KHNPDCDRAIsPEm Resource

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Subject:	APR1400 Design Certification Application RAI 498-8595 (16 - Technical Specifications)
Attachments:	APR1400 DC RAI 498 SPSB 8595.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, the following RAI question response times. We may adjust the schedule accordingly.

16-153: 45 days
16-154: 60 days

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

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 498-8595

Issue Date: 06/30/2016
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: 16.3.3, 16.3.7.5, 16.3.7.6

QUESTIONS

16-153

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.

Acronyms:
AFAS – auxiliary feedwater actuation signal
CIAS – containment isolation actuation signal
CSAS – containment spray actuation signal
ESFAS – engineered safety features actuation system
MSIS – main steam isolation signal
SIAS – safety injection actuation signal

The applicant is requested to clarify its responses to Question No. 16-111 (RAI 295-8263/28036) Sub-question Nos. 8, 10, and 11.

1. (Follow up to Sub-question 8) Although the Bases of Subsection 3.3.5 say that a channel of ESFAS Function 1.b, SIAS on Pressurizer Pressure – Low; and Function 3.b, CIAS on Pressurizer Pressure – Low, is inoperable if the associated automatic bypass removal function channel is "in effect" and "inoperable," staff does not find the Required Action C.1 "Disable bypass channel" to be a sufficiently clear prescription for making the associated ESFAS Function channel Operable. The NRC staff understands the relationship between the Operability of ESFAS instrument Functions 1.b and 3.b and the associated operating bypass and automatic operating bypass removal Function, as follows (bold font is for emphasis):

An Operating Bypass and the **Automatic Operating Bypass Removal Function** channel, **associated with an SIAS/CIAS on Pressurizer Pressure – Low Function** trip channel

- May be *manually* placed "**in effect**" when **pressurizer pressure** is < 400 psia.

- Is Operable if the **bypass** of the **(associated SIAS/CIAS on Pressurizer Pressure – Low Function)** trip channel is
  - In effect, and
  - **Capable of being automatically removed** when pressurizer pressure increases > 500 psia.

- Is inoperable if the **bypass** of the **(associated SIAS/CIAS on Pressurizer Pressure – Low Function)** trip channel is
  - In effect, but
  - **Not capable** of being **automatically** removed when pressurizer pressure increases > 500 psia.

    - This means that the ESFAS Function trip channel remains bypassed as RCS pressure ascends to normal operating pressure.

    - What is unclear is whether *manually removing the bypass* –after pressure is > 500 psia– restores the ESFAS Function trip channel to Operable status; is this what disable bypass channel(s) means? If the trip channel is **not** in bypass (bypass and its automatic removal function "not in effect"), then the automatic removal of the bypass is not necessary, and the trip channel is considered Operable.

    - Also unclear is whether the **automatic increase in the setpoint** of the (**SIAS/CIAS Pressurizer Pressure – Low Function**) trip channel is necessary for the trip channel to be Operable, as long as the setpoint can be **manually** increased.

Staff draft conclusion: Therefore, an **SIAS/CIAS on Pressurizer Pressure – Low Function** trip channel is inoperable when it is in bypass; it continues to be inoperable if it cannot be automatically removed from bypass above the 500 psia setpoint. However, once the bypass has been manually removed, the trip channel is considered Operable. The preceding description and conclusion also apply to generic TS Subsection 3.3.1, Function 4, Reactor Trip on Pressurizer Pressure – Low, and Required Action C.1.

a. The applicant is requested to confirm the accuracy of the above conclusion, or provide appropriate corrections.

b. Based on the above description and conclusion, the applicant is requested to confirm the accuracy of the following markup of the applicant's response to Sub-question 8 and that it is consistent with the response's intended meaning, or provide appropriate corrections. The appplicant is rquested to provide a revised response with appropriate corrections consistent with this markup.

