



Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066  
Tel 504 739 6660  
Fax 504 739 6678

Charles M. Dugger  
Vice President, Operations  
Waterford 3

W3F1-2000-0016  
A4.05  
PR

March 3, 2000

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Technical Specification Change Request NPF-38-212  
Supplement Moderator Temperature Coefficient End of Cycle  
Limit Response to the Request for Additional Information

Gentlemen:

In discussions with the NRC Staff concerning Technical Specification Change Request (TSCR) NPF-38-212, submitted by Letter W3F1-98-0175 dated October 9, 1998, clarification was requested of the information provided. The clarification specifically concerned the information in the supporting document, Combustion Engineering's (CE) Report CE-NPSD-911 Amendment 1. The attached contains the responses to the areas the NRC Staff reviewer requested Entergy and CE to provide additional information.

In final discussions with the NRC Staff reviewer concerning TSCR NPF-38-212, the following conclusion was agreed upon. The methodology presented by the CE Report CE-NPSD-911 Amendment 1 for the calculation of Moderator Temperature Coefficient (MTC) values for specific operating cycles, using the NRC Staff approved CE codes or code packages, meets the approval of the NRC Staff. Once TSCR NPF-38-212 is approved by the NRC Staff, other organizations that have previously received approval by the NRC Staff for the use of the CE codes or code packages for the calculation of MTC values for specific operating cycles may apply this methodology to their organizations. However, organizations desiring the approval of the presented methodology, but the use of different codes or code packages than that presented by the CE Report CE-NPSD-911 must apply for specific approval. In

A001

Technical Specification Change Request NPF-38-212  
Supplement Moderator Temperature Coefficient End of Cycle  
Limit Response to the Request for Additional Information  
W3F1-2000-0016

Page 2

March 3, 2000

these cases the organizations will need to submit the appropriate analysis for NRC Staff review and approval.

Approval of the TSCR would allow Entergy to not perform the MTC end of cycle test, since it presently is using the CE codes or code packages for this analysis. However, if Entergy considers changing to an alternate code or code packages to perform this analysis a subsequent submittal to the NRC Staff would be required prior to implementation.

The information provided in this correspondence does not change the original submittal's (TSCR NPF-38-212) Significant Hazards Consideration (SHC) Determination; therefore, the original SHC Determination remains valid.

This letter and its contents contain no new commitments.

Should you have any questions or comments concerning this request, please contact Arthur E. Wemett at (504) 739-6692.

Very truly yours,



C.M. Dugger  
Vice President, Operations  
Waterford 3

CMD/AEW/rtk

Attachments: Affidavit  
Request for Additional Information for NPF-38-212

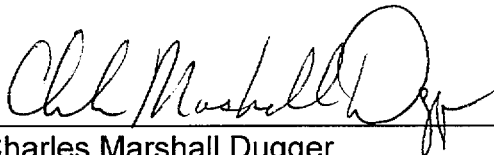
cc: E.W. Merschoff (NRC Region IV), N. Kalyanam (NRC-NRR),  
J. Smith, N.S. Reynolds, NRC Resident Inspectors Office,  
Louisiana DEQ/Surveillance Division, American Nuclear Insurers

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the matter of )  
 )  
Entergy Operations, Incorporated ) Docket No. 50-382  
Waterford 3 Steam Electric Station )

AFFIDAVIT

Charles Marshall Dugger, being duly sworn, hereby deposes and says that he is Vice President Operations - Waterford 3 of Entergy Operations, Incorporated; that he is duly authorized to sign and file with the Nuclear Regulatory Commission the attached Request for Additional Information pertaining to Technical Specification Change Request NPF-38-212; that he is familiar with the content thereof; and that the matters set forth therein are true and correct to the best of his knowledge, information and belief.



Charles Marshall Dugger  
Vice President Operations - Waterford 3

STATE OF LOUISIANA )  
 ) ss  
PARISH OF ST. CHARLES )

Subscribed and sworn to before me, a Notary Public in and for the Parish and State above named this 3<sup>rd</sup> day of March, 2000.

  
Notary Public

My Commission expires at death.

NPF-38-212  
Additional Information

**ATTACHMENT**

**Question 1:** "Explain the statement in the *topical report* submitted to support the technical specification change request which begins as the following, 'Contains a significant sample . . .'."

**Response:**

In support of the statement in the topical report, the statement was based on the values in Table 1 of Amendment 1. These values represent the current set of benchmarks in support of Combustion Engineering's current nuclear design methodology (ROCS/DIT). These benchmarks represent pairs of measurement and calculated results where the core conditions are absolutely consistent. In other words, where the exact calculations have been performed at the exact core conditions of the measurement. The differences represent true "calculational errors". These benchmark calculations are used to periodically update the bias factors and to confirm the uncertainty allowances used in the safety analysis. Although there exist other MTC measurements and associated calculated values (primarily startup test predictions), there are differences in assumed core conditions, which may produce a result, which is not representative of the true "calculational error".

**Question 2:** "Why are two comparable figures different? Comparing the figures on Page 10 of the present submittal to figure 2 on page 12 of the previous submittal there are obvious points left out."

