also listed in that document.

Thus, the XN-3 correlation and its application in the safety limit calculation is conservative, resulting in a conservative value of the calculated safety limit.

The assembly flow rate uncertainty listed in Table 3.5 of XN-NF-81-76, Rev. 1 was based upon consideration of the following individual subcomponents:

The power distribution uncertainties for the radial and local peaking factors are given in Table 3.5 of XN-NF-81-76, Rev. 1. The data and analyses used to generate those uncertainties were presented in XN-NF-80-19(P), Volume 1, Supplement 2. Histograms of that data are shown in Figures 6.3 through 6.10 of that document.

Thus, the radial and local power distributions were treated in a conservative manner in the safety limit calculation.

References

(1) Licensing Topical Report, General Electric Boiling Water Reactor, Generic Reload Fuel Application, NEDO-24011-A, July 1979.

Question 492.1, Item 2

Demonstrate, by discussion, that those parameters not statistically convoluted are placed at their conservative value.

Response

The safety limit calculation considered virtually all parameter uncertainties which have impact upon the safety limit. One parameter uncertainty which was not treated statistically is the axial power distribution uncertainty.

The axial power distribution uncertainty was accounted for in the safety limit calculation by using a conservatively biased distribution.

Thus, all factors which have not been statistically convoluted in an explicit manner have been inherently accounted in other parameter uncertainties, or accounted for by using a conservative value for them.

Question 492.1, Item 3

Demonstrate that the uncertainties in plant parameters are treated with at least a 95% probability at a 95% confidence level in accordance with Acceptance Criteria 1.0 of Standard Review Plan Section 4.4.

Response

The treatment of plant parameter uncertainties used in generating the safety limit was discussed in the response to Question 492.1, Items 1 and 2. The uncertainties in each of the parameters used in calculating the safety limit have been accounted for in a conservative manner. Those uncertainties were used to conservatively calculate a safety limit which protects at least 99.9% of the rods in the core from experiencing boiling transition. Thus, Acceptance Criterion 1.0 of SRP Section 4.4 has been satisfied using an accepted approach.

Question 492.1, Item 4

Perform a goodness-of-fit analysis for the fitting of the Pearson curve in order to insure that the number of Monte Carlo trials used in establishing the safety limit MCPR are sufficient.

Response

Question 492.2, Item 1

Supply the variance and distribution of the predictor variables used in the response surface fitting and sufficient data to identify the mean and statistical variation of each predictor variable.

Response

Four variables were used as predictor variables in the ΔCPR calculations for Dresden 3-Cycle 8.

Question 492.2, Item 2

Supply the experimental design used in the construction of the response surface. If it is not one of the three designs referenced in XN-NF-81-22, also provide justification on why this new design is acceptable.

Response

The experimental design used in the construction of the response surface is provided in the attached Table 492.2.2.

Table 492.2.2 ΔCPR Experimental Design

Coded Values of Predictor Variables				
X1	X2	X3	X4	Observed ΔCPR

Question 492.2, Item 3

Demonstrate, by discussion, that all plant parameters not treated statistically and any predictor variable which is eliminated from the response surface fitting must be set at their conservative value.

Response

Conservatisms in plant transient analyses are assigned on an individual basis for each transient calculation because conservatism can only be defined relative to a specific outcome. For purposes of determining the statistical distribution for ΔCPR during the Dresden 3 load rejection without bypass transient, the following specific conservatisms were applied to assure the generation of conservative values to define the ΔCPR response surface.

Question 492.2, Item 4

Supply a goodness-of-fit analysis, the results of the analysis, and the criterion for acceptability for the constructed response surface.

Response

A goodness-of-fit analysis as described in Section 3.1.4 of XN-NF-81-22(P) was performed on the fitted response surface. Residual plots for the fitted response surface are shown in the attached Figures 492.2.4-1 and 492.2.4-2. These plots reveal no nonrandom trends or outliers. Thus, the residual plots indicate that the form of the fitted response surface is appropriate.

A comparison of the values of ΔCPR as predicted by the fitted response surface vs observed COBRA calculations is shown in Table 492.2.4. This comparison shows good agreement between predicted and observed values of ΔCPR.

This goodness-of-fit analysis shows that the fitted response surface is adequate.

Table 492.2.4

Observed vs Predicted ΔCPR

Variable Level	ΔCPR	
	Observed	Predicted

Question 492.2, Item 5

Demonstrate that uncertainties for the value of predictor variables, response variables, and calculational method are treated with at least a 95% probability at a 95% confidence level in accordance with Acceptance Criterion 1.0 of SRP Section 4.4.

Response

Question 492.2, Item 6

If the quadratic fit of the response surface is not adequate, demonstrate that the estimates of the errors in the first four moments of the probability distribution using SOERP are small.

Response

As demonstrated in the goodness-of-fit analysis reported in the response to Question 492.2, Item 4, the fitted quadratic response surface form was adequate.

Question 492.2, Item 7

A goodness-of-fit analysis must be performed on the probability distribution.

Response

A goodness-of-fit analysis on a fitted probability distribution is appropriate in the case where the distribution is being compared with a random data sample.

Question 492.3

With regard to Table 5.4 of XN-NF-81-76, supply the following:

1. Were the ΔCPR's for all three fuel types (XN-1, 8x8R, 8x8) calculated from separate response surfaces? If so, provide the information requested in 492.2 for each surface. If one surface was used for all fuel types, demonstrate that the one surface is applicable to all fuel types.

Response

2. Define what is meant by "typical value for 8x8R and P8x8R fuel types.

Response

Question 492.4

The upper tie plate loss coefficient for the G.E. 8x8R fuel is approximately three times greater than the ENC fuel while the spacer loss coefficient for the fuel types are represented by two different functions. Demonstrate by appropriate calculations that the pressure drop for each fuel type is equal.

Response

The Dresden Unit 3 Cycle 8 reload analysis, XN-NF-81-76, provides results of an XCOBRA core thermal hydraulic calculation in which ENC fuel is coresident with G.E. fuel. Figure 492.4 (attached) compares axial pressure distributions for an ENC fuel assembly and a G.E. 8x8R fuel assembly from this calculation. The two assemblies considered both have a radial peaking factor of 1.5. The flow to each of these assemblies is different in order that both assemblies have the same static pressure drop. All other assemblies in the core have this pressure drop as well.

Above the upper tie plate, the static pressures are equal so that both assemblies have the same static pressure drop from the inlet orifice to the channel exit.