

February 1, 2001

Mr. Charles M. Dugger  
Vice President Operations  
Entergy Operations, Inc.  
17265 River Road  
Killona, LA 70066-0751

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3, RE: ISSUES IDENTIFIED BY ENTERGY OPERATIONS, INC. IN THE STAFF SAFETY EVALUATION ISSUED WITH THE LICENSE AMENDMENT NO. 165 TO REDUCE OPERABLE CONTAINMENT FAN COOLERS IN THE CONTAINMENT COOLING SYSTEM (TAC NO. MB0275)

Dear Mr. Dugger:

By letter dated July 6, 2000, the Nuclear Regulatory Commission (NRC) issued Amendment No. 165, to Facility Operating License No. NPF-38 for the Waterford Steam Electric Station, Unit 3 (Waterford 3), in response to your Technical Specifications Change Request NPF-38-224, dated October 18, 1999, as supplemented by letters dated May 16, 2000, and June 1, 2000. In your original request, you described the use of a graded approach to instrument uncertainty as a basis for the acceptability of the request for reduction in operable containment fan coolers in the containment cooling system.

While granting the amendment request, the staff had summarized in the Safety Evaluation (SE) that the original submittal from Entergy Operations, Inc. (Entergy), stated that even though the loss-of-coolant accident (LOCA) and main steam line break (MSLB) analyses did not explicitly include measurement uncertainties for the five input parameters detailed in Section 3.3 of the SE, it was acceptable because of the large margin available between the design pressure and the actual failure pressure of the containment. Entergy's supplemental letter dated June 1, 2000, stated that the calculations performed in which measurement uncertainties were included, showed that containment pressure and temperature limits were satisfied for both LOCA and MSLB accidents. These calculations were the basis for the staff's approval of the license amendment.

By letter dated October 6, 2000, Entergy identified certain issues with the staff's SE on the subject amendment, related to the graded approach to instrument setpoint determination. In that letter, Entergy requested the staff to revise the SE issued for Amendment No. 165 to accurately reflect the Waterford 3 licensing basis relative to the graded approach for documenting and accounting for instrument uncertainty as contained in the October 18, 1999, submittal.

The staff has reviewed the issues identified in your letter dated October 6, 2000, relative to the discussion of the graded approach to instrument setpoint determination, and provides its disposition of each issue below:

## Issue 1

### Entergy Statement of Staff Position:

“The NRC staff states in its cover letter:

The calculations performed, in which measurement uncertainties were included, show that containment pressure and temperature limits are satisfied for both the loss of coolant accident and main steam line break accident, and these calculations are the basis for the staff’s approval of this specific license amendment. The staff has not, however, made a final determination of the acceptability of this approach on a generic basis.”

### Entergy Response:

“The issue here is one of clarification. These statements are inconsistent with the text of the safety evaluation. The statement as worded seems to imply that the NRC staff has not “made a final determination of the acceptability” of including measurement uncertainties in the calculations. Based on statements in safety evaluation text (see page 7), it is apparent that the NRC staff has not accepted, on a generic basis, the Waterford 3 graded approach to the treatment of uncertainties.”

### Staff Evaluation of the Issue:

The words “this approach” in the statement that “The staff has not, however, made a final determination of the acceptability of this approach on a generic basis” could literally be interpreted as referring to the inclusion of uncertainties as proposed by you. However, from the next sentence in the same paragraph, which states “Waterford 3 should discuss with the staff the appropriate forum for pursuing the use of graded uncertainties,” the intent is clear.

Therefore, the staff does not see any inconsistency between the statements in the cover letter and the SE. Both statements make it clear that the graded approach to instrument setpoint determination has not been accepted on a generic basis. The staff has accepted those containment pressure and temperature calculations which include graded instrument uncertainties.

## Issue 2

### Entergy Statement of Staff Position:

“The NRC staff states on page 2 of the Safety Evaluation Report (SER) that Waterford 3 “included a new method of treating measurement uncertainties” in the license amendment request (LAR).”

