MEETING WITH KHNP ON
APR1400 CHAPTER 16 - GENERIC TECHNICAL SPECIFICATIONS AND BASES

– AGENDA –

DAY 1

0900 Introductions and Discussion of Agenda

0915 General Issues regarding generic technical specifications (TS):

- Content, Style, and Presentation (format) conventions of Standard TS (STS)
- Deviation Report (NUREG-1432, Rev. 4; CE System 80+ generic TS and Bases)
- Combined License (COL) Action Items
- Bases RAIs
- Specification 5.5.14, TS Bases Control Program (§52.98 vs §50.59)
- General RAIs (TSTFs, Units, §50.36(c)(2)(ii) LCO criteria)

1015 Break

1030 RAIs for TS Sections 1.1, 1.2, 1.3, 1.4, 2.1, and 2.2

1130 RAIs for TS Sections 3.0, 3.1, 3.2, 5.6.3

1230 Lunch

1330 RAIs for TS Sections 3.4, 5.5.7, 5.5.8, 5.5.9, 5.6.4, and 5.6.7

1430 RAIs for TS Section 3.5

1530 Break

1545 RAIs for TS Sections 3.6, 5.5.6, 5.5.16, and 5.6.6

1630 RAIs for TS Sections 3.7, 5.5.11, and 5.5.18

1700 End Day 1

DAY 2

0900 RAIs for TS Sections 3.8, 5.5.13, and 5.5.17

0945 RAIs for TS Sections 3.9, 4.1, 4.2, 4.3, 5.1, 5.2, 5.3, and 5.4

1015 Break

1030 RAIs for TS Sections 5.5.1, 5.5.2, 5.5.3, 5.5.4, 5.5.5, 5.5.10, 5.5.12, 5.5.15, 5.6.1, 5.6.2, 5.7

1130 RAIs for TS Sections 3.3, 5.5.19, 5.6.5

1230 Lunch

1330 RAIs for TS Sections 3.3, 5.5.19, 5.6.5 (continued)

1530 Break

1545 Hold-Over Issues, Action Items

1615 Adjourn

Staff Followup Comments on KHNP RAI-Question Responses (Tjader)

- **Question 16-18** (RAI 8069, Question 27335, Response 24139)
  An adequate response would be to rewrite Specification 3.5.2 Required Action A.1 to read: "Restore train(s) to OPERABLE status," with a 72 hour Completion Time.

- **Question 16-30** (RAI 8065, Question 27319, Response 24197)
  The needed explanation of and justification for the Section 1.1 definition of OPERABILITY was not included in the Deviation Report[1] as indicated in the response.

- **Question 16-6** (RAI 8073, Question 27356, Response 24297)
  In adding a requested statement to Subsection B 3.8.2, the applicant also added the reference, "1. DCD Tier 2, Section 8.2." In accordance with **RAI-Question 16-45**, the reference should refer to the FSAR section, instead of the DCD Tier 2 section.

- **Question 16-7** (RAI 8073, Question 27357, Response 24298)
  In addressing the difference between an EDG Subsystem and an EDG Train, adding a discussion to Bases Subsection B 3.8.1 that is similar to the description provided in the Deviation Report, Section III, Paragraph 4.2.1, would be appropriate.

- **Question 16-46** (RAI 8108, Question 27533, Response 24683)
  Bases Subsection B 3.5.1 should add a discussion of when electrical power is and is not removed from the safety injection tank (SIT) motor operated isolation valves, similar to that provided in the RAI-Question response.

- **Question 16-48** (RAI 8108, Question 27536, Response 24685)
  The Actions and References sections of Bases Subsection B 3.5.2 should add a reference to the FSAR (DCD) discussion, provided in the RAI-Question response, that says full flow from two diagonal Safety Injection System (SIS) trains is credited because the safety analysis acceptance criteria cannot be satisfied should a cold leg break occur ~~on one of~~ **with** the **only** two ~~adjacent~~ **operable** direct vessel injection (DVI) nozzles **being adjacent to the faulted cold leg** due to core bypass flow that could occur. The Bases for Specification 3.5.2 Actions A and C should include this reference, and the added discussion should be revised, as indicated by the markup.

