Dr. Graham B. Wallis, Chairman Advisory Committee on Reactor Safeguards U. S. Nuclear Regulatory Commission Washington, DC 20555-0001

SUBJECT: WATERFORD STEAM ELECTRIC STATION, UNIT 3, EXTENDED POWER UPRATE

Dear Dr. Wallis:

On January 26, 2005, the staff presented its review of the Waterford Steam Electric Station, Unit 3 (Waterford 3), extended power uprate (EPU) application to the Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Thermal-Hydraulic Phenomena. During the 519th meeting of the ACRS, on February 10, 2005, the staff discussed the EPU with the ACRS Full Committee. By letter dated February 24, 2005, the ACRS forwarded its conclusions and recommendations on the staff's review of the Waterford 3 EPU application to Chairman Diaz. In that letter, the ACRS provided the following conclusions and recommendations:

- 1. The application by Entergy for an 8 percent EPU at Waterford 3 should be approved, subject to (1) the staff's approval of the alternate source term (AST) application and (2) documentation of the resolution of the boron precipitation issue during long-term cooling for Waterford 3 by the submittal of the analysis details and their acceptance in the staff's safety evaluation (SE).
- 2. We agree with the staff that the requirement for large-transient testing should be waived for this application.
- 3. The staff should review the generic potential for boron concentration and precipitation to interfere with core cooling following a loss-of-coolant accident (LOCA).

Subsequent to the ACRS Full Committee meeting, the licensee identified the need for a revision to its EPU submittal. On March 17, 2005, the licensee provided a revised analysis for peak cladding temperature (PCT) following a large-break LOCA. Specifically, the new analysis uses a lower input value for the peak linear heat generation rate which slightly lowered the calculated PCT and maximum cladding oxidation, while increasing maximum core-wide oxidation. The

G. Wallis

supplement showed that coolable geometry is maintained. The staff is currently reviewing the revised analysis to ensure conformance to the emergency core cooling criteria and will reflect review of the supplement in the SE of the Waterford 3 EPU application.

The staff's responses to the ACRS conclusions, recommendations, and comments are enclosed.

Sincerely,

/**RA**/

Luis A. Reyes Executive Director for Operations

Enclosure: Staff Response to ACRS Comments

cc w/enclosure: Chairman Diaz Commissioner McGaffigan Commissioner Merrifield Commissioner Jaczko Commissioner Lyons SECY G. Wallis

supplement showed that coolable geometry is maintained. The staff is currently reviewing the revised analysis to ensure conformance to the emergency core cooling criteria and will reflect review of the supplement in the SE of the Waterford 3 EPU application.

The staff's responses to the ACRS conclusions, recommendations, and comments are enclosed.

Sincerely, /**RA**/ Luis A. Reyes Executive Director for Operations

Enclosure: Staff Response to ACRS Comments

cc w/enclosure: Chairman Diaz Commissioner McGaffigan Commissioner Merrifield Commissioner Jaczko Commissioner Lyons SECY

DISTRIBUTION: G20050151/LTR-05-0106 See next page

Accession No.: ML050820559 Package: ML0					830504 Incoming: ML050660265				
OFFICE	PDIV-1/PM PDIV		′-1/LA	Tech Editor		PDIV-1/SC		PDIV/D	
NAME	NKalyanam	DBaxley		PKleene		AHowe		HBerkow	
DATE	3/23/05	3/16/05		3/21/05		3/23/05		3/23/05	
OFFICE	SRXB/BC		SPLB/BC		IF	IPSB/BC DI		_PM/D	
NAME	JWermiel		JHannon (w/comment)		t) T	TQuay		TMarsh	
DATE	3/18/05		3/21/05		3/	3/18/05		3/28/05	
OFFICE	NRR/D		EDO						
NAME	JDyer (BSheron for)		LReyes						
DATE	3/30/05		4/4/05						

OFFICIAL RECORD COPY

THE STAFF'S RESPONSE TO ADVISORY COMMITTEE ON REACTOR SAFEGUARDS LETTER DATED FEBRUARY 14, 2005 RELATED TO THE EXTENDED POWER UPRATE FOR WATERFORD STEAM ELECTRIC STATION, UNIT 3 (WATERFORD 3)

ACRS Conclusions and Recommendations

1. The application by Entergy for an 8 percent extended power uprate (EPU) at Waterford 3 should be approved, subject to (1) the staff's approval of the alternate source term (AST) application and (2) documentation of the resolution of the boron precipitation issue during long-term cooling for Waterford 3 by the submittal of the analysis details and their acceptance in the staff's safety evaluation (SE).

