

RCP Auxiliaries Seismic Classification



KEPCO/KHNP

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Agenda

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- NUREG-0852 Approval of SYS80 RCP Auxiliary Systems Seismic Categorization
- Impact of Changes in SRP 3.2.1
- Impact of Changes in RG 1.29
- Conclusions

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Overview

- KEPCO is addressing USNRC RAI 03.02.01-5 requesting clarification and justification of RCP Auxiliary Systems Seismic Categorization
- The USNRC approved the response to a similar RAI for System 80, which maintained that the RCP auxiliaries did not have to meet Category I criteria
- Review of RCP and related auxiliaries design since the System 80 approval, as well as, a review of applicable USNRC regulations indicate no change in the RCP Auxiliary Systems Seismic Categorization is required (i.e., they are not Category I)
- Therefore, revisions to the APR1400 DCD, that will specifically clarify which portions of the RCP and its support systems (auxiliaries) are, or are not, seismic Category I, should be sufficient for the USNRC to approve the current APR1400 Seismic Categorization of the RCP Auxiliary Systems

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RAI on RCP Aux. Systems Seismic Categorization

The USNRC has provided the following RAI 03.02.01-5 (paraphrased):

SRP 3.2.1. implements RG 1.29, which states in Section C.1.g “cooling water and seal water systems ... required for functioning of reactor coolant system components important to safety, such as reactor coolant pumps” should be Seismic Category I. However, note N-3 to Table 3.2-1 of the DCD indicates an exception to RG 1.29: “the continuous operation of the pumps is not required during or following an SSE. The auxiliaries are therefore not necessarily seismic Category I. The provision for cooling water to the pump bearing oil cooler and pump motor air cooler does not conform with the requirements of NRC RG 1.29.” ... In addition, note N-4 states: “Only those structural portions of the RCPs that are necessary to provide reasonable assurance of the integrity of the RCPB are Safety Class 1.”

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RAI on RCP Aux. Systems Seismic Categorization

The USNRC has provided the following RAI 03.02.01-5 (cont.):

These notes should be revised to clarify which portions of the pump and its support systems (auxiliaries) are seismic Category I, [etc.]. A complete justification from exceptions to RG 1.29 and 1.26 is also necessary, with reference to the key functions of the pump ... General statements such as “not necessarily” and “those structural portions ... that are necessary” are not sufficient to support the staff’s finding [per] SRP Sections 3.2.1 and 3.2.2.

The following slides:

1. Describe the USNRC approved System 80 response to a similar RAI and
2. Justify a similar approval for APR1400, because of the limited changes in
 - 1) RCP and associated auxiliaries design and
 - 2) Related licensing regulations since the System 80 approval.

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Design History of APR1400 RCP & Aux. Systems

- The design and related specification documents for the APR1400 RCP and associated auxiliary systems are essentially identical to System 80, except for changes in size of the RCPs and related components/auxiliary systems.
- These documents identify both safety and non-safety functions for the RCPs.
 - The safety function is to maintain the RCPB integrity.
 - The non-safety function provides forced circulation of reactor coolant during various modes of RCP operation. The RCP auxiliary systems of interest (i.e., pump bearing oil cooler and pump motor air cooler) only support the non-safety function and are not required to support the safety function.

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NUREG-0852 Approval of SYS80 RCP Aux. Systems Seismic Categorization

- SYS80 received a similar RAI to the RAI 03.02.01-5 during its design review.
- The SYS80 DCD (and APR1400 DCD) safety analyses justify that forced RCP circulation is not required for plant safety
- The response to the SYS80 RAI included CENPD-201-(A) and SUPP 1, which together justified that failures in RCP auxiliary systems do not adversely impact the RCP safety function (e.g., pump seals provide >30 minute pump operation following component cooling water system failure, allowing sufficient time for mitigating action, etc.)

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NUREG-0852 Approval of SYS80 RCP Aux. Systems Seismic Categorization

- In the USNRC SYS80 Safety Evaluation Report (NUREG-0852) the NRC results of the review of this information concluded: “CESSAR provides adequate information relating to the reactor auxiliaries cooling water system (component cooling water), in order that referencing applicants can comply with the requirements of GDC 2 and 44 and the guidelines of Regulatory Guides 1.26 and 1.29 and BTP AS6 9-2 and is, therefore, acceptable and complete in this regard.”

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Impact of Changes in SRP 3.2.1

- Between the USNRC approval of the System 80 DCD (CESSAR) and the initiation of the APR1400 review, SRP 3.2.1 was revised from Revision 1 to Revision 2
- Revision 2 is a complete rewrite of the SRP including the addition of a section addressing SRP Acceptance Criteria (i.e., a clarification of the more general regulatory requirements)
- However, these clarifications and additions still do not go beyond invoking the GDCs and RGs (e.g., RG 1.29)
- Therefore, by itself, the changes in SRP 3.2.1 Revision 2, do not directly impact any changes in regulatory requirements for RCP auxiliaries

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Impact of Changes in RG 1.29

- Between the USNRC approval of the System 80 DCD (CESSAR) and the initiation of the APR1400 review, RG 1.29 was revised from Revision 3 to Revision 4
- Major additions to Revision 4 included 1) adding fire protection information, 2) updating source term calculations and 3) addressing potential backfit analyses. None of these changes have any impact on RCP system auxiliaries
- Although appearing editorial, a potentially significant impact was made by changing all “should be included in the design” to “must be included in the design.” This change would enhance the seismic requirements for implementing the design of systems important to safety.
- Note, however, that RAI 03.02.01-5 changes “must” back to “should”

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Conclusions

- The USNRC approved the response to a similar RAI for System 80, which maintained that the RCP auxiliaries did not have to meet Category I criteria.
- Review of RCP and related auxiliaries design since the System 80 approval, as well as, a review of applicable USNRC regulations indicate no change in the RCP Auxiliary Systems Seismic Categorization is required (i.e., they are not required to be Category I).
- Therefore, revisions to the APR1400 DCD, that will specifically clarify which portions of the RCP and its support systems (auxiliaries) are, or are not, seismic Category I, should be sufficient for the USNRC to approve the current APR1400 Seismic Categorization of the RCP Auxiliary Systems.

Proposed APR1400 Mark-ups

Table 3.2-1 Classification of Structures, Systems, and Components

Item No. / Principal	Location ⁽²⁾	Safety Class	Quality Group	Codes and Standards	10 CFR 50, App. B ⁽³⁾	Seismic Category	Remarks
d. RCP (RCPB components)	RCB	SC-1	A	ASME Sec. III NB-2007 with 2008 addenda	Yes	I	(N-3, 4)

(N-3) Loss of cooling water and/or seal water service to the reactor coolant pumps (RCPs) may require stopping the pumps. However, the continuous operation of the pumps is not required during or following an SSE. The auxiliaries are therefore not ~~necessarily~~ **required to be** seismic Category I (Ref. CENPD-201(A) and SUPP.1). The provision for cooling water to the pump bearing oil cooler and pump motor air cooler does not conform with the requirements of NRC RG 1.29.

(N-4) Only those structural portions of the RCPs that are necessary to provide reasonable assurance of the integrity of the RCPB are Safety Class 1 (Ref. CENPD-201(A) and SUPP. 1).

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Questions