> Required Action C.1, which states "Disable bypass channel," means that if the inoperable **automatic operating** bypass removal function for ~~any bypass~~ **the associated SIAS/CIAS on Pressurizer Pressure – Low Function trip** channel cannot be restored to ~~an~~ OPERABLE status within 1 hour (except for the case that the **operating** bypass is not in effect), the associated **SIAS/CIAS on Pressurizer Pressure – Low Function** trip channel must be declared inoperable ~~as stated in~~ **and** Condition A **must be entered**.
>
> Required Action D.1, which states "Disable bypass channels" means that if the inoperable **automatic operating** bypass removal function for two **associated** ~~bypass~~ **SIAS/CIAS on Pressurizer Pressure – Low Function trip** channels cannot be restored to OPERABLE status within 1 hour (except for the case that ~~**the**~~ **each operating** bypass is not in effect), the **two** associated **SIAS/CIAS on Pressurizer Pressure – Low Function** trip channels must be declared inoperable ~~as stated in~~ **and** Condition B **must be entered**.

c. Based on the above understanding, NRC staff suggests changes as indicated in the following markup of the Bases for generic TS Subsection 3.3.5, Required Actions C.1, C.2.1, and C.2.2, to clarify its meaning, consistent with the intended meaning of the applicant's response to Sub-question 8. Note that the response's insertion of "automatic" before "operating bypass" in two locations in the first sentence of second paragraph do not belong and are marked as deleted.

> Condition C applies to ~~one~~ **an inoperable** automatic operating bypass removal function ~~inoperable~~**of any operating bypass channel**. The only automatic operating bypass removal **function** on an ESFAS **Function** is on the Pressurizer Pressure – Low signal**, which is used to actuate SIAS and CIAS**. This **automatic operating** bypass removal **function** is shared with the RPS **Reactor Trip on** Pressurizer Pressure – Low **automatic operating** bypass removal **function**.
>
> If the **automatic operating** bypass removal function ~~for~~ **of** any ~~**automatic**~~ operating bypass **channel** cannot be restored to OPERABLE **status**, the associated ESFAS **Pressurizer Pressure – Low Function trip** channel may be considered OPERABLE only if the ~~**automatic**~~ operating bypass is not in effect **(disabled)**. Otherwise the affected ESFAS **Pressurizer Pressure – Low Function trip** channel must be declared inoperable, ~~as in~~ **and** Condition A **must be entered.**~~, and~~ **Action C requires within 1 hour either removing (disabling)** the **operating** bypass ~~either removed~~, or **placing the**

affected automatic trip channel in bypass or trip; it also requires ~~and~~ **repairing** the **automatic** operating bypass removal channel **before entering MODE 2 following the next MODE 5 entry** ~~repaired~~. The Bases for the Required Actions and ~~required~~ **associated** Completion Times **of Condition C** are consistent with Condition A.

The applicant is requested to confirm the accuracy of the above markup, or provide appropriate corrections. The applicant is then requested to revise these two paragraphs as indicated, with any needed corrections.

2. (Follow up to Sub-question 10) In Sub-question 10, NRC staff stated that the Applicability column in Table 3.3.5-1 should state the applicable Modes for each ESFAS instrument Function (trip signal from each bistable processor), and not for the ESFAS signal from coincidence logic, and processed through initiation logic and actuation logic, which are covered by LCO 3.3.6. The applicant's response said:

   Since the scheme to state the Applicability is consistent with that applied in NUREG-1432, Rev. 4, and is also the same as Table 3.3.1-1 in the generic TS and with NUREG-1432, Rev. 4, the current description to state the applicability will be maintained.

   The response is incorrect. The STS does not specify the ESFAS instrument Function applicabilities as proposed in generic TS Table 3.3.5-1. The Applicant is requested to match the STS presentation by listing the "Applicable Modes or Other Specified Conditions" of each ESFAS instrument Function; do not list in Table 3.3.5-1 the "Applicable Modes or Other Specified Conditions" of the ESF actuation Function, to which each channel of each instrument Function provides a bistable trip signal to the ESFAS Coincidence Logic.

3. (Follow up to Sub-question 11) In Sub-question 11, NRC staff asked the applicant to justify not including Mode 4 in the Applicability of generic TS Table 3.3.5-1 Functions 3a, Containment Isolation Actuation Signal (CIAS) on Containment Pressure – High and 3b, CIAS on Pressurizer Pressure – Low. The applicant's response said:

   Applicable Modes for ESFAS functions such as SIAS, CSAS, and MSIS in generic TS Table 3.3.5-1 are extended from Modes 1, 2, and 3 to Modes 1, 2, 3, and 4 in order to enhance the safety of nuclear power plants. This approach is more conservative than NUREG-1432, Rev. 4; however, it is not necessary to add Mode 4 to CIAS based on operating experience from the Korean operating fleet. Therefore, no revision pertaining to Applicable Modes is necessary.