### Entergy Response:

“Entergy respectfully disagrees with the NRC staff statement that the LAR included a “new” method of calculating instrument uncertainties. The methodologies used by

Entergy to determine the instrument uncertainties are consistent with the guidance provided in ISA S67.04, "Setpoints for Nuclear Safety-Related Instrumentation." As the NRC staff was made aware during several meetings with Waterford 3 personnel and during a recent Waterford 3 inspection, plant procedures utilize a graded approach to establish the level of rigor applied to documenting the instrument uncertainty and the associated accounting in the applicable analyses and procedures. This graded approach is based on the safety significance of the instrument function and is consistent with industry guidance. This type of graded approach to instrument uncertainty is explicitly endorsed in Regulatory Guide 1.105, Revision 3, "Setpoints For Safety-Related Instrumentation" and Branch Technical Position HICB-12, "Guidance on Establishing and Maintaining Instrument Setpoints."

More specifically, Entergy discussed the use of a graded approach at Waterford [3] with the NRC staff during the December 2, 1999, meeting at NRC Headquarters and during a February 22, 2000, meeting at the NRC Region IV offices. The same Entergy position was stated and considered during the NRC staff inspection which took place from February 28, 2000, through March 3, 2000, (see March 30, 2000, letter from Dr. Dale A. Powers, USNRC to Charles M. Dugger, Vice-President Operations - Waterford 3). During each of these events, Entergy reaffirmed its position that use of a graded approach that allows a less-rigorous method for documenting and accounting for instrument uncertainty based on the safety significance of the instrument function is consistent with Waterford 3's licensing basis. While these communications may not have reached all potential reviewers and inspectors, the Waterford 3 graded approach is not "new."

#### Staff Evaluation of the Issue:

The staff's statements on page 2 of the SE only imply that the graded approach to instrument setpoint methodology has not been accepted by the staff. The staff has reviewed the calculations related to the subject license amendment and has accepted those containment pressure and temperature calculations which include instrument uncertainties using the deterministic approach. The graded approach to instrument setpoint determination is considered a new method because the methodology has not been generically reviewed and accepted by the staff. It should also be noted that ISA Standard S67.04, Regulatory Guide 1.105, Revision 3, and HICB Branch Technical Position 12 accept the graded approach to instrument setpoint methodology from a conceptual standpoint. They do not, however, define an acceptable methodology to implement a graded approach, such as, defining an acceptable rigor for determining instrument uncertainty based on the safety significance of the instrument. The ISA Subcommittee on S67.04 is currently developing the necessary guidance for the industry to use the graded approach on a generic basis. During the meeting of December 2, 1999 (as shown on page 12 of the minutes of the meeting), and as documented in your letter of May 16, 2000 (the response to question 4), the NRC did not formally endorse the Entergy graded approach but supported the overall concept presented and encouraged the licensee's participation in an industry forum to develop the guidance needed for the utilization of the graded approach to instrument setpoint determination.

### Issue 3

#### Entergy Statement of Staff Position:

“The NRC staff states on SER page 7 that the method “proposed” by Waterford 3 for documenting and accounting for instrument uncertainties “is combining a design basis analysis with a risk-based success criterion.””

#### Entergy Response:

“The NRC staff statement is correct. In applying the graded approach, Waterford 3 strives to use all available information to determine the safety significance of the instrument function. This includes assessing the deterministic requirements, the impact on risk, and other specific design information. Entergy believes that this is consistent with the NRC staff expectations to provide a comprehensive evaluation. Entergy does not fault with this approach considering that it is consistent with recent regulatory trends in risk-informed regulation. Entergy (Waterford 3) did assess the impact of instrument uncertainty on containment integrity during an accident using a risk-informed method. This assessment concluded that the instrument uncertainty in the identified parameters was not safety significant. This result confirmed that the graded approach used by Waterford 3 appropriately classified the instrument uncertainties in the limiting analysis as having negligible impact on the containment safety function.”

#### Staff Evaluation of the Issue:

See the evaluation for Issue 2.

### Issue 4

#### Entergy Statement of Staff Position:

“The NRC staff states in its cover letter and on SER page 7 that Waterford 3 “should discuss with the staff the appropriate forum for pursuing the use of graded uncertainties.””

