

## KHNPDCDRAIsPEm Resource

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**Sent:** Monday, October 17, 2016 11:51 AM  
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**Subject:** APR1400 Design Certification Application RAI 526-8651 [16 - Technical Specifications]  
**Attachments:** APR1400 DC RAI 526 SPSB 8651.pdf

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, KHNP requests, and we grant, 45 days to respond to this RAI. We may adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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## REQUEST FOR ADDITIONAL INFORMATION 526-8651

Issue Date: 10/17/2016  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 16 - Technical Specifications  
Application Section: TS Subsection 3.7.11

### QUESTIONS

#### 16-223

This is a followup to the responses dated 6/14/2016 to RAI Question 16-144, Items 1 and 3, and the response dated 2/19/2016 to RAI Question 16-24.

Paragraph (a)(11) of 10 CFR 52.47 and paragraph (a)(30) of 10 CFR 52.79 state that a design certification (DC) applicant and a combined license (COL) applicant, respectively, are to propose TS prepared in accordance with 10 CFR 50.36 and 50.36a. 10 CFR 50.36 sets forth requirements for technical specifications to be included as part of the operating license for a nuclear power facility. NUREG-1432, "Standard Technical Specifications-Combustion Engineering Plants," Rev. 4, provides NRC guidance on format and content of technical specifications as one acceptable means to meet 10 CFR 50.36 requirements. Staff needs to evaluate all technical differences from standard TS (STS) NUREG-1432, STS Combustion Engineering Plants, Rev. 4, which is referenced by the DC applicant in DCD Tier 2 Section 16.1, and the docketed rationale for each difference because conformance to STS provisions is used in the safety review as the initial point of guidance for evaluating the adequacy of the generic TS to ensure adequate protection of public health and safety, and the completeness and accuracy of the generic TS Bases.

In the 2/19/16 response to RAI Question 16-24, sub-question 9, KHNP proposed many changes to Subsection 3.7.11 which need to be modified. The response to sub-question 9 stated:

The CRHS requires two OPERABLE CREACS divisions and two OPERABLE AHUs to satisfy the design requirements of LCO 3.7.11. LCO 3.7.11 will be revised to clarify the relationship of the AHUs to the OPERABILITY of CRSRS and CRHS by stating that "The CRHS shall be OPERABLE with: a. Two CREACS divisions OPERABLE and b. Two AHUs OPERABLE." The Actions will be revised to separate Condition A into Condition A and Condition B to address Condition A for inoperability of a CREACS division and to address Condition B for inoperability of individual AHUs. Condition A will state that with one CREACS division inoperable for reasons other than Condition C, the CREACS division must be restored to operable status within 7 days. Condition B will state that with three AHUs inoperable, at least one AHU should be restored to operable status within 7 days. KHNP will maintain the current combined LCO 3.7.11 for CREACS and CRSRS since they are closely related and can be more effectively addressed in a single LCO.

Staff noted that DCD Section 9.4.1.2, Control Room HVAC System Description, states in part:

#### Emergency Mode

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Upon receipt of an engineered safety feature actuation signal ... The emergency makeup ACU of the operating division starts automatically ... Upon failure of the designated ACU, the standby AHU and ACU of the redundant division start automatically.

For clarity and consistency with the design of the control room emergency air cleanup system (CREACS) and the control room supply and return system (CRSRS), and in conformance with the STS conventions on the use of notes, staff recommends the following changes to generic TS Subsection 3.7.11:

1. Revise the subsection title by replacing "Control Room HVAC System (CRHS)" with "Control Room Heating, Ventilation, and Air Conditioning (HVAC) System (CRHS)"; this change to the subsection title enables defining the HVAC acronym, as previously requested by the staff in RAI 481-8546, Question 16-144, which KHNP responded to on 6/14/16.
2. Remove the subsection title Note, which was expanded by KHNP's response to RAI 120-7977, Question 16-24, that states: "The CRHS consists of two divisions of control room emergency makeup air cleaning system (CREACS) and control room supply and return system (CRSRS). Each division of CREACS consists of one air cleaning unit (ACU) and each division of CRSRS consists of two air handling units (AHUs)."