   As stated in Sub-question 2 above, Table 3.3.5-1 should list the Applicability of each instrument Function, not the Applicability of the ESF Actuation Function, specifically CIAS, which is addressed in Specification 3.3.6.

   a. Explain how the Operability requirements for the bistable trip signals from the ESFAS instrument Functions of Containment Pressure – High and Pressurizer Pressure – Low are different in Mode 4 for SIAS than in Mode 3 for CIAS. That

is, what hardware and software associated with these ESFAS instrument Functions are not required to be Operable in Mode 4?

b. Explain how the Operability requirements for the bistable trip signals from the ESFAS instrument Function of Containment Pressure – High are different in Mode 4 for SIAS and MSIS than in Mode 3 for CIAS. That is, what hardware and software associated with this ESFAS instrument Function are not required to be Operable in Mode 4?

c. Regarding generic TS Table 3.3.6-1, explain why the Applicability of CIAS Actuation Logic and Manual Trip includes Mode 4, when the supporting ESFAS instrument Functions of Containment Pressure – High and Pressurizer Pressure – Low are only required in Modes 1, 2, and 3?

d. Regarding generic TS Table 3.3.6-1, explain why the Applicability of AFAS (-1 and -2) Actuation Logic and Manual Trip includes Mode 4, when the supporting ESFAS instrument Function of Steam Generator Level (1 and 2) – Low is only required in Modes 1, 2, and 3?

e. Regarding generic TS Table 3.3.6-1, explain why the Applicability of CIAS Initiation Logic is Modes 1, 2, and 3, but in STS Table 3.3.6-1, the Applicability of CIAS Initiation Logic is Modes 1, 2, 3, and 4.

f. Regarding generic TS Table 3.3.6-1, explain why the Applicability of SIAS, CSAS, and MSIS Coincidence Logic is Modes 1, 2, 3, and 4, but in STS Table 3.3.6-1, the Applicability of SIAS, CSAS, and MSIS Matrix Logic is Modes 1, 2, and 3.

g. The applicant's response says that increasing Operability requirements to include Mode 4 for ESFAS instrument Functions of
   - Containment Pressure – High ..... to support SIAS and MSIS
   - Pressurizer Pressure – Low ..... to support SIAS
   - Containment Pressure – High High ..... to support CSAS
   - Steam Generator Pressure – Low..... to support MSIS
   - Steam Generator Level – High..... to support MSIS

   is done "in order to enhance the safety of nuclear power plants. This approach is more conservative than NUREG-1432, Rev. 4."

   While this requirement is more restrictive on unit operation—in that (1) applicable surveillance requirements must be met before entry into Mode 4 instead of before entry into Mode 3, and (2) default actions require placing the unit in Mode 5 instead of just Mode 4—the response does not say why automatic actuation of safety injection, containment spray, and main steam isolation is needed when cold leg temperature is between 350 degrees F and 200 degrees F. Neither does "operating experience from the Korean operating fleet" explain why automatic containment isolation is not needed in Mode 4.

h. Generic TS 3.5.3, SIS – Shutdown requires two SIS trains to be Operable in Mode 5 and in Mode 6 with refueling water level below that required by LCO 3.9.6 (See Question 16-149, Sub-questions H and J; RAI 481-8546/29183.) The

applicant is requested to explain why the automatic ESF Actuation Functions of (1) SIAS on Containment Pressure – High, and (2) SIAS on Pressurizer Pressure – Low are apparently not needed for Operability of the two SIS trains required by LCO 3.5.3 in Mode 5, and in Mode 6 with refueling water level below that required by LCO 3.9.6.

16-154

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 response to Question 16-131 (444-8530/29114) KHNP made many changes to Subsections 3.7.5 and 3.7.6 which need to be modified:

1. In Specification 3.7.5, the phrase "AFW trains" is proposed to be replaced with "AFW flow paths." Staff finds this confusing, and recommends not using "flow paths" as a synonym for "trains." Staff also recommends not using "AFW division inoperable" by itself to mean "one AFW division with both trains inoperable." With changes denoted by markup of generic TS 3.7.5 Rev. 0 (not a markup of TS 3.7.5 as revised in the Question 16-131 response), staff recommends:

   a) Revising LCO 3.7.5:

      Two ~~Four independent~~ auxiliary feedwater (AFW) ~~trains~~ divisions, each with one motor driven train and one turbine driven train, shall be OPERABLE.

      And LCO 3.7.5 Note:

      Only ~~one AFW train, which includes a~~ the motor driven ~~pump,~~ train of one AFW division is required to be OPERABLE in MODE 4.