- **Question 16-34** (RAI 8067, Question 27322, Response 24955)
  Question 16-35 (RAI 8067, Question 27323, Response 24956)
  STS LCO 3.0.8 pertaining to snubbers and supported system operability, and STS LCO 3.0.9 pertaining to barriers and supported system operability, require generic risk assessments that KHNP says will be completed in the third quarter of calendar year 2016. These RAIs will need to be re-evaluated at that time to confirm that these LCOs have an acceptable basis for inclusion in the APR1400 generic Technical Specifications.

[1] Between NUREG-1432 Rev. 4.0 and APR1400 Technical Specifications, APR1400-K-O-NR-14001-NP, Rev. 1, December 2015.

- **Question 16-107** (RAI 8289, Question 28186, Response 24865)
  Need to make sure that response to **RAI-Question 16-44** includes the following values as bracketed COL Action Items: SR 3.8.1.4, EDG day tank fuel volume limit, and SR 3.8.3.4, EDG starting air receiver pressure limits.

Staff Followup Comments on KHNP RAI-Question Responses (Thomas - SRSB)

- **Question 06.03-6** (RAI 7997, Question 27502, Response 25072)
  In the applicant's response to RAI 158-7997, Question 06.03-6, the applicant stated that any problem caused by the SIT vent valves can be detected by Surveillance Requirement 3.5.1.3. The staff believes that SR 3.5.1.3 does not verify that the vent valves are locked closed and power removed, as specified in Tier 2 Section 6.3.2.1.1. The staff is unable to verify the adequacy of the existing scope of the surveillance requirements per 10 CFR 50.36(c)(3). The staff would like to discuss the applicant's approach forward regarding this issue. Verifying the vent valves are locked closed could not be done during normal power operation; however, verifying the vent valves are locked closed could be done during refueling outages. Verifying power is removed from the vent valves could be done every 31 days.

- **Question 06.03-7** (RAI 7997, Question 27502, Response 25072)
  In the applicant's response to RAI 158-7997, Question 06.03-7, the applicant stated that boron recycling operations are not used for the APR1400. The staff noted that in Tier 2 DCD Section 9.3.4.2.2, "Boron Recovery Subsystem," the APR1400 design provides for a means of recycling boron. The staff needs the applicant to clarify if boron recycling is used in the APR1400. The applicant also states that B-10 mass spectroscopy is administratively controlled and confirmation of B-10 atom percent of the IRWST and SIT is done at each refueling outage. The staff needs to confirm that the applicant uses the measured B-10 atom percent at each refueling outage in its post-LOCA sump mixture calculation which ensures post-LOCA sub-criticality. Does the additional uncertainty of 1000 pcm (140 ppm) account for B-10 depletion? Or is 1000 pcm (140 ppm) just calculational uncertainty not accounting for B-10 depletion?

Staff Followup Comments on KHNP RAI-Question Responses (Scully)

- **Question 16-55** (RAI 8059, Question 27300, Response 24622)
  In generic TS 5.5.19, Setpoint Control Program (SCP), the list of reports in proposed paragraph h should be placed under paragraph b, and paragraph h should be deleted. This will make the APR1400 SCP Specification more consistent with the SCP Specifications in the generic TS for the AP1000 and ESBWR certified designs.

- **Question 16-43** (RAI 8064, Question 27306, Response WFR)
  Question 16-57 (RAI 8059, Question 27303, Response 24624)
  Need to verify that generic TS 5.6.7 is consistent with TSTF-510; see **RAI-Question 16-43** (RAI 8064)

- **Question 16-51** (RAI 8055, Question 27269, Response 24440)
  Response contains error that needs correcting. (Editorial Comment 3.4.14-1 about Logical Connector formatting.)

- **Question 16-59** (RAI 8057, Question 27279, Response 24570)
  Need to renumber generic TS Section 3.1 Subsections.

- **Question 16-62** (RAI 8057, Question 27283, Response 24573)
  The issue of having spaces between number values and their respective units will be eliminated during a global check by applicant. Verification of this will be a part of Global Editorial Comment #4 for documentation purposes.

