

September 13, 2002

MEMORANDUM TO: Kahtan N. Jabbour, Acting Section Chief  
Project Directorate 2-1  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

FROM: F. Mark Reinhart, Chief **/RA/**  
Licensing Section  
Probabilistic Safety Assessment Branch  
Division of Systems Safety and Analysis  
Office of Nuclear Reactor Regulation

SUBJECT: ASSESSMENT OF RADIOLOGICAL CONSEQUENCES FOR 1.7%  
POWER AT H. B. ROBINSON UNIT 2 POWER (TAC NO. MB5106)

We have completed our assessment of the radiological dose consequences associated with the 1.7% power uprate for H. B. Robinson Unit 2. We concur with the licensee's conclusions that the consequences of postulated accidents for the power uprate conditions are bounded for 504 Effective Full Power Days of operation.

The attached safety evaluation (SE) inputs summarize our assessments.

Attachment: As stated

CONTACT: John J. Hayes,  
SPSB/DSSA/NRR, 415-3167

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## Radiological Analysis

The licensee submitted in a May 16, 2002 letter a request for a 1.7% power uprate based upon an evaluation which justified the radiological consequences of the uprate with analyses using the alternate source term. This evaluation included analysis of the consequences of the main steam line break (MSLB), the steam generator tube rupture (SGTR), the loss-of-coolant (LOCA), the single rod cluster control assembly (RCCA), the reactor coolant pump shaft seizure (locked rotor) and the radioactive waste gas decay system leak or failure. Following the May 16<sup>th</sup> submittal, staff discussions with the licensee indicated that a more timely staff review and approval of the power uprate amendment request might occur if approval was not dependent upon the use of the alternate source term for postulated accidents. The staff recommended using the guidance in Regulatory Issue Summary (RIS) 2002-03, "Guidance on the Content of Measurement Uncertainty Recapture Power Uprate Applications". Consequently, the licensee provided a revised evaluation of the radiological consequences of postulated accidents for the 1.7% power uprate in a letter dated August 12, 2002.

Section II of RIS 2002-03 states that a matrix should be used to identify the information for each accident or transient analysis for which the existing analyses of record bound plant operation at the proposed uprated power level. The licensee provided such a matrix in their August 12<sup>th</sup> submittal. In this matrix, the licensee identified the LOCA, RCCA and the locked rotor accidents as remaining bounded by their existing UFSAR analyses since each of these accidents had been analyzed at 102% of 2300 MWt. For the MSLB, SGTR and the waste gas system leak or failure, the licensee indicated that the power level was not used as an input to the analysis. In an August 22, 2002 conference call with the staff, the licensee was asked to address the effects of the change in power level on the break flows for the MSLB and the SGTR and to address the effects of any changes of operating parameters on source terms or releases.

In the August 12<sup>th</sup> submittal, the licensee concluded that the radiological consequences of the postulated accidents were bounded for approximately 95% of Cycle 22 (approximately 504 effective full power days [EFPD]). This conclusion was based upon establishing a LOCA analysis of record burnup limit for Cycle 22 that accounts for operation at the proposed 2339 MWt reactor power level.

## Staff Assessment

The staff has reviewed the information contained in the August 12<sup>th</sup> submittal. The staff's review concluded that the LOCA, RCCA and the locked rotor accident analyses were conducted at 102% of the 2300 MWt power level.

In response to questions raised during the August 22<sup>nd</sup> conference call, the licensee provided additional information on September 6, 2002. In this submittal the licensee indicated that the analysis of record for the SGTR utilizes a break flow and a steam release flow rate based upon an initial core power level of 102% of 2300 MWt. In addition, they indicated that the reactor coolant system pressure was not being changed as a result of the power uprate. While the average reactor coolant system temperature was increasing by 0.5°F due to the power uprate, this temperature increase remains within the  $\pm 4^\circ\text{F}$  incorporated into the analysis of record. The secondary side pressure in the analysis of record is 800 psia. This value remains conservative relative to the uprate condition. For the uprate, the secondary side pressure will be 806 psia. Based upon the above, the staff has concluded that the SGTR is bounded by the analysis of record.

In the September 6<sup>th</sup> letter, the licensee indicated that the analysis of record for the MSLB included as sources of activity released during the MSLB the water boiled off from the affected steam generator, i.e., the steam generator with the break, plus the steam released from the two unaffected steam generators during cooldown of the reactor. The analysis of record assumes that the secondary side pressure on the affected steam generator drops instantaneously to atmosphere while primary coolant pressure remains essentially at 2250 psia during the first two hours following the break. Since the power uprate will not result in a change in reactor coolant system pressure and only a small change in primary and secondary thermal hydraulic conditions, i.e., pressure and temperature, there will not be a significant change in break flow resulting from the uprate. In addition, the fuel integrity acceptance criteria will continue to be met even at the power uprate conditions because the greatest challenge to the fuel relative to its departure from nucleate boiling ratio and its centerline melt conditions continues to be at zero power. Based upon the above, the staff has concluded that the consequences of a MSLB at the proposed increased power level remains bounded by the analysis of record.

The curie contents of any waste gas decay tank are currently limited so that their release would not result in a whole body dose of 0.5 rem or greater. This limitation is irrespective of reactor power level. Consequently, the staff has concluded that they are in agreement with the licensee that the consequences of the release or failure of a waste gas tank are not a function of the reactor power level and that the potential consequences remain acceptable.

#### Conclusion

The staff has reviewed the licensee's assessment of the consequences of the 1.7% power uprate on the radiological doses associated with postulated accidents. The staff has concluded that the consequences remain acceptable for the power uprate for 504 EFPD of Cycle 22.