      The recommended changes improve the LCO statement and the modifying Note by highlighting the distinguishing design details of the APR1400 AFW system, which by use of consistent phrasing enables stating the action requirements unambiguously.

   b) Revising generic TS 3.7.5 Action A:

A. One ~~turbine driven~~ AFW division with one train inoperable ~~due to associated inoperable steam supply~~ in MODE 1, 2, or 3. ~~OR NOTE—Only applicable if MODE 2 has not been entered fllowing refueling.— One turbine driven AFW pump inoperable in Mode 3 following refueling.~~ | A.1 Restore ~~affected equipment~~ train to OPERABLE status. | 7 days

Staff expects that the justification in the Action A.1 Bases for the 7 day completion time will address why 7 days is an acceptable period to be vulnerable to a main steam line break (MSLB) or feed line break (FLB) in the unaffected AFW division's steam generator, assuming no additional single failures. In such a scenario, core heat removal would need to rely on the remaining train in the affected AFW division using the unfaulted steam generator, assuming one AFW train (turbine or motor driven) is capable of maintaining the unit in MODE 3. Usual STS practice for a loss of redundancy in a two division system, is to require restoring redundancy within 72 hours.

c) Revising generic TS 3.7.5 Action B (Suggest renumbering Action B and Action C as Action C and Action B, respectively, since relabeled Action B is recommended to have a completion time less than 72 hours):

C~~B~~. One AFW division with two trains inoperable in MODE 1, 2, or 3 ~~for reasons other than Condition A~~. | C~~B~~.1 Restore one ~~AFW~~ train of affected AFW division to OPERABLE status. | ~~72 hours~~ 24 hours

In KHNP's proposed revised Action B ("B. One AFW division inoperable in MODE 1, 2, or 3. | B.1 Restore AFW division to OPERABLE status. | 72 hours"), it is unclear whether KHNP had intended to require one or both trains to be made operable within 72 hours. STS convention would dictate restoring one train within 72 hours, with the restoration time for the remaining inoperable train governed by the Required Action A.1 completion time and Specification 1.3.

This recommendation clarifies that one of the inoperable trains in the affected division must be restored to operable status within 24 hours, because this AFW configuration is more equivalent to STS 3.7.5 Condition C (*"Turbine driven AFW train inoperable due to one inoperable steam supply. AND One motor driven AFW train inoperable."*). However, the completion time of less than 72 hours needs to be justified consistent with the Reviewer's Note in the Bases for Required Actions C.1 and C.2 of Specification 3.7.5 of NUREG-1432, Revision 4. If the note's criteria for allowing a 48 hour completion time are not satisfied, then a 24 hour completion time should be specified. But, if the note's criteria for allowing a 24 hour completion time are also not satisfied, then an even shorter completion time, perhaps 12 hours or 6 hours, should be specified. The applicant may refer to TSTF-412-A, Rev. 3 (Accession No. ML070100363) and the associated model safety evaluation (ML071230105) for additional background information regarding the origin of STS 3.7.5 Action A.

Staff expects that the justification in the Action B.1 (or C.1 as relabeled) Bases for a 48 hour, 24 hour, or shorter completion time will address why the time is an acceptable period to be vulnerable to a main steam line break (MSLB) or feed line break (FLB) in the unaffected AFW division's steam generator, assuming no additional single failures. In such a scenario, AFW function would be lost. Core heat removal would need to initially rely on nonsafety-related secondary heat sink systems using the

unfaulted steam generator, but would soon have to rely on the safety injection system and the pressurizer pilot operated safety relief valves (POSRVs), and the incontainment refueling water storage tank cooling mode of the shutdown cooling system or the containment spray system heat exchangers.

Normally, with a loss of redundancy in a two division system, where the limiting postulated accident would make the remaining division inoperable, redundancy must be restored within a short time period; that is, a period of less than 72 hours. In this case, a period of 24 hours or less seems appropriate, but must to be justified.

d) Revising generic TS 3.7.5 Action C (Suggest renumber as Action B):

> B~~C~~. Two AFW divisions with one ~~One turbine driven AFW~~ train inoperable ~~due to associated inoperable steam supply~~ in MODE 1, 2, or 3. ~~AND One motor driven AFW train inoperable.~~ | B~~C~~.1 Restore two ~~steam supply to turbine driven~~ trains of one AFW division to OPERABLE status. | ~~48 hours~~ 72 hours ~~OR C.2 Restore motor driven AFW train to OPERABLE status.~~ | ~~48 hours~~