**Response 2:**

Figure 2 of CE-NPSD-911 represents a subset of the points on Figure 1 of the amendment. The two outlier points obvious in Figure 2 have been removed from Figure 1 since they were demonstrated to satisfy the statistical tests for outliers given in Section 17.3 of the reference (M. Gibbons Natrella, Experimental Statistics, National Bureau of Standards Handbook 91, issued August 1, 1963). Application of this test allowed rejection of all data points that had an absolute value residual error greater than 2.38 pcm/°F. The two points that were deleted had residual errors of -2.83 and 2.49 pcm/°F.

With these two data points deleted, the 95/95 tolerance limit for the 105 data points given in Amendment 1 was computed to be 1.26

pcm/°F. Even if these two data points were included in the analysis of the data set given in Amendment 1, the tolerance limit would be 1.43 pcm/°F, which is still less than the quoted limit of 1.6 pcm/°F given in CE-NPSD-911.

**Question 2A:** "If the topical would have been approved. Today's bank of data for startup tests at BOC a given number of the EOC tests would have been eliminated. Of those that would have been eliminated which ones failed to meet the predictions plus or minus the allowed tolerance."

**Response 2A:**

As shown on Table 1 of Amendment 1 to CE-NPSD-911, the predicted MTCs for all the EOC MTC tests, including those which have been eliminated fall within the tolerance band of 1.6 pcm/°F. (When the methodology was applied to the two outlier points eliminated from the data analysis in Amendment 1, one would have exceeded the EOC measurement tolerance limit.)

**Question 3:** "In the present submittal on page 7 Table One, Calvert Cliff's Cycle 10 measured values and predicted values appear to be different even though the fuel burnup is approximately the same. Why?"

**Response:**

The two data points represent core conditions with different rod insertions.

**Question 4:** "In the present submittal under the Results Equation the deviation value calculated was rounded to a higher value versus a lower value which appears non conservative. Why?"

**Response:**

The value ( $\pm 0.153 \times 10^{-4} \Delta\rho/^\circ\text{F}$ ) from the Results equation was not rounded. It is the actual value obtained from the data set given in Amendment 1. This value is bounded by the safety analysis value of  $\pm 0.16 \times 10^{-4} \Delta\rho/^\circ\text{F}$ , which is the acceptance criterion.

**Question 5:** "Was the statistical testing ran with the new data or the old, if so, why? If the old data was used, is it still valid?"

**Response:**

The statistical testing was ran with all data in which the core conditions were consistent. The resulting data used in the analysis is data that was not rejected using the criterion of an absolute value of a residual error of less than or equal to 2.38 pcm/°F.

**Question 6:** "An RAI was sent by NRR in which the questions were addressed. NRR stated that they would like Question 5 be answered completely."

**Response:**

Question 5 refers to the request for additional information from the initial Technical Specification Change Request (TSCR) NPF-38-161 via Letter W3F1-94-0131 dated December 9, 1994. Subsequently, Entergy responded to the request for additional information with Letter W3F1-97-0215 dated August 26, 1997 which requested the withdrawal of the TSCR and informed the NRC Staff that Entergy would resubmit the change in its entirety.

Question 5 was as follows: "Assuming that Combustion Engineering has performed all the calculations, why is there not more data? In addition, please supply all additional data obtained since the report was prepared (Update Table 1 to include all data available)."

Response 1 of this Attachment states all data was included which met the requirement of consistent core conditions.

**Question 7:** "How does the data given in Table 1 of Amendment 1 compare to current and expected future core designs?"

**Response:**

The data contained in Table 1 of Amendment 1 represents a wide range of the core designs. This Table contains a sampling of 12, 18, and 24 month cycle designs; core sizes ranging from 133

assemblies to 241 assemblies; power levels from 1500 Mwth to 3800 Mwth; cores from 14x14 and 16x16 CE lattice designs, as well as cores containing discrete B4C/Al2O3, and integral Gadolinia and Erbia type burnable absorbers. The wide variation in core design represented by this sample encompasses current and expected future core designs of CE type plants.

**Question 8:** “The report represents benchmark data for CE’s methodology in predicting MTC values. Where the CE methodology has been applied to predict the BOC HZP and HFP MTC values, the results have shown that the most negative EOC MTC value remains within the Technical Specification limits. This demonstrates the EOC MTC test for verification of expected negative values can be eliminated. How do the results of the report apply to situations where non-CE methodology is used to perform the BOC and EOC predictions?”

**Response:**

The results of the report will remain valid for any NRC Staff approved methodology provided it has been verified that the Tolerance limits (k) on residual error between prediction and measurement of the MTC over the cycle is less than or equal to 1.6 pcm/°F. As stated in the response to Question 4 on page A3 of the Amendment to CE NPSD-911, substantial evidence exists within the industry to indicate that other NRC Staff approved nuclear analysis methodologies (e.g. CASMO/SIMULATE) will yield results that are within the allowed tolerances. Other NRC Staff approved methodologies may be used provided the licensee verifies the tolerance limits of these methodologies is less than or equal to 1.6 pcm/°F.