The CRHS design clarification intended by the note, can be better achieved by revising the LCO statement, as follows; and explaining in the Bases LCO section that an operable CRSRS division requires just one of the two AHUs:

LCO 3.7.11    ~~Two CRHS divisions shall be OPERABLE~~ Two Control Room Emergency Makeup Air Cleaning System (CREACS) divisions and two Control Room Supply and Return System (CRSRS) divisions of the CRHS shall be OPERABLE.

Since a division of the CREACS cannot perform its control room envelope (CRE) occupant radiation protection function without the support of the associated CRSRS of the same division, staff considers that combining CREACS and CRSRS functions in the same generic TS subsection is an acceptable presentation. Because the CREACS and the CRSRS support different aspects of maintaining control room envelope (CRE) habitability, aspects that are all needed to satisfy GDC 19 requirements, staff considers that separating operability, action, and surveillance requirements for the CREACS and the CRSRS within the subsection is prudent, and is also an acceptable presentation.

By STS convention, the Bases is the preferred location to describe system design details including the equipment, components, and alignments needed to meet the operability requirements of the LCO. For example, the Bases for LCO 3.7.11 clarify that an operable CRSRS division requires just one of the two air handling units (AHUs) in the division to be operable. Neither the revised LCO statement (which is quoted in sub-question 3 below) nor the expanded subsection title Note, both suggested by the applicant, provide this clarification, which the operator must understand to properly apply the action requirements. The applicant is requested to make the above requested change to the original LCO statement and, as noted in sub-question 8 below, the suggested changes to the LCO section of the Bases.

KHNP's responses to RAI 120-7977, Question 16-24 (red and blue colored markup) and RAI 481-8546 Question 16-144 (green and burnt orange colored markup) revised Actions A, B, and C as indicated:

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A. One ~~CRHS-CREACS~~ division inoperable for reasons other than Condition C  
Condition-B. | A.1 Restore ~~CRHS-CREACS~~ division to OPERABLE status. |  
7 days

CB. One or two CREACS divisions inoperable due to inoperable CRE boundary  
in MODE 1, 2, 3, or 4. | CB.1 Initiate action to implement mitigating actions. |  
Immediately AND CB.2 Verify mitigating actions to ensure CRE occupant  
exposures to radiological, ~~chemical,~~ [, toxic gas,] and smoke hazards will not  
exceed limits. | 24 hours AND CB.3 Restore CRE boundary to OPERABLE  
status. | 90 ~~92~~ days

DC. Required Action and associated Completion Time of Condition ~~A or B~~ A, B,  
or C not met in MODE 1, 2, 3 or 4. | DC.1 Be in MODE 3. | 6 hours AND DC.2 Be  
in MODE 5. | 36 hours

These indicated changes are acceptable.

3. In Attachment 6 to the response to RAI 120-7977, Question 16-24, the applicant proposed the following new Action B as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes:

B. One CRSRS division ~~Three AHUs inoperable.~~ | B.1 Restore one inoperable  
AHU-CRSRS division to OPERABLE status. | 7 days

Staff recommends the above phrasing for proposed new Condition B in place of the applicant's proposed phrasing of "Three AHUs inoperable" because the staff's above recommended change to the LCO statement—"Two Control Room Emergency Makeup Air Cleaning System (CREACS) divisions and two Control Room Supply and Return System (CRSRS) divisions of the CRHS shall be OPERABLE."—does not use or define the term "AHU"; also, the applicant's proposed LCO statement only requires two AHUs to be operable without explicitly stipulating that they be in separate divisions.

In contrast, in the response KHNP had proposed to revise the LCO statement, as indicated below:

LCO 3.7.11 ~~Two CRHS divisions shall be OPERABLE. The CRHS shall be~~  
OPERABLE with:

a. Two CREACS divisions OPERABLE, and

b. Two AHUs OPERABLE.

The statement of Condition B should only address required AHUs (one operable AHU in each division), not all four AHUs, unless the applicant intends that the LCO require both AHUs in both divisions to be operable, which it does not. The Bases should explain that an operable CRSRS division requires just one AHU. Therefore, it is acceptable to state Condition B as "One CRSRS division inoperable" without explicitly referring to just one cause for the inoperability, namely an inoperable required AHU.

Staff noted an inaccuracy in the response to RAI 120-7977, Question 16-24. Because of the interlock feature to automatically start the standby AHU and ACU in the opposite CRHS division upon failure of the running AHU or ACU, when the CRHS is in the emergency mode

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of operation, and because each CRSRS division's two AHUs are supported by the same essential chilled water division, each AHU is completely independent only from the two AHUs in the opposite division, but is not completely independent from the other AHU in the same division, as asserted by KHNP in the response to RAI 120-7977, Question 16-24.

