

Response to SDAA Audit Question

Question Number: A-5.4.1.3-3

Receipt Date: 12/05/2024

Question:

The following items are needed for docketing related to the approach temperature in FSAR Section 5.4.1.3, "Performance Evaluation."

Item 1: Need information on the docket to show that approach temperature limit is reached prior to predicted DWO onset for all cases.

Item 2: Need information on the docket to clarify the NPM HCSG operating range and DWO analysis range. Staff's understand is in the table below.

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}}^{2(a),(c)}

Item 3: Need information on the docket to describe how DWO onset calculations use suitably conservative input.

Item 4: Need information on the docket to summarize the DWO PIRT and describe how important phenomena are captured. The importance of {{
}}^{2(a),(c)}

Item 5: Need information on the docket to describe and justify the time-step scheme which maintains the Courant number {{
}}^{2(a),(c)}

Item 6: Need information on the docket to describe the NPM HCSG nodalization.

Item 7: Need assessment data or a description of it on the docket.

Item 8: Need a description of the {{
}}^{2(a),(c)} with a clear statement indicating that the test was {{
}}^{2(a),(c)}

Item 9: Need information on the docket to summarize {{
}}^{2(a),(c)}

Item 10: Need information on the docket to provide evidence that {{
}}^{2(a),(c)}

Item 11: Need information on the docket to address {{
}}^{2(a),(c)}

Item 12: Need information on the docket to describe {{
}}^{2(a),(c)}

Item 13: Need information on the docket to summarize {{
}}^{2(a),(c)}

Item 14: Need information on the docket to justify that {{
}}^{2(a),(c)}

Item 15: Need information on the docket to address {{
}}^{2(a),(c)}

Item 16: Need information on the docket to address {{
}}^{2(a),(c)}

Item 17: Need information on the docket to address {{
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Item 18: Need information on the docket to address {{
}}^{2(a),(c)}

Item 19: Need information on the docket to address {{
}}^{2(a),(c)}

Response:

The following items are needed for docketing related to the approach temperature in Final Safety Analysis Report (FSAR) Section 5.4.1.3, “Performance Evaluation.”

Item 1 Response

Figure 1, Figure 2, and Figure 3 show there is {{

}}^{2(a),(c),ECI} is the boundary between Region 1 and Region 2 in FSAR Figure 5.4-16, “Approach Temperature for NPM-20.” Engineering calculation EC-174500, Revision 1, will be provided in the electronic reading room (eRR).

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Item 2 Response

NuScale provides the following information in Table 1 to confirm the NRC’s understanding of the ranges of power, secondary side pressure, feedwater (FW) subcooling, FW flow rate (per SG), and RCS T_{avg} .

Range units used are

- percent rated thermal power (percent RTP)
- pounds per square inch absolute (psia)
- gallons per minute (gpm)
- degrees Fahrenheit (degrees F)

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The values in Table 1 come from or are derived from EC-174500, Revision 1, “DWO Approach Temperature Limit,” which is in the eRR.

Item 3 Response

Section 3.4.1 of EC-174500, Revision 1, {{

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Item 4 Response

Table 2 describes the important phenomena identified in the DWO phenomena identification and ranking table (PIRT) from ER-109852, Revision 0, “NRELAP5 DWO Applicability.” {{

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Item 5 Response

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Revision 0, is in the eRR.

}}^{2(a),(c),ECI} Engineering report ER-118731,

Item 6 Response

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Engineering calculation ER-118731, Revision 0, EC-152384, Revision 1, and EC-132245, Revision 1, are in the eRR. Engineering calculation EC-174500, Revision 1, will be in the eRR.

Item 7 Response

Table 3 shows the {{ }}^{2(a),(c),ECI}

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Table 4 shows the {{

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Item 8 Response

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The primary conclusions are

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Item 9 Response

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Item 10 Response

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Item 11 Response

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}}^{2(a),(c),ECI} Engineering calculation EC-170122, Revision 0, is in the eRR.

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Item 12 Response

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Item 13 Response

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Item 14 Response

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}}^{2(a),(c),ECI} Calculation EC-164896, Revision 0, “Ledinegg Instability Screening,” describes the method demonstrating that the SG is free of Ledinegg instability for both individual tubes and the bulk SG, and is in the eRR.

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Item 15 Response

Figure 18 is {{

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Item 16 Response

The following text is from {{

}}^{2(a),(c),ECI} of ER-101144, Revision 3, “Pressure and Thermal Transient Definitions for Analysis of NSSS Components,” which is in the Chapter 3 Audit eRR. Some additional detail is added for clarity and completeness.

Description

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Initial Conditions

DWO could potentially occur when the DWO onset approach temperature limit in Figure 5.4-16 is violated. {{

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Number of Cycles

For design purposes, this transient is specified to occur for a total of 2840 days over the 60-year life of the plant. {{

}}^{2(a),(c),ECI} a conservative design DWO operational time of 2840 days to be used in ASME component analyses. The ASME component analyses may use an oscillation period to convert the DWO operational time to a cycle count as needed.

Item 17 Response

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Item 18 Response

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Item 19 Response

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No changes to the SDAA are necessary.