- **Question 16-65** (RAI 8057, Question 27288, Response 24576)
  Question 16-66 (RAI 8057, Question 27289, Response 24577)
  For **RAI-Question 16-66**, the applicant's response resulted in a change to generic TS 3.1.9 (included in the mark-up in the response to **RAI-Question 16-65**), which included adding what appears to be an Action statement (Turn on auxiliary charging pump if necessary) in a Note and therefore does not have a Completion Time specified. Furthermore, although this apparent action statement should not be located in a Note, there is no discussion of the Note in the "Actions" section of the Bases for generic TS 3.1.9. There are issues that need discussing with this.

- **Question 16-68** (RAI 8057, Question 27291, Response 24579)
  The applicant agreed to revise a Note and will ensure that the Bases for generic TS SR 3.1.~~10~~**9**.2 accurately reflects this change. Although the Note in SR 3.1.**9**.2 reflects the correct SR (SR 3.1.5.5), the Bases refers to it as SR 3.1.4.5, which is the number in the STS [Subsection Number] due to the numbering discrepancy. This error will be documented in the Editorial Comments prior to the meeting.

- **Question 16-76** (RAI 8057, Question 27474, Response 24587)
  The applicant was asked to enhance/improve upon the Bases section for newly proposed TS 3.1.~~9~~**8** Charging Flow. This response is still being evaluated.

<u>Staff RAI-Questions for Discussion</u> (Harbuck)

- **Question 16-42** (RAI 8064, Question 27305, Response WFR)
  Question 16-43 (RAI 8064, Question 27306, Response WFR)
  Question 16-44 (RAI 8064, Question 27307, Response WFR)
  Question 16-45 (RAI 8064, Question 27308, Response WFR)

- **Question 16-90** ((RAI 8076, Question 27780
  - 3.3.1 Required Action C.1 should say "Disable automatic operating bypass removal channel."
  - 3.3.1 Requirted Action C.2.2 should say "Restore automatic operating bypass removal channel and associated automatic trip channel to OPERABLE status."
  - 3.3.1 Required Action D.1 should say "Disable automatic operating bypass removal channels."

- **Question 16-96** (RAI 8076, Question 27780 Sub-question b, Response tbd, In Evaluation)
  - On page 3.3.2-4, markup of Footnote (b) of Table 3.3.2-1, make RTCBs to be singular: "With any reactor trip ~~switchgears (RTSGs)~~ **circuit breaker (RTCB)** closed, any control element assembly (CEA) capable of being withdrawn, and fuel loaded in reactor."
  - On page 3.3.4-1, markup of LCO 3.3.4, make "Reactor Trip Circuit Breakers (RTCBs)" lower case: "reactor trip circuit breakers (RTCBs)"
  - On page 3.3.4-1, markup of LCO 3.3.4, Applicability should say "with any RTCB closed and any control element assembly (CEA) capable of being withdrawn" instead of "with any RTCBs closed and any control element assemblies capable of being withdrawn" to be consistent with LCO 3.3.2 Applicability
  - On page B 3.3.1-2, markup of Bases Background, third paragraph, first sentence of list item c, should say "RPS logic - provides trip signal to ~~RTSG~~ **reactor trip circuit breakers (RTCBs)** after performing 2/4 logic based on bistable trip status of four channels."; list item d should say "~~RTSG~~ **Reactor Trip Switchgear System (RTSS)** – opens ~~trip switchgear~~ **RTCBs** based on trip signal from RPS logic. ~~RTSG consists of~~ **Each RTCB has** undervoltage trip equipment and shunt trip equipment. The PPS interfaces with the undervoltage trip device of ~~RTSS breakers~~ **the RTCBs**. The DPS interfaces with the shunt trip device of the ~~RTSS breakers~~ **RTCBs**."
  - On page B 3.3.1-8, in markup of Bases Background section, fourth paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
  - On page B 3.3.1-9, markup of Bases Background, last paragraph on page, the last two sentences should say "Each RTSS channel consists of two ~~reactor trip switchgears (RTSGs)~~ **RTCBs**. The eight ~~RTSGs~~ **RTCBs** are connected ~~with~~ **in a** 2-out-of-4 **logic** configuration."
  - On page B 3.3.2-2, markup of Bases Background, third paragraph on page, list item d, "Reactor trip switchgears (RTSGs)" should be replaced by Reactor trip circuit breakers (RTCBs) for consistency.
  - On page B 3.3.3-2, markup of Bases Background, first paragraph on page, list item d, "RTSG" should be replaced by "Reactor trip circuit breakers (RTCBs)" for consistency.
  - On page B 3.3.4-2, markup of Bases Background, third paragraph on page, list item d, "RTSG" should be replaced by "Reactor trip circuit breakers (RTCBs)" for consistency.
  - On page B 3.3.4-3, in markup of Bases Background section, fifth paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
  - On page B 3.3.4-6, in markup of Bases LCO section, third paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
  - On page B 3.3.4-11, in markup of Bases SR section, under SR 3.3.4.2, third and fourth sentences, for consistency, suggest replacing "RTSS breakers" with "RTCBs"