4. In the response to RAI 120-7977, Question 16-24, the applicant proposed the following changes to original Action D (renumbered here as Action E) as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes:

ED. Required Action and associated Completion Time of Condition A or B ~~A~~-not met [in MODES 5 or ~~and~~ 6, or] during movement of irradiated fuel assemblies. | ED.1 [NOTE—Place CRHS in toxic gas isolation mode if automatic transfer to toxic gas isolation mode is inoperable.] Place CREACS and CRSRS of an OPERABLE CRHS division in emergency mode. | Immediately OR ED.2 Suspend movement of irradiated fuel assemblies. | Immediately

These changes reflect the design of a CRHS division, which consists of the portions of the CREACS and CRSRS in the same ventilation division that are supported by the same train of Class 1E electrical power. The Note to Required Action E.1 must be positioned inline, and accounts for the possibility that a COL applicant will need to address CRE occupant protection from toxic gas. By placing this contingency action in a required action Note, the operator will have to immediately initiate action to place the CRHS in isolation mode upon discovery that automatic transfer to toxic gas isolation mode is inoperable at any time subsequent to entering Condition E. Placing brackets around the Note and its Bases, and all other references to toxic gas in Subsection 3.7.11 and B 3.7.11, designates this provision as a COL action item, which according to the applicant's response to sub-question 12 of RAI 120-7977, Question 16-24, "to provide flexibility to the COL Applicant to delete them if the COL Applicant concludes that these features of the CRHS are not needed based on the toxic gas analysis results." The response also stated, "A reviewer's note will also be added to the Bases for 3.7.11 that states the need for toxic gas isolation mode will be determined by the COL applicant." Designating information and provisions involving toxic gas as a COL action item is acceptable. The applicant is reminded to include this COL action item in its pending response to RAI 154-8064, Question 16-44 (27307).

- a. The applicant is requested to indicate the flow path location of the toxic gas detectors in the CRHS system diagram in DCD Tier 1 Figure 2.7.3.1-1, and in DCD Tier 2 Figure 9.4.1-1. The applicant is also requested to include, in DCD Tier 2 Section 9.4.1, a discussion of CRHS automatic switchover—from both normal and emergency modes—to the CRHS isolation mode of operation on detection of toxic gas.
- b. The applicant is requested to state whether all CRHS toxic gas mitigation features, such as toxic gas detectors and the capability to automatically place both divisions of the CRHS in the isolation mode of operation, must be operable to consider the CRHS to be operable to meet LCO 3.7.11.
- c. The applicant is requested to state whether all CRHS smoke mitigation features, such as smoke detectors, automatic smoke isolation dampers, and the capability to manually place both divisions of the CRHS in the isolation mode of operation, must be operable to consider the CRHS to be operable to meet LCO 3.7.11.
- d. The applicant is requested to include toxic gas detectors in DCD Tier 1 Table 2.7.3.1-2.

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- e. The applicant is requested to state whether the interlock feature—to automatically start the standby AHU and ACU in the opposite CRHS division upon failure of the running AHU or ACU, when the CRHS is in the emergency or isolation mode of operation—must be operable for both CRHS divisions to be considered operable. Also state whether this feature is tested by SR 3.7.11.3 (“Verify active CREACS and CRSRS components in each CRHS division ~~actuates~~ actuate on an actual or simulated actuation signal. | 18 months”). See Subquestion 7 below.
5. In the response to RAI 120-7977, Question 16-24, the applicant proposed the following changes to original Action E (renumbered here as Action F) as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes:

~~FE~~. Two ~~CRHS~~ CREACS divisions inoperable [in ~~Mode~~ MODE 5 or 6, or] during movement of irradiated fuel assemblies. OR One or two CREACS divisions inoperable due to inoperable CRE boundary [in ~~Mode~~ MODE 5 or 6, or] during movement of irradiated fuel assemblies. | ~~FE~~.1 Suspend movement of irradiated fuel assemblies. | Immediately