#### Entergy Response:

“Entergy interprets this statement to refer to our graded approach to addressing instrument uncertainty. We believe uncertainties must always be considered. However, the level of rigor used to document and account for instrument uncertainty is dependent on the safety significance of the instrument function. As discussed above, Entergy’s position on this matter was stated in the December 2, 1999, meeting at NRC headquarters and during the February 22, 2000, meeting at the NRC Region IV offices. The same position was stated and considered during the NRC Staff inspection which took place from February 28 - March 3, 2000, (see March 30, 2000, letter from Dr. Dale A. Powers, USNRC to Charles M. Dugger, Vice-President Operations - Waterford 3). During each of these events, Entergy reaffirmed to the NRC staff its position that use of a graded approach that allows less rigorous methods based on safety

significance of the instrument function is consistent with the Waterford 3 licensing basis. Entergy believes these interactions were appropriate for resolving the matter with the NRC Staff.”

Staff Evaluation of the Issue:

During licensing and inspection activities, the staff has found the graded approach to instrument uncertainties to be acceptable for specific applications. However, the staff has not accepted the methodology on a generic basis, because the level of rigor based on the level of risk significance has not been defined by Waterford 3 and accepted by the staff on a generic basis. We cannot predict that the Waterford 3 process to grade instrument uncertainty for various pieces of equipment will always be found acceptable when future submittals are made. The inspection documented by the March 30, 2000, report also encompassed a discrete set of plant equipment, and it found the program acceptably implemented for the scope of the inspection. Waterford 3 cannot extrapolate those conclusions to mean all of the results of their graded process are acceptable to the NRC for all other equipment. Therefore, until the generic approach to graded instrument setpoint methodology is developed, reviewed and accepted by the staff, the staff will continue to review the analysis on a case-by-case basis.

On the basis of this evaluation, the staff finds that no changes to the SE are needed and that it accurately represents the staff’s determination of the licensee’s use of graded approach to instrument setpoint determination. However, as suggested by you, if Entergy wishes to meet with the staff to further discuss this matter, we can arrange a meeting at the NRC Headquarters in Rockville, Maryland, on a date and time mutually convenient.

Entergy Position on GOTHIC Computer Code:

In Attachment 2 of your letter dated October 6, 2000, Entergy’s position regarding the use of the computer code GOTHIC was provided.

Entergy Statement of Staff Position:

“In the Safety Evaluation accompanying License Amendment No. 165, the NRC Staff stated:

- (Page 4) “The CONTEMPT computer code is the licensee’s original and current licensing basis code.”
- (Page 7) “the calculations performed in which measurement uncertainties were included, show that containment pressure and temperature limits are satisfied for both the LOCA and MSLB accident” additionally “These calculations are the basis for the staff’s approval of this license amendment.””

Entergy Response:

“It is the position of Entergy that the analyses performed to support License Amendment No. 165 define the new licensing basis for peak containment pressure and temperature

for Waterford 3. This includes the use of the GOTHIC computer code. Instrument uncertainties are treated in a less-rigorous manner consistent with the Waterford 3 “graded approach.””

Staff Evaluation on the Issue:

The GOTHIC code was developed for the Electric Power Research Institute and is maintained under a 10 CFR Part 50 Appendix B Quality Assurance Program by its developer, Numerical Applications, Inc. It has been verified against analytical solutions and experiments. Entergy has used the GOTHIC code to calculate the containment response for both the LOCA and MSLB accidents.

The staff agrees with the Entergy position that the containment response analyses (peak containment pressure and temperature for LOCA and MSLB accidents) for Waterford 3, which were performed using the GOTHIC computer code to support License Amendment No. 165, define the new licensing basis. However, the staff will review future applications, including but not limited to the specific use of the GOTHIC computer code, the degree of conservatism in the calculation, and the bounding parameters.

If you have any questions, please call N. Kalyanam at (301) 415 1480.

Sincerely,

**/RA/**

Robert A. Gramm, Chief, Section 1  
Project Directorate IV & Decommissioning  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

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cc: See next page

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If you have any questions, please call N. Kalyanam at (301) 415 1480.

Sincerely,

**/RA/**

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