- **Question 16-99** (RAI 8076, Question 27783 Sub-question 8, Response tbd, In Evaluation)
  Question 16-105 (RAI 8076, Question 27873 Sub-question 8, Response tbd, In Evaluation)
  - (3.3.1, 3.3.2) Response is unclear because "disable [automatic operating] bypass [removal] channel(s)" does not mean "restore [automatic operating] bypass [removal] channel(s) to OPERABLE status." Also, it is not clear how the phrase "except for the case that the bypass is not in effect" is relevant to the question asked.

- **Question 16-101** (RAI 8076, Question 27785, Sub-question 3, Resp. tbd, In Evaluation)
  - Sub-question 3 – In SR 3.3.4.3 Bases added text, need to find a better phrase than "The 31-day Surveillance period is determined by operating experience and shows that equipment can meet the Surveillance requirement condition when equipment is tested at this Surveillance period."

- **Question 16-102** (RAI 8076, Question 27786, Sub-question 3a, Resp. tbd, In Evaluation)
  - (3.3.4) Sub-question 3a response does not resolve the question because Condition D does not include the case of "two channels of Manual Trip, RTCB, or RPS logic *inoperable for reasons other than Condition C. However, the Sub-question 3b response's revised second condition statement of Condition D is correct – so 16-102 is resolved.* **Note:** The Condition D markup in the response did not change "channels" to "channel"; but must to ensure that generic TS 3.3.4 Rev 1 is correct.

- **Question 16-109** (RAI 8263, Question 28034, Response 25084)
  - ► In COLR Figure 3.2.4-2, "DNBR Margin Operating Limit based on the Core Protection Calculators (COLSS out of Service, Minimum **of** One CEAC Operable in each operable CPC channel)"
  - ► In LCO 3.2.4.b.2 and COLR Figure 3.4.2-3, "DNBR Margin Operating Limit based on the Core Protection Calculators (COLSS out of Service, Both CEACs Inoperable in any OPERABLE CPC channel)," and in the LCO section of Bases, it is unclear whether all four operable CPC channels have both CEACs inoperable.

- **Question 16-113** (RAI 8263, Question 28385, Response 25085)

  1. The generic TS 3.3.14 markup needs correction, as follows:

     - LCO 3.3.14 should say: "Two Boron Dilution Alarm System (BDAS) channels shall be OPERABLE."
     - Condition A should say: "One BDAS channel inoperable." • Condition B should say: "Two BDAS channels inoperable."
     - In B 3.3.14 Background section third paragraph, use "BDAS" only, because acronym is already defined in first paragraph. Also, third paragraph must define first use of ENFMS.
     - In B 3.3.14 LCO section second paragraph, the second change should be same as first change; i.e., use "startup channels of the ENFMS."
     - In B 3.3.14 Applicability section third paragraph, the first sentence should not refer to a Note. Revise sentence to say, "The Applicability specifies that the BDAS is required in MODE 3 within 1 hour after . . ."
     - ► In B 3.3.14 Actions section first paragraph, the second sentence says: "These [OPERABILITY] criteria are outlined in the LCO section of the Bases." However, no BDAS channel operability criteria are stated in the LCO section; please add a description of the criteria to the LCO section.
     - ► In B 3.3.14 Actions section second paragraph, in the first sentence, replace "prohibit" with "prevent" which better conveys the intended meaning.

  2. In the markup of GTS 3.3.14, remove the extra line in the Applicability statement. Also, indentation of continuation line is 1.82 inches from left page margin.

  3. Since the applicant is planning new Subsection 3.9.7 in response to Jeffrey Schmidt's **RAI 216-8221 27860 Question 15.04.06-7; resp. 24805 ML15345A378 12/11/15** to prohibit dilution in MODE 6, SPSB concludes that the BDAS channel operability is not needed in MODE 6.