- a. Staff understands that the operability of the ACU of a CREACS division requires an operable AHU in the same CRSRS division. Therefore, referring to CREACS in the first condition statement is equivalent to referring to the CRHS. The applicant is requested to make the indicated changes.
- b. The third paragraph of the LCO section of the Bases, which matches the content of the corresponding paragraph in STS Bases Subsection B 3.7.11 of NUREG-1432, needs clarification. Unlike the CREACS design assumed by the STS, an ACU includes two fans in parallel that supply two AHUs in parallel, each equipped with a control room air supply fan. An operable CREACS division requires being capable of automatic and manual actuation, from normal to emergency, from normal to isolation, and from emergency to isolation modes of operation, and being capable of automatic and manual actuation upon failure of the opposite CREACS division. Placing a CRHS division in the emergency mode of operation requires:
- An operable ACU with an ACU fan running;
  - An operable AHU with an AHU fan running;
  - An operable recirculation air damper to the ACU inlet open;
  - An operable emergency makeup air damper to the ACU inlet open;
  - An operable isolation damper in each of the two normal makeup air flow paths to the AHU inlet closed;
  - An operable ACU outlet air flow control damper and an operable AHU outlet air flow control damper both open and ensuring correct flow through the ACU; and
  - Two operable smoke removal fan isolation dampers closed.
  - Four operable outside air supply isolation dampers capable of being closed.



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In addition to the above, with the exception of an open emergency makeup air damper to the ACU inlet, placing the CRHS in the isolation mode of operation requires:

- Two operable emergency makeup air dampers to the ACU inlet, and two operable kitchen & toilet exhaust fan isolation dampers closed. These dampers must be capable of automatically closing on a control room ventilation isolation signal upon detection of smoke [or toxic gas].
- Four operable outside air supply isolation dampers closed.

Unless an ESFAS main control room air intake radiation high signal has initiated CREACS in the emergency mode of operation, upon a CRE isolation signal the recirculation flow path through the ACU remains isolated and the ACU fan remains off, while an AHU fan recirculates control room air. That is, the recirculation air damper to the ACU inlet remains closed.

The applicant is requested to revise the third paragraph of the LCO section of the Bases for Specification 3.7.11 to account for the above requirements regarding an operable CREACS division. See sub-questions 8 and 9 below for suggested clarifications of the first two paragraphs of the LCO section.

- c. The bracketed phrase in the first and second condition statements “[in MODE 5 or 6, or]” in Action F (as renumbered) must be adopted by a COL applicant if CREACS is determined to be necessary to protect against a radioactive gaseous release resulting from a failure of the Gaseous Radwaste System. However, the associated required action does not include remedial measures to address this hazard, such as “AND [F.2 Suspend operations with a potential for releasing radioactivity from the Gaseous Radwaste System. | Immediately]”.

The applicant is requested to consider including such a bracketed required action in Action F, including an appropriate bracketed Bases discussion.

6. For consistency with the staff's proposed changes to the LCO statement and the Actions table Conditions, the applicant is requested to revise Action F (renumbered as Action G) as indicated for applicant proposed changes with blue or red colored markup (response Attachment 6); and staff suggested additional changes with green or burnt orange colored markup:

~~FG~~. Two ~~CRHS~~-CREACS divisions inoperable in MODE 1, 2, 3, or 4 for reasons other than ~~Condition B~~-Condition C. OR Two CRSRS divisions inoperable in MODE 1, 2, 3, or 4. | ~~FG~~.1 Enter LCO 3.0.3. | Immediately

These suggested changes clarify that inability of both CRSRS divisions to provide adequate heating, cooling, or humidity control of air in the main control room would also warrant placing the unit in Mode 5 within 37 hours, per LCO 3.0.3. The applicant is requested to change Action G as indicated, and also to make conforming changes to the Bases for Required Action G.1, as suggested in sub-question 13 below.

7. For consistency with the staff's above proposed changes to the LCO statement and the Actions table Conditions, the applicant is requested to revise SR 3.7.11.3 as indicated:



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Verify active CREACS and CRSRS components in each CRHS division ~~actuates~~ actuate on an actual or simulated actuation signal. | 18 months

Due to unique APR1400 design features for the CRHS, the suggested change is intended to ensure all applicable ESF actuations and fan-damper interlocks used for the automatic response of active CREACS and CRSRS components, such as fans and dampers, and the AHU cooling coil essential chilled water three-way flow control valve, are tested.

