ATTACHMENT

SAFETY EVALUATION
CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
REACTOR VESSEL MATERIAL PROPERTIES

MATERIALS ENGINEERING BRANCH
COMPONENT INTEGRITY SECTION

INTRODUCTION

To support new estimates of the copper and nickel content of the reactor vessel beltline welds of H. B. Robinson 2, CP&L submitted on June 29, 1984 a letter report summarizing the findings of a chemical analysis of samples recently cut from welds in the reactor vessel head (welds that happened to match the beltline welds), plus the results of a recent search of weld records. A recalculation of RT_{NDT} values per the requirements of the PTS rule (now called "RT_{PTS} values") was also given. In response to a request from the NRC staff, dated September 11, 1984, further information was submitted on October 30, 1984. The purpose of this safety evaluation is to review the acceptability of the CP&L reports for use in PTS analyses and other analyses of reactor vessel integrity.

In past work on PTS, the controlling weld in HBR-2 was deemed to be the lower girth weld (the intermediate to lower shell girth seam). Its copper and nickel content were unknown, hence upper bound values (0.35% Cu and 1.2% Ni) were used in the calculations reported in SECY 82-465. The upper girth weld (the nozzle shell to intermediate shell girth seam) received

less fluence and the longitudinal welds had low nickel content; therefore, they were not controlling. The surveillance weld, which was reported to be made with the same weld wire heat number as the upper girth weld, had 0.34% copper and 0.66% nickel (surveillance report WCAP 10304, March, 1983).

LOWER GIRTH WELD

Carolina Power and Light Company has provided acceptable evidence to support their position that the best estimate chemical composition of the lower girth weld of the H. B. Robinson 2 reactor vessel is 0.20 percent copper and 0.80 percent nickel.

PLATE AND LONGITUDINAL WELD MATERIALS

At our request, CP&L also supplied their best estimate values of the chemical composition of the plate materials and the longitudinal welds in the reactor vessel beltline and showed that their RT_{PTS} values are not controlling. These values are acceptable to the staff.

UPPER GIRTH WELD

The staff also requested that CP&L give us their best estimate of the copper and nickel content of the upper girth weld. It may become the controlling material now that the lower girth weld is known to have lower copper and nickel contents than previously reported and also lower fluence resulting from the flux reduction program. In fact, the latest CP&L report gives the EOL fluence at the lower girth weld as 1.89×10^{19} n/cm^2 (E > 1 MeV) and that at the upper girth weld as 1.75×10^{19} n/cm^2. The problem in establishing acceptable values of copper and nickel content for the upper girth weld lies in an inconsistency in the data for the surveillance weld and data for other welds made with the same heat of weld wire, as described in our previous memorandum. Despite our request, CP&L declined to resolve the issue ". . . since, if either the chemistry assumed by CP&L or the chemistry measured in the surveillance weld is assumed for the Upper Girth Weld, the PTS Screening Criteria will not be reached prior to the expiration of the HBR2 operating License." The staff agrees with this statement and with the CP&L calculation that H. B. Robinson 2 will meet the PTS screening criterion to the end of licensed life, using an upper bound calculation as specified in the PTS rule that is being promulgated.

Carolina Power and Light Company has provided acceptable evidence to support their position that the best estimate chemical composition of the lower girth weld of the H. B. Robinson 2 reactor vessel is 0.20 percent copper and 0.80 percent nickel.

Although the question does not have to be resolved now, please be advised that the calculation of RT_{NDT} for the HBR-2 vessel will be required in the future, either for an update of the pressure-temperature limits or for possible evaluation of a transient or a flaw found in an NDE inspection. For any of these purposes, the copper and nickel content will be required in order to use Revision 2 of Regulatory Guile 1.99 now in preparation. And, as matters stand now, the upper girth weld will be controlling. At the same time, the question of applicability of the HBR-2 surveillance data will have to be resolved.

CONCLUSION

We have determined that the chemical composition of the betline materials of the H. B. Robinson 2 reactor vessel are acceptable for the purpose of the calculating RT_{PTS} for your response to the proposed rule when it becomes effective. However, we noted that the upper girth weld will be controlling and, at end of life, it appears that RT_{PTS} will be 293.5°F.