  4. Staff does not understand how the response addresses Sub-question No. 4 regarding the conservatism of assuming 30 minutes instead of 15 minutes before initiating manual action to terminate a boron dilution event.

     a. In the markup of generic TS B 3.9.2 Background section, the ENFMS and BDAS acronyms should be defined on first use such that the first two sentences say: "The installed startup channels of the **Ex-Core Neutron Flux Monitoring System (**ENFMS**)** and **the B**oron **D**ilution **A**larm **S**ystem **(BDAS)** are used during refueling operations to monitor **the** core reactivity condition. The startup channels are a part of the ENFMS and related indicators and recorders. **The neutron flux** detectors **of these startup channels** are located external to the reactor vessel and detect neutrons leaking from the core." In addition, discuss how the startup channels are a part of the "related indicators and recorders."

     b. Suggest adding the following sentence to the B 3.9.2 LCO section: "The BDAS is not required to be OPERABLE in MODE 6 because sufficient time is available for the operator to detect and terminate a boron dilution event, and because such an event is precluded by LCO 3.9.7, "Unborated Water Source Isolation Valves" which requires the flow paths for unborated makeup water sources to be [locked] [secured] closed in MODE 6."

c. The B 3.9.2 ASA section says "Each **startup channel of the ENFMS** provides visual indication in the **main control room (**MCR**)** and an audible alarm to alert operators to a possible dilution accident." Is the audible alarm a BDAS channel, or a separate alarm?

5. The surveillance column Note for SR 3.3.14.1, Channel Check of BDAS channels, proposed revision is not consistent with the STS convention for Notes that actually modify the surveillance frequency, not the applicability of the surveillance. The Note should say: "Not required to be performed until 1 hour after neutron flux is within the startup range." which is what DCD Rev 0 says.

- Discuss Subsections 3.3.8 CPIAS, 3.3.9 CREVAS, & 3.3.10 FHEVAS required sensor channels/channel, required Actuation Logic division, required Manual Actuation division and DCD Figure 7.3-9 FHEVAS, Figure 7.3-10 CPIAS, & Figure 7.3-11 CREVAS.
    - Discuss the following draft additions to B 3.3.8, CPIAS, LCO section:
        - The two containment area radiation monitor channels in each CPIAS division are not totally redundant to each other, since the indication overlap only ranges from 10 mSv/hour to 100 mSv/hour; however both NTSPs are within this range.
        - The containment upper operating area radiation monitor channel supports the CPIAS during MODES 1, 2, 3, and 4, and has a higher NTSP. The containment operating area radiation monitor channel supports the CPIAS during MODES 5 and 6, and has a lower NTSP. In any MODE, just one area radiation monitor channel is relied upon for initiating an automatic containment purge line isolation.

- **Question 16-123** (RAI 8263, Question 28417, Response – WFR)
  — Generic TS 3.3.11, Accident Monitoring Instrumentation – variable selection and appropriate Actions Condition for each variable
  — Note that related **RAI-Questions 7.5-1** and **7.5-6** need to be resolved as part of the resolution of this question.

- **Question 16-114** (RAI 8263, Question 28386, Response – WFR)
  Question 16-115 (RAI 8263, Question 28387, Response – WFR)
    - Discuss the Diverse Actuation System Manual Functions' inclusion in 3.3.6
    - Discuss the Diverse Actuation System Automatic Functions' omission from 3.3.6

- Generic TS 3.3.3 surveillance requirements for CPCS (Mott)
    - The CPCS "pre-determined" penalty factor (PF) reactor trip value is selected to guarantee a CPCS reactor trip output to PPS. How is this value confirmed from outage to outage? Is it part of the Tech Spec surveillance?"
    - The definition of a "pre-determined penalty factor" (PF) was added to the APR1400 FSAR, Tier 2, Table 7.2-7, mark-ups (FSAR mark-up page 7.2-71), as submitted in the response to RAI 274-8277 (ML15363A340; **Question 7.1-38**).