8. In Attachment 6 of the response to RAI 120-7977, Question 16-24, the applicant proposed the following changes to the original first paragraph of the LCO section of the Bases for Subsection 3.7.11 as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes. Note that words added by the applicant but proposed for removal by the staff are indicated by burnt orange lined out and underlined font attributes. The applicant is requested to revise this paragraph of the LCO section of the Bases for Subsection 3.7.11, for clarity as indicated:

Two independent and redundant ~~CREACS divisions and any two of the four independent and redundant AHUs divisions of the CRHS divisions of the CRHS~~ are required to be OPERABLE to ensure that ~~at least one one division is one CREACS division and one AHU are is~~ available during an event requiring the CRHS, if a single failure disables the other ~~division CREACS division or AHU division~~. An OPERABLE CRHS division requires the emergency makeup air cleaning unit (ACU) in the associated CREACS division and one of two air handling units (AHUs) in the associated CRSRS division to be OPERABLE. The ACU emergency makeup air and return air isolation dampers, and the ACU fan and discharge airflow control damper, which are associated with the required AHU flow path, are also required to be OPERABLE for OPERABILITY of a CRHS division.

Total ~~system-CRHS~~ failure, such as from a loss of both CRSRS ventilation divisions, or both CREACS divisions, or one CRSRS division and the CREACS in the opposite division, or from an inoperable CRE boundary, could result in exceeding a dose of 50 mSv to the control room operators in the event of an accident with a large radioactive release ~~and in the equipment operating temperature exceeding limits in the event of an accident~~.

Total CRSRS failure, such as from the loss of all AHUs, could result in exceeding the equipment operating temperature ~~exceeding~~ limits of equipment in the CRE, not just in the event of an accident when the CRSRS may be needed to operate in the recirculation or emergency mode, but also during normal operation.

9. In Attachment 6 of the response to RAI 120-7977, Question 16-24, the applicant proposed the following changes to the original second paragraph of the LCO section of Bases for Subsection 3.7.11, for clarity, as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes. The applicant is requested to revise this paragraph of the LCO section of the Bases for Subsection 3.7.11, as indicated:

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~~The A~~ CRSRS division is considered OPERABLE when the necessary individual components associated with one AHU of the two AHUs that is are OPERABLE. The necessary components are those needed to maintain MCR CRE temperatures and relative humidity within limits is OPERABLE in both divisions to meet equipment OPERABILITY requirements. These components include the AHU cooling coils and associated essential chilled water system three-way flow control valve, heating coils, and associated temperature control instrumentation; ~~and~~ the AHU supply fan, AHU inlet isolation dampers, ~~and the AHU discharge airflow control damper, and the humidifier in the AHU discharge duct.~~ In addition, the CRSRS division must be OPERABLE to the extent that the minimum necessary air circulation in the CRE can be maintained.

10. In response to RAI 120-7977 Question 16-24, in Attachment 6, the applicant proposed changes (shown in ~~red~~ strike out and blue underlined font attributes) to the Bases for Action A.1 of Subsection 3.7.11, which the applicant proposed to split into Action A.1 for CREACS and Action B.1 for CRSRS. The staff suggests additional edits (shown in ~~burnt orange~~ strike out and green underlined font attributes), as follows. Note that words added by the applicant but proposed for removal by the staff are indicated by ~~burnt orange~~ lined out and underlined font attributes. Action B for an inoperable CRE boundary is renumbered as Action C:

### A.1

With one ~~CRHS CREACS~~ division inoperable for other than an inoperable CRE boundary, action must be taken to restore the division to OPERABLE status within 7 days. In this condition, the remaining OPERABLE ~~CRHS CREACS~~ division is adequate to perform the CRE ~~occupants occupant~~ protection function. However, the overall reliability is reduced because a single failure in the OPERABLE division could result in loss of the ~~CRHS CREACS~~ function. The 7-day Completion Time is based on the low probability of a DBA ~~occurring occurring occurring~~ during this time period, and ~~the the~~ ability of the remaining division to provide the required ~~capabilities capability capabilities~~.