NRC Staff Response

- (i) The staff review and action on Entergy's AST application is scheduled to be complete in April 2005.
- (ii) The licensee documented the resolution of the boron precipitation issue during long-term cooling for Waterford 3 by submitting the analysis described in its supplemental letter dated February 16, 2005 (ML050490396). The staff reviewed the licensee's submittal and will document the results of its review in the EPU SE.
- 2. We agree with the staff that the requirement for large-transient testing should be waived for this application.

NRC Staff Response

The staff notes the committee's agreement that the large-transient testing for Waterford 3 EPU application has been waived, based on the licensee's justification and the staff's agreement with that justification.

The staff believes that in case of Waterford 3, the licensee has demonstrated that the post-EPU plant performance will be adequately established by post-modification and startup testing. The licensee performed safety analyses, using NRC staff-approved methods and computer models that were applicable at power levels that envelop EPU conditions at Waterford 3. Therefore, significant insights into the capability of the facility to safely respond to upset conditions would not be expected from a large-transient test such as a turbine trip transient. The staff reviewed the licensee's arguments for waiving the large-transient testing and accepted the rationale based on consideration of the criterion in Section 14.2.1. of the Standard Review Plan.

The staff will, however, continue to evaluate the need for large-transient tests for EPUs on a case-by-case basis, based on plant-specific evaluations.

Enclosure

3. The staff should review the generic potential for boron concentration and precipitation to interfere with core cooling following a loss-of-coolant accident (LOCA).

NRC Staff Response

Prior to the ACRS review of the Waterford power uprate, the staff identified additional generic considerations for the potential for boron precipitation to interfere with core cooling following a LOCA. The staff will communicate its concerns about the current boron concentration modeling approach to the pressurized water reactor (PWR) vendors and will work with them to modify the boron precipitation methodologies as appropriate to resolve the boron precipitation issues. The concerns the staff will pursue include the issues identified in the ACRS letter of February 24, 2005. The staff will continue to review the issue of post-LOCA boron precipitation as part of each PWR power uprate licensing action.

The staff has considered the need to enter the issue of post-LOCA boron precipitation into the agency generic issues program. However, based on its understanding of the safety significance of the issue and past consideration of the boron precipitation issue by the Office of Nuclear Regulatory Research, the staff continues to believe that the issue does not meet the threshold for evaluation as a generic safety issue. The industry should address the issue as part of the long-term cooling requirements of 10 CFR 50.46.

G20050151/LTR-05-0106 - Waterford Steam Electric Station, Unit 3, Extended Power Uprate

Date: 4/4/05

DISTRIBUTION: PUBLIC RidsEdoMailCenter (LReves, WKane, MVirgilio, JSilber, WDean) RidsResOd (JCraig) RidsNrrOd (JDyer, RBorchardt) RidsNrrAdpt (BSheron, KGrimes) RidsOgcRp RidsOpaMailCenter RidsOcaMailCenter RidsNrrWpcMail RidsNrrDlpm (TMarsh, JLyons) RidsNrrDlpmLpdiv (HBerkow) RidsNrrDlpmLpdiv1 (AHowe) RidsNrrDlpmLpdiiii (WRuland) RidsNrrPMJStang JWermeil SSun JHannon SJones RidsNrrPMNKalyanam RidsNrrLADBaxley PDIV1 RF ACRS RidsRgn4MailCenter (AHowell) SBurns/KCyr BMallett LCox