- **Question 16-89** (RAI 8076, Question 27773, Response 25223)
    - Discuss last sentence of response
    - Figure 7.2-11 does not depict "CPCS Test" and "Manual Trip Test"

General Issues Regarding Generic Technical Specifications (GTS):

1. Selected Content, Style, and Presentation (Format) Conventions of Standard TS (STS)

- Paper size for STS is 8.5 inches wide by 11 inches long; width of content is 6.5 inches
- Font Normal Style: Arial Regular 11 pt, single line spacing, no space after paragraph
- White space – vertical dimensions – generic TS Sections 3.1 through 3.9
    - Section title is two blank lines below line with Subsection number in header
    - Subsection title is one blank line below Section title
    - LCO statement begins two blank lines below Subsection title
    - Applicability statement begins three blank lines below end of LCO statement
    - Title for ACTIONS table and title for SURVEILLANCE REQUIREMENTS table are never followed by a blank line; any table NOTES begin on line below table title, and are followed by a blank line and then the table itself.
- White space – horizontal dimensions – generic TS Sections 3.1 through 3.9
    - The Section designator is the Section number followed by two spaces and the Section title in all caps
    - The Subsection designator is the Subsection number followed by two spaces and the Subsection title
    - The LCO designator is “LCO” followed by two spaces and the LCO number
    - The LCO statement hanging indent is 1.5 inches
    - The Applicability statement hanging indent is 1.5 inches
        - Except for statements that wrap to the next line, the second line should be futher indented 0.32 inches (or 1.82 inches from left margin)
- Note that table defaults in Office Word software changes with each new version.
- White space – vertical dimensions – ACTIONS table
    - Inside top and bottom margins of each table cell should be 0.0 inches
    - Column Title Row has one blank line above and one blank line below label
    - In each row, the first item in each column has one blank line above it
        - Except in the Completion Time column because the first line of the Completion Time must align with the first line of the associated Required Action statement
    - In each row the last item in each column has *at least* one blank line below it
    - Space between items is almost always one blank line
        - An exception is possible in a Required Action column with two or more Required Actions because each Logical Connector must be one blank line below the last line of the Completion Time for the previous Required Action
    - Three blank lines are prescribed between the end of the ACTIONS table and the title of the SURVEILLANCE REQUIREMENTS table – if these occur on the same page.
    - The title of the ACTIONS table is two blank lines below the last line of the Applicability statement
- White space – horizontal dimensions – ACTIONS table
    - Inside left and right margins of each table cell should be 0.1 inches
    - Condition statement hanging indent is 0.26 inches
    - Required Action statement hanging indent is 0.55 inches for three or fewer levels of nesting, and 0.65 inches for four levels of nesting – contrary to Writers Guide
    - Logical Connectors align with [period before] last digit of Required Action designator
    - The CONDITION column is 2.15 inches wide
    - The REQUIRED ACTION column is 2.65 inches wide
    - The COMPLETION TIME column is 1.7 inches wide

- White space – vertical dimensions – SURVEILLANCE REQUIREMENTS table
  - Inside top and bottom margins of each table cell should be 0.0 inches
  - Column Title Row has one blank line above and one blank line below label
  - In each row, the first item in each column has one blank line above it
    - Except in the Frequency column because the first line of the Frequency must align with the first line of the associated Surveillance statement
  - In each row the last item in each column has *at least* one blank line below it
- White space – horizontal dimensions – SURVEILLANCE REQUIREMENTS table
  - Inside left margin of each table cell should be 0.1 inches
    - Exception when the surveillance column cell is divided into two columns with the middle vertical boundary line made invisible; in this case the right hand column has an inside left margin of 0.0 inches, and is 4.05 inches wide.
  - Inside right margin of each table cell should be 0.1 inches
  - The SR designator is "SR" followed by two spaces and the surveillance number
  - The surveillance statement hanging indent should be 1.25 inches
  - The SURVEILLANCE column should be 5.05 inches wide
  - The FREQUENCY column should be 1.45 inches wide
- White space – Ordered Lists
  - One blank line separates each list item
  - Hanging indentation preferred to be 0.33", 0.66", 0.99", etc. (LCO statements and LCO NOTES; Applicability NOTES; NOTES above ACTIONS tables or SURVEILLANCE REQUIREMENTS tables; Sections 4.1, 4.2, and 4.3; Sections 5.2, 5.4, 5.5 and 5.6)
  - NOTES inside ACTIONS tables or SURVEILLANCE REQUIREMENTS tables, and footnotes of Specification End-tables typically use hanging indentation of 0.25", 0.50", 0.75", etc.
- Global Editorial Comments Summary – previously provided to KHNP