### B.1

With ~~one CRHS division three AHUs one CRSRS division~~ inoperable, ~~for reasons other than an inoperable CRE boundary~~, action must be taken to restore the division to OPERABLE status within 7 days. In this condition, the remaining ~~OPERABLE CRHS division OPERABLE CRSRS division~~ is adequate to maintain the control room temperature and relative humidity within limits ~~and to perform the CRE occupants protection function and to perform the CRE occupant protection function~~. However, the overall reliability is reduced because a single failure ~~in the OPERABLE division of the OPERABLE AHU in the OPERABLE CRSRS division~~ could result in ~~less the CRHS~~ loss of the CRSRS function. The 7-day Completion Time is based on the low probability of a DBA occurring during this time period and the ability of the remaining ~~division AHU of the OPERABLE CRSRS division~~ to provide the required ~~capabilities capability capabilities~~.

BC.1, BC.2, and BC.3

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11. In response to RAI 120-7977 Question 16-24, in Attachment 6, the applicant proposed changes (shown in ~~red~~ strike out and blue underlined font attributes) to the first paragraph of the Bases for Actions C.1 and C.2 of Subsection 3.7.11, which the applicant proposed to renumber as Actions D.1 and D.2. The staff suggests additional edits (shown in ~~burnt orange~~ strike out and green underlined font attributes), as follows:

### ~~CD.1~~ and ~~CD.2~~

In MODE 1, 2, 3, or 4, if the inoperable ~~CRHS~~CREACS or CRSRS ~~division~~ or the CRE boundary cannot be ~~restore~~restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes the accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and MODE 5 within 36 hours.

12. In response to RAI 120-7977 Question 16-24, in Attachment 7, the applicant proposed changes (shown in ~~red~~ strike out and blue underlined font attributes) to the first paragraph of the Bases for Action E.1 of Subsection 3.7.11, which the applicant proposed to renumber as Action F.1. The staff suggests additional edits (shown in ~~burnt orange~~ strike out and green underlined font attributes), as follows:

### ~~EF.1~~

~~In MODE 5, 6, or [In MODES 5 and 6, or]~~ In MODE 5 or 6, or] during movement of irradiated fuel assemblies with two ~~CRHS~~CREACS ~~divisions inoperable or two CRSRS~~ divisions inoperable, or with one or two CREACS divisions inoperable due to an inoperable CRE boundary, action must be taken immediately to suspend activities that could result in a release of radioactivity that may require isolation of CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

As suggested in Subquestion 5.c above, if CREACS is determined to be necessary to protect against a radioactive gaseous release resulting from a failure of the Gaseous Radwaste System, it may be appropriate to specify a required action to address this hazard, such as “AND [F.2 Suspend operations with a potential for releasing radioactivity from the Gaseous Radwaste System. | Immediately]”.

If the applicant includes such a bracketed required action in (as renumbered) Action E and Action F, an appropriate bracketed Bases discussion should also be included in the Bases for Actions E and F.

The applicant is also requested to consider stating in the Bases for Action E.1 and F.1 that placing the remaining OPERABLE CRHS division in emergency or isolation mode of operation also involves verification that in the opposite inoperable division all isolation dampers are closed, and the ACU and AHUs are not in standby for automatic initiation.

13. In response to RAI 120-7977 Question 16-24, in Attachment 6, the applicant proposed changes (shown in ~~red~~ strike out and blue underlined font attributes) to the Bases for Action F.1 of Subsection 3.7.11, which the applicant proposed to renumber as Action G.1. The staff suggests additional edits (shown in ~~burnt orange~~ strike out and green underlined font attributes), as follows:

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### EG.1

If both ~~CRHS~~-CREACS divisions are inoperable in MODE 1, 2, 3, or 4 for ~~reason~~-reasons other than an inoperable CRE boundary (i.e., Condition BC) or both CRSRS divisions are inoperable in MODE 1, 2, 3, or 4, the CRHS may not be capable of performing the intended ~~function~~-functions and the unit is in a condition outside the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

14. In the Surveillance Requirements section of Bases, the applicant is requested to revise the discussion of SR 3.7.11.3, in part, as indicated:

This SR verifies each respective component in the ~~CRHS~~-CREACS division and CRSRS division starts and operates on an actual or simulated actuation signal ...

15. In response to RAI 120-7977 Question 16-24, in Attachment 7, the applicant proposed changes (shown in ~~red~~ strike out and blue underlined font attributes) to the Bases for Actions D.1 and D.2 of Subsection 3.7.11, which the applicant proposed to renumber as Actions E.1 and E.2. The staff suggests additional edits (shown in ~~burnt orange~~ strike out and green underlined font attributes), as follows:

### DE.1 and DE.2

Required Action ~~DE~~.1 is ~~operated~~-performed manually.