In KHNP's proposed revised Required Action C.1, KHNP had proposed a completion time of 72 hours; in the following quotation of the proposed revised Required Action C.1 staff inserts "[train]" to highlight the intended meaning of "flow path":

> C. One AFW flow path [train] in each division inoperable in MODE 1, 2, or 3. | C.1 Restore affected AFW flow path [train] to OPERABLE status. | 72 hours

In KHNP's proposed revised Required Action C.1, it is unclear whether KHNP had intended to require one or both inoperable trains to be made operable within 72 hours. This recommendation clarifies that one of the inoperable trains must be restored to operable status within 72 hours. However, the 72 hour completion time needs to be justified.

Staff expects that the justification in the Action C.1 (or B.1 as relabeled) Bases for the 72 hour completion time will address why that time is an acceptable period to be vulnerable to a main steam line break (MSLB) or feed line break (FLB) faulting one steam generator, assuming no additional single failures. In such a scenario, core heat removal would need to rely on the remaining train in one AFW division using the unfaulted steam generator, assuming one AFW train (turbine or motor driven) is capable of maintaining the unit in MODE 3. Usual STS practice for a loss of redundancy in a two division system is to require restoring redundancy within 72 hours.

In the event of a worst case SLB or FLB postulated accident with the unit in Condition A or Condition C (or B as relabeled), with no additional single failures not caused by the event, one intact steam generator with one turbine or motor driven AFW train will remain operable to mitigate the event by enabling core heat removal using the intact steam generator. Consequently, since AFW function would be maintained, a 72 hour completion time is acceptable for both Required Action A.1 and Required Action C.1 (or B.1 as relabeled).

e) Revising Action D:

D. Required Action and associated Completion Time of Condition~~s~~ A, B, or C not met with at least one motor driven train OPERABLE. OR ~~Three~~ One AFW division with both trains inoperable and the other AFW division with the turbine driven train inoperable in MODE 1, 2, or 3. | D.1 Be in MODE 3. | 6 hours AND D.2 Be in MODE 4. | 18 hours

This recommendation clarifies that entering MODE 4 from MODE 3 requires having one motor driven train operable. The applicant is requested to confirm that 18 hours is an appropriate time to cool down to MODE 4 for the APR1400 design using (1) two AFW trains and their associated steam generator, or (2) one motor driven train for one steam generator and one turbine driven train for the other steam generator.

f) Inserting a new Action E:

E. Required Action and associated Completion Time of Condition B not met with both motor driven AFW trains inoperable. OR One AFW division with both trains inoperable and the other AFW division with the motor driven train inoperable in MODE 1, 2, or 3. | E.1 Initiate action to restore one motor driven train to OPERABLE status. | Immediately AND E.2 Be in MODE 3. | 6 hours AND E.3 Be in MODE 4. | 18 hours after restoring at least one motor driven train to OPERABLE status

This recommendation accounts for the need to avoid cooling down to MODE 4 without an operable motor driven train.

g) Revising the previous Action E as Action F:

F. NOTE–LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW train is restored to OPERABLE status. ~~Four~~ Two AFW divisions with two trains inoperable in MODE 1, 2, or 3. | F.1 Initiate action to restore one AFW train to OPERABLE status. | Immediately

Maintaining this Condition for just MODES 1, 2, and 3 allows returning control of unit status to Action D upon restoration of a motor driven train or Action E upon restoration of a turbine driven train. This Condition should not be merged with a separate Condition for MODE 4.

h) Revising the previous Action F as Action G:

G. NOTE–LCO 3.0.3 and all other LCO Required Actions requiring MODE changes are suspended until one AFW motor driven train is restored to OPERABLE status. Required AFW motor driven train inoperable in MODE 4. | G.1 Initiate action to restore one AFW motor driven train to OPERABLE status. | Immediately

Specifying Action G to separately address non-compliance with the motor driven train operability requirement of the Note to LCO 3.7.5 improves its clarity.

i) Revising SR 3.7.5.1 for clarity and consistency in phrasing:

Verify each ~~AFW~~ manual, power-operated, and automatic valve in the flow path of each AFW train and in ~~each~~ the steam supply flow path ~~to the~~ of each AFW turbine driven ~~turbine driven~~ pump~~s~~, that is not locked, sealed, or otherwise secured in position, is in the correct position.

