Enclosure 3

Set 1 of Responses to Requests for Additional Information on Westinghouse Topical Report WCAP-16747-P/-NP Appendices C and D, Revision 2, "POLCA-T: System Analysis Code with Three-Dimensional Core Model, Appendices C and D."

(Non-Proprietary)

June 2025

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Request for Additional Information (RAI) 12-2

[

]a,c

Response to RAI 12-2

[

]a,c

[

]a,c

WCAP-18950-P has been recently accepted for NRC review.

RAI 12-5

Please confirm that concerns as discussed in Appendix D of the original NRC staff's SE related to the reactor internal pump model are only relevant to the Advanced BWR, which is outside the scope of the requested review.

Response to RAI 12-5

Westinghouse confirms that the reactor internal pump model, relevant for the Advanced BWR, is outside the scope of the requested review.

RAI 12-7

[

]a,c

Response to RAI 12-7

[

]a,c

a,b,c

[**]a,c**

RAI 12-9

Please provide justification for the adequacy of the **[** **]**[a,c] in POLCA-T.

Response to RAI 12-9

The response for the [**]**[a,c] *will be provided later.*

The **[**

][a,c] with Table 7-1 in WCAP-17203-P-A.

The **[** **]**[a,c] is presented in Section D.3.2 of the subject WCAP. The proper input values, to the model, are established in Section D.4.8, and are based on the **[** **]**[a,c]. The input values to the model are established to **[** **]**[a,c].

Westinghouse does not have access to measurement data to validate the model. However, verification of the **[**

][a,c].

The **[**

][a,c]. The reactor pressure vessel model, from the demonstration case in Section D.8 in the WCAP, is used in the verification but **[**

][a,c].

The relative flow rate in the POLCA-T simulation is compared to **[**

][a,c].

a,b,c

Figure 12.9-1 Measured versus predicted efficiency from full- and half-scale experiments.

As can be seen in the figure, POLCA-T predicts **[** **]**[a,c]. However, for the full scale tests, a **[**

][a,c].

Thus, it can be concluded that the **[**

][a,c]. The input parameters to the model, as presented in Section D.4.8 of the WCAP, **[**

][a,c].

References

1 NUREG/CR--5951 “The Management of ATWS by Boron Injection”

RAI 12-10

Please provide details on the application **[** **]**[a,c] in POLCA-T utilized in evaluation of AOO transients and ATWS. Specifically, please address how **[** **]**[a,c] are treated.

Response to RAI 12-10

Phenomenon D6 **[** **]**[a,c] in Westinghouse Phenomena Identification and Ranking Table has a **[** **]**[a,c] per WCAP-17203-P-A "Fast Transient and ATWS Methodology". The basis for the **[** **]**[a,c] is discussed in response to RAI-9h, where it was concluded that the **[** **]**[a,c] for transients and ATWS are **[** **]**[a,c].

Therefore, the **[** **]**[a,c] in POLCA-T is not included in the evaluation of AOO transients and ATWS.

RAI 12-12

Please confirm that the application of POLCA-T to Delta CPR Versus Oscillation Magnitude (DIVOM) analysis is outside the scope of this review.

Response to RAI 12-12

Westinghouse intends to evaluate CPR during oscillations to be able to support the DIVOM methodology, which should therefore be a part of the review. The validation for this application is presented in Section C.3.1.4 in the Topical report.

RAI 12-13

Please provide details of **[** **]**[a,c] for POLCA-T, including a specification and justification of the models used, given that **[** **]**[a,c] for ATWS events may reach **[** **]**[a,c] at which **[** **]**[a,c] becomes significant.

Response to RAI 12-13

In the evaluation of ATWS events, **[**

][a,c]

RAI 12-14

Is **[ ]**[a,c] required for AOO transient or ATWS analysis? If so, please provide justification on the treatment of uncertainties in this model.

Response to RAI 12-14

[ ][a,c] in POLCA-T is not required in the evaluation of AOO transient or ATWS analysis.

RAI 12-15

Much of the POLCA-T methodology for AOO transient and ATWS analysis relies on the Phenomena Identification and Ranking Table (PIRT) and other information provided in the NRC-approved TR WCAP-17203-P-A, "Fast Transient and ATWS Methodology." However, POLCA-T's application to **[ ]**[a,c] is not directly addressed in the current TR. Please provide justification for POLCA-T's application to **[ ]**[a,c]

Response to RAI 12-15

CENPD-300-P-A groups AOO transients into **[**

][a,c] WCAP-17203-P-A categorizes AOO events into the following four categories:

- Pressure increase/decrease (PI/PD)
- Reactor coolant flow increase/decrease (RI/RD)
- Feedwater flow increase/decrease (FI/FD)
- Reactor coolant temperature increase/decrease (TI/TD)

Each category is represented by its own column in the PIRT. Section 6.4.4.2.1 of WCAP-17203-P-A discusses an example of how an event can be modeled **[**

][a,c]

RAI 12-16

Please clarify the intent of the Appendix C discussion regarding the interface to the plant control simulation tool SAFIR when the use of SAFIR was previously approved in the initial review of POLCA-T.

Response to RAI 12-16

The intent of the Appendix C discussion regarding the interface to the plant control simulation tool SAFIR is included purely as an illustration for informational purposes of an application. Included is also for informational purposes additional qualification of the SAFIR interface.

RAI 12-17

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][a,c]

Response to RAI 12-17

[

][a,c]

a,b,c

Figure 12.17-1 Results of 10 kV busbar test – Narrow Water Level

RAI 12-18

Please discuss whether **[** **]**[a,c] been validated and describe how this validation was performed.

Response to RAI 12-18

[**]**[a,c] is only relevant to the evaluation of transients in Advanced BWR and Nordic reactor designs, which are outside the scope of the requested review.

RAI 12-19

Please confirm that Sections C.4, C.6, D.4, and D.6 are providing a description of the approved uncertainty quantification methodology for the fast transient analysis and ATWS, not requesting approval of any new methodology aspects not previously reviewed and approved in TR WCAP-17203-P-A.

Response to RAI 12-19

Westinghouse confirms that Sections C.4, C.6, D.4, and D.6 are included to provide a description of the approved uncertainty quantification methodology for the fast transient analysis and ATWS. Westinghouse does not request approval of any new methodology aspects not previously reviewed and approved in TR WCAP-17203-P-A.

RAI 12-21

Please clarify the role of the decay ratio and oscillation frequency calculation within the ATWS instability methodology. Is this calculation performed for informational purposes, or does it impact the ATWS instability evaluation process or its conclusions?

Response to RAI 12-21

Section D.3.5 in the topical report was included in response to a previous Audit Issue from the review of Appendix B as additional information on how the decay ratio and resonance frequency are evaluated in stability applications. Since the ATWS instability event is a non-stationary process, a recursive method is applied as illustration for informational purposes.