<u>Oconee (Units 1, 2, and 3) SLRA: Breakout Questions</u>

SLRA Section 4.2.1: Neutron Fluence Projections

TRP 142.1: Neutron Fluence

Question Number	SLRA Section	SLRA Page	Background / Issue (As applicable/needed)	Discussion Question / Request
1	4.2.1	4-22	• Background: Section 2.3 of ANP-3898P discusses the dpa adjustment methodology for the extended beltline that is mentioned in the SLRA. • Purpose: To better understand the dpa adjustment methodology employed for the extended beltline.	Please, explain why there is confidence in the dpa at the location of interest in the extended beltline and not in the fluence. In other words, why is a multiplier needed for dpa and not fluence, if dpa is typically calculated with fluence as an input. That is to say that elementary displacement theory states that the dpa is typically a product of the fluence, the scattering cross section, and the number of displacements produced per primary knock-on atom (PKA).
2	4.2.1	4-22	• Background: The dpa adjustment method described in Section 2.3 of ANP-3898P is stating that the following relationship is applicable $\frac{dpa(ext.\,beltline)}{\Phi(ext.\,beltline)} = \frac{dpa(beltline\ surface)}{\Phi(beltline\ surface)}$ • Purpose: To better understand the dpa adjustment methodology employed for the extended beltline.	Please explain the basis of this relationship and whether differences in the neutron spectrum from the beltline to the extended beltline would affect the validity.
3	4.2.1	4-23	• Background: On page 4-23 of the SLRA it is stated that in the "equivalent margins	Please explain how the fluence of 1.5E18 n/cm2 was

			analysis of the Linde 80 reactor pressure vessel nozzle welds reported in BAW-2192, Revision 0, Supplement 1P-A, Revision 0 [Reference 4.2-13] and BAW-2178, Revision 0, Supplement 1P-A, Revision 0 [Reference 4.2-14]) utilized an inside wetted surface fluence of 1.5E+18 n/cm2. This is significantly higher than the 72 EFPY inside wetted surface fluence values for the reactor pressure vessel nozzle welds reported in Table 4.2.1-1, Table 4.2.1-2, and Table 4.2.1-3 (highest at 3.50E+17 n/cm2)." • Purpose: To understand why there are differences in fluence calculations and methodologies used in the SLRA and BAW-2192, Revision 0 Supplement 1P-A, Revision 0 and BAW-2178, Revision 0, Supplement 1P-A, Revision 0.	calculated for the RPV nozzles welds in BAW-2192, Revision 0 Supplement 1P-A, Revision 0 and BAW-2178, Revision 0, Supplement 1P-A, Revision 0 and why that method was not employed for the SLRA.

SLRA Section 4.7.1.3: Reactor Vessel Internals Irradiation Embrittlement
TRP 149.13: Reactor Vessel Internals Irradiation Embrittlement

Question Number	SLRA Section	SLRA Page	Background / Issue (As applicable/needed)	Discussion Question / Request
1	4.7.1.3 and B2.1.7	B-64	• Background: Section B2.1.7 of the SLRA states that "As discussed in MRP-189, Revision 3, Sections 3.2, Item C and 3.3, Item B, neutron exposures are best-estimate values in units of displacements per atom at the end of 80 calendar years of operation, which are projected from existing 60-year documentation. In most instances, displacements per atom values	Please clarify and explain whether the fluence values from MRP-189 Rev. 3 that are used in the Reactor Vessel Internals TLAA are best-estimate or conservative.

			reported in MRP-189, Revision 3, are obtained from a conservative extrapolation of discrete ordinate transport 60-year best estimate analyses to 80-years to bound the B&W fleet. The 60-year discrete ordinate transport displacements per atom values were obtained using methods that comply with Regulatory Guide 1.190 for the reactor vessel as reported in BAW-2241NP-A, Revision 2." • Purpose: To better understand the fluence values used for the reactor vessel internals TLAA.	
2	4.7.1.3	4-119	• Background: Section 4.7.1.3 of the SLRA states that "The projected 72 EFPY fluence values developed for the update of BAW-10008, Part 1, Revision 1 (Section 4.7-1) are TLAA and are obtained from Reference 4.7-20. These fluence inputs were developed based on extrapolation of 60-year reactor vessel internals transport calculations that were developed using the RG 1.190 compliant methodology (i.e., deterministic discrete ordinates transport 3-D synthesis methods) developed for the reactor vessel as described in BAW- 2241PA, Revision 2, and are consistent with the fluence estimates reported in MRP-189, Revision 3 [Reference 4.7-19]. Since the BAW-2241PA, Revision 2 methodology is mainly concerned with reactor vessel fluence, some specific modeling	Please explain why there is such a large difference between the fluence values used to support the Reactor Vessel Internals TLAA and the ONS-specific MCNP/DORT-calculated fluence values if the TLAA also used a BAW-2241P-A methodology.

			enhancements were required in order to accurately represent the reactor vessel internals components." Additionally, Section 5.6 of ANP-3899NP states that "The fluence/dpa used for the Oconee gap analysis (GALL SLR XI.M16A), which is based on MRP-189 Revision 3 and was developed to bound the B&W fleet of reactors, is reported in Table 5-2." Furthermore, Table 5-3 of ANP-3899P compares the fluence values used to support TLAA and the ONS-specific MCNP and DORT-calculated fluence values. • <u>Purpose</u>: To better understand the fluence values used as input to the TLAA and the ONS-specific MCNP/DORT-calculated fluence values.	