j) Revising SR 3.7.5.2 Note for consistency in phrasing:

----------NOTE----------
Not required to be performed for ~~the turbine driven~~ AFW turbine driven pumps until 24 hours after reaching 69.25 kg/cm^{2}G (985 psig) ~~985 psig~~ in steam generators.
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k) Revising Note "a" of SR 3.7.5.3 and SR 3.7.5.4 for consistency in phrasing:

----------NOTE----------
a. Not required to be performed for ~~turbine driven~~ AFW turbine driven pumps until 24 hours after reaching 69.25 kg/cm^{2}G (985 psig) ~~985 psig~~ in steam generators.
...
---

l) Revising SR 3.7.5.3 for clarity and consistency in phrasing:

Verify each AFW automatic valve that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.

m) Revising SR 3.7.5.5: for clarity and consistency in phrasing:

Verify proper alignment of required ~~AFW~~ flow paths of each train of each AFW division by verifying flow from the associated auxiliary feedwater storage tank to ~~each~~ the associated steam generator.

Prior to entering MODE 2 whenever ~~a~~ the unit has been in MODE 5~~, 6,~~ or 6, or defueled for a cumulative period of > 30 days.

2. The applicant is requested to confirm that automatic actuation of the required AFW motor driven train on Steam Generator Level - Low is not required in MODE 4, which is consistent with Table 3.3.5-1 for AFAS-1 and AFAS-2 ESFAS Functions. Based on this, deletion of the phrase "when in MODE 1, 2, or 3" from the end of the surveillance statement for SR 3.7.5.4, as shown on page 4 of the attachment to the response to RAI 444-8530 - Question 16-131, is acceptable. Staff notes, however, that this change was not in the scope of Question 16-131.

3. The applicant is requested to revise Revision 0 of the Bases of generic TS 3.7.5 to be fully descriptive of and consistent with the suggested changes, stated in Sub-question 1, that the applicant decides to adopt.

4. The applicant is requested to revise Revision 0 of the LCO statement of generic TS 3.7.6, "Auxiliary Feedwater Storage Tank (AFWST)," and the Bases for SR 3.7.6.1 ("Verify each AFWST level is ≥ 1,524,165 L (400,000 gal). | 12 hours"), for clarity, as follows:

   ~~One~~ Two AFWSTs shall be OPERABLE.

   This SR verifies that the ~~each~~ AFWST of each AFW division contains the required volume of cooling water. (This level is greater than or equal to 1,524,165 L (400,000 gal).) The ~~12-hour~~ 12 hour Frequency is based on operating experience and the need for operator awareness of unit evolutions that could affect the AFWST inventory between checks. The ~~12-hour~~ 12 hour Frequency is considered adequate in view of other indications in the MCR, including alarms, to alert the operator to abnormal AFWST level deviations.

5. In consideration of the vulnerability of the APR1400 design to a FLB on the steam generator of the unaffected AFW division when both trains in the other AFW division are inoperable (such as when there is insufficient water in the other AFW division's AFWST), and to justify a 7-day restoration completion time, the staff recommends specifying additional compensatory measures for Condition A ("One AFWST inoperable.") of generic TS 3.7.6, as follows:

REQUIRED ACTION		COMPLETION TIME
A.1	Verify OPERABILITY of backup water supply for affected AFW division.	4 hours AND Once per 12 hours thereafter
AND		
		4 hours

	REQUIRED ACTION	COMPLETION TIME
A.2~~1~~	Verify OPERABILITY of AFWST of unaffected AFW division.	AND Once per 12 hours thereafter
AND		
A.3~~2~~	Restore AFWST to OPERABLE status.	7 days

The applicant is requested to describe in the Bases the backup water supply for each AFW division, including valve position changes necessary to make each backup water supply operable.

6. The applicant is requested to explain why the 24-hour Completion Time of generic TS 3.7.6 Required Action B.2 is an appropriate time period, given the APR1400 design, to place the unit in MODE 4 without reliance on steam generator for heat removal in the event a Required Action and associated Completion Time of Condition A are not met. This unit cool down would appear to be based on one AFW division with two operable trains and one steam generator.

   However, if two AFWSTs are inoperable, LCO 3.0.3 must be entered. By LCO 3.0.6, LCO 3.7.5 would not be entered, but 13 hours are permitted by LCO 3.0.3 to reach MODE 4 and 37 hours are permitted to reach MODE 5.


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