~~MODE 5, 6, or [In MODES 5 and 6, or]~~ [In MODE 5 or 6, or during] [During] ~~during~~ movement of irradiated fuel assemblies, if Required Action A.1 or B.1 cannot be completed within the required Completion Time, the CREACS and CRSRS of the OPERABLE CRHS division must be immediately placed in the emergency MODE of operation. This action ensures that the remaining division is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure will be readily detected.

An alternative to Required Action ~~DE~~.1 is Required Action[s] E.2[.1 and E.2.2] to immediately suspend activities that could result in a release of radioactivity that may require isolation of the control room. This places the unit in a condition that minimizes the accident risk.

This does not preclude the movement of fuel assemblies to a safe position.

As suggested in Subquestion 5.c above, if CREACS is determined to be necessary to protect against a radioactive gaseous release resulting from a failure of the Gaseous Radwaste System, it may be appropriate to specify a required action to address this hazard, such as “AND [E.2.2 Suspend operations with a potential for releasing radioactivity from the Gaseous Radwaste System. | Immediately]”.

If the applicant includes such a bracketed required action in (as renumbered) Action E and Action F, an appropriate bracketed Bases discussion, as indicated above, should also be included in the Bases for Actions E and F.

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The applicant is also requested to consider stating in the Bases for Actions E.1 and F.1 that placing the remaining OPERABLE CRHS division in emergency or recirculation mode of operation also involves verification that in the opposite inoperable division all isolation dampers are closed, and the ACU and AHUs are not in standby for automatic initiation.

16. In Attachment 7 of the response to RAI 120-7977, Question 16-24, the applicant proposed the following changes to the Applicability section of the Bases for Subsection 3.7.11, as indicated by blue or red colored markup; markup colored green or burnt orange are staff recommended additional changes. The applicant is requested to revise the Applicability section of the Bases for Subsection 3.7.11, for clarity as indicated:

In MODES 1, 2, 3, 4, ~~5, and 6~~ [5, and 6] and during movement of irradiated fuel assemblies, the CRHS must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA and ~~ensure that~~ the control room temperature will not exceed equipment operational requirements following isolation of the control room.

[In MODES ~~5 and 6~~ 5 and 6, the CRHS is also required to cope with a failure of the Gaseous Radwaste System.]

During movement of irradiated fuel assemblies, the CRHS must be OPERABLE to cope with the radioactivity release from a fuel handling accident.

17. The applicant is requested to clarify the following aspects of CRHS design:

- a. The applicant is requested to explain whether the following active components of an operable CRHS division must be powered by the same Class 1E electrical power division and train (Div. I, Train A or C) or (Div. II, Train B or D):
  - i. The CREACS division required ACU, required ACU fan, ACU makeup air inlet isolation damper, ACU recirculation inlet isolation damper, and ACU fan discharge air flow control damper;
  - ii. The CRSRS division required AHU, AHU fan, AHU outside air inlet isolation damper pair, and AHU fan discharge air flow control damper; and
  - iii. The CRSRS kitchen isolation damper pair and the smoke removal fan isolation damper pair.
  - iv. The two pairs of CRHS outside air dampers, one pair of which closes on a CREVAS main control room air intake high radiation signal.
    - A. The applicant is requested to state whether the instrumentation control logic to isolate the damper pair, which corresponds to the higher radiation signal, is required for operability of CREACS. Where is this logic implemented?
    - B. According to DCD Tier 2 Figure 7.3-11, ESFAS Functional Logic (CREVAS), just one of the four main control room air intake radiation monitors needs to reach its trip setpoint to initiate placing the CRHS division with the operating AHU in the emergency mode of operation, and the other CRHS division in standby. Explain

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how the CRSRS division with the operating AHU determines which CREACS train initiates ACU filtering of makeup air and MCR recirculated air.

- b. The applicant is requested to list the four ACU fans in DCD Tier 1 Table 2.7.3.1-1, and state the Class 1E electrical power source and distribution that powers each fan.
- c. The applicant is requested to describe how the ACU fan air flow control damper and the AHU fan air flow control damper maintain air flow within design limits during normal, emergency, and isolation modes of operation of the CRHS.
- d. The applicant is requested to state whether operability of the four CRHS tornado dampers is required for CRHS operability.