Comment Resolution Table
NEDC-33256P, NEDC-33257P, and NEDC-33258P, "The PRIME Model for Analysis of Fuel Rod Thermal-Mechanical Performance"

Location	GNF Comment	NRC Resolution
Section 3.1.5 Cladding Thermal Expansion	Conclusions in this section are inconsistent with the Section 3.9.8 of the SER and Section 9 Limitation 3.b of the TER. Maximum cladding temperature is limited to [ ] in these sections. To avoid future misinterpretation of this limitation, GNF recommends making the Section 3.1.5 limitation consistent, i.e., the maximum cladding temperature to [ ] Suggested Changes in Markup.	Comment partially accepted. Revised section to read: Based upon FRAPCON-3 confirmatory analyses and comparisons to relevant empirical data, PNNL concluded that the PRIME cladding thermal expansion model is acceptable up to [ ]. During subsequent discussions regarding PRIME's overall range of applicability with respect to cladding temperature (based upon a systematic review of each model's empirical database), PNNL and NRC staff agreed on a slightly higher upper limit of cladding temperature (See Section 3.9.8 of this SE and Section 9 of the TER). Based upon NRC staff review of this assessment, the NRC staff finds the cladding thermal expansion model in PRIME acceptable.
Section 3.1.10 Integral Temperature Assessment	Page: 1 Section 3.9.6 of the SER notes the fuel temperature calculations in PRIME are qualified up to [ ] To be consistent with these sections, GNF recommend limiting the fuel temperature calculations to [ ] GNF understand that PRIME application will be limited to [ ] due to staff's concern about other PRIME models. Suggested Changes in Markup.	Comment accepted. Section revised as suggested in markup.
Section 3.3.1 Cladding Corrosion	The [ ] oxide value in Figure 3-1 of NEDC-33258P is not a limit. Rather, it is the [ ] used for the oxide perturbation in the PRIME application methodology. The [ ] During the	Comment accepted. Section revised as suggested in markup.

	ESBWR fuel review, GNF established an [ ] limit for GNF fuel designs based on GNF experience with successful operation of fuel with limited spalling. This limit is intended to protect fuel from extensive spalling or unusual corrosion/crud events and thus maintain uniform material properties. To be consistent with this [ ] in all licensing calculations. In cases where higher cladding oxidation is observed compared to GNF's experience base [ ] Suggested Changes in Markup.	
Section 3.5.2 Young's Modulus and Poisson's Ratio	Conclusions in this section are inconsistent with the Section 3.9.8 of the SER and Section 9 limitation 3.b of the TER. Maximum cladding temperature is limited to [ ] in these sections. To avoid future misinterpretation of this limitation, GNF recommends to limit the maximum cladding temperature to [ ] Suggested Changes in Markup.	Comment partially accepted. Sentences revised and added to read: Based upon comparisons to FRAPCON-3 and published data, PNNL concluded that the model for cladding elastic (Young's) modulus in PRIME is acceptable within the [ ]. Based upon comparison to FRAPCON-3, PNNL concluded that the model for Poisson's ratio in PRIME is acceptable within the [ ]. During subsequent discussions regarding PRIME's overall range of applicability with respect to cladding temperature (based upon a systematic review of each model's empirical database), PNNL and NRC staff agreed on a slightly higher upper limit of cladding temperature (see Section 3.9.8 of this

		report and Section 9 of the TER).
Section 3.7.2 Plenum Temperature	Due to the complexity of BWR fuel rod plenum designs [ ] and the elevation of the plenum in the core (particularly for different part length rod designs), [ ] As discussed in the RAI-41 response, the [ ] plenum gas temperature was calculated for a plenum including a [ ] While it was not especially clear in the RAI-41 response, this was intended to be an example, not a fixed number for all designs. [ ] For the GE14 IMLTR LHGR limit revision, for a fuel rod [ ] the plenum temperature is recalculated to be [ ] using the same methodology as in RAI-41. The NRC staff reviewed the plenum temperature calculation methodology (the same as in the RAI-41 response) in detail as part of the GE14 compliance report audit. For the GNF2 design, the plenum gas temperature for the full, short and long part length rods are conservatively calculated using the RAI-41 methodology. The values for the GNF2 full, long PLR, and short PLR are approximately [ ] respectively. As noted above, plenum temperature is a function of the specific plenum design [ ] and their location in the core (differences in the gamma heating & power on top of the fuel column). Application of any predefined value for plenum gas temperature may be inappropriate for particular fuel designs and in some cases may produce non-conservative results. Based on this discussion,	Comment accepted. Third sentence maintained as in Draft Safety Evaluation: “Based upon their review of GNF’s response to RAI 41 (Reference 2), PNNL concluded that the bounding plenum gas temperature of [ ] was acceptable for future licensing calculations on full length fuel rods.” Additional revisions incorporated as suggested. Added sentence and further revised the end of the section to read: “Independent of PNNL’s assessment, the NRC staff conducted an audit of the plenum gas temperature methodology and concluded that it was acceptable (See ML091590455). Based upon these assessments, the NRC staff finds the methodology for the determination of plenum gas temperature acceptable.”

	GNF recommends revising Section 3.7.2 as shown with revision tracking. Suggested Changes in Markup.	
Section 4 Limitation 2 and Section 3.3.3	Although the EPRI Water Chemistry Guidelines are generally followed by US Utilities, there is a concern that referencing the EPRI Water Chemistry Guidelines may have unintended consequences or complications. This concern results from the fact that the Guidelines document is quite large, and at locations may involve parameters or suggestions that are not directly related with fuel performance parameters of interest for oxide and crud thickness. In addition, as GNF doesn't own this Guideline nor determine its revisions or changes, it is not possible to ensure compliance with future revisions. Therefore, GNF suggests revising Section 4 Limitation 2 and Section 3.3.3 as marked. The recommended values for the cycle average feedwater iron and zinc, (as well as the copper values, for the small number of plants with significant feedwater copper sources) are generally consistent with those suggested in the EPRI BWR Water Chemistry Guidelines, and the EPRI BWR Fuel Crud and Corrosion Guidelines. These recommendations are consistent with GNF fuel inspection experience and supported by the experience base used in developing Figure 3-1.	Comment accepted. Sections revised as suggested in the markup.