WG ─ TSTF-GG-05-01, Writer's Guide for Plant-Specific Improved Technical Specifications, Revision 1, August 2010

1. Incomplete footers (WG Section 2.1.2.e) – "APR1400 GTS"
2. Capitalization as it applies to defined/undefined terms (WG 3.3.2.b)
3. Use of symbols vice words they represent (WG 3.3.4.d)
4. Keeping symbols, numbers, and units together (WG 3.3.4.b)
5. Text in Reference Sections (WG 4.2.8)
6. Referring to a Reference in the Bases text (WG 3.1.1.j)
7. Using initials for documents vice the entire title (WG 3.3.2)
8. Use of hyphens (WG 3.3.3.f)
9. Use of initial capitalization in the TS (WG 3.3.2.d.4)
10. Formatting of paragraphs/use of line breaks
11. Ordered list formatting (WG 2.1.3.c)
12. Use of initial capitalization as it applies to system names (WG 3.3.2.d.4)
13. Formatting of Completion Times (WG 2.5.5.d.4)
14. Formatting of Frequencies (WG 2.5.6.d)
15. Use of punctuation, particular attention to NOTES
16. Use of line breaks as they apply to Logical Connectors (WG 2.1.5.a)
17. Re-numbering of Subsections in Section 3.1, see response to **RAI-Question 16-59**
18. Order of References (WG Section 4.2.1.g)
19. Column heading formatting in the Actions table (WG Section 2.5.5.a)
20. Column heading formatting in the SR table (WG Section 2.5.6.a)

2. Deviation Report (NUREG-1432, Rev. 4)

- Deviation Report states that generic TS Subsection 3.1.1 (SDM) is divided into two Subsections, 3.1.1 and 3.1.2. In **RAI-Question 16-59**, the staff inquired about the reasoning behind this, since it deviated from the STS and the two proposed Subsections are identical except for the Applicability statements. In the RAI response, KHNP stated that the two proposed Subsections would be merged back into one Subsection in alignment with STS 3.1.1. The staff expects Subsections 3.1.3 through 3.1.12 to be re-numbered as Subsection 3.1.2 through 3.1.11, and all references to generic TS Section 3.1 Subsections in the generic TS and Bases (and possibly in DCD Tier 2 and the Deviation Report) to be updated. See Global Editorial Comment #17.

- The "APR1400 NRC DC TS (Rev 0)" column in the Deviation Report for generic TS 4.3.1.1.e contains text which ends with a semi-colon. This semi-colon, which is required, does not appear in generic TS 4.3.1.1.e. This formatting issue is addressed in WG 2.1.3.c and should be corrected in response to Global Editorial Comment #11.

- The "APR1400 NRC DC TS (Rev 0)" column in the Deviation Report, the end of the quotation of generic TS 4.3.1.1.f contains the phrase "shall only be stored in Region I spent fuel storage racks." This phrase does not appear in generic TS 4.3.1.1.f, and is an editorial error in the Deviation Report itself that needs to be corrected.

- Generic TS provision language quoted in the Deviation Report does not match the actual language in Revision 0 of the generic TS:

    - Generic TS SR 3.4.2.1 Frequency is missing the 12 hour Frequency as shown in the Deviation report. Also, the 12 hour Frequency should be second, not third, since only the last Frequency may have a Note, per TSTF-GG-05-01 Paragraph 4.1.7.e. But that conflicts with the convention to have Frequencies listed from smallest interval to largest interval. The applicant is requested to remove the Note and state the 30 minute Frequency as "30 minutes with the reactor critical and T_{cold} < 289.4 °C (553 °F)".

    - Generic TS 3.4.4, "RCS Loops - MODES 1 and 2," LCO 3.4.4 states, "Two RCS loops shall be OPERABLE and in operation with two reactor coolant pumps operating in each loop." The Deviation Report states it as "Two RCS loops shall be OPERABLE and two reactor coolant pumps in each loop shall be in operation." The applicant is requested to correct the Deviation Report.

    - Generic TS 3.4.10, "POSRVs," the Applicability is missing the Note stated in the Deviation Report.

    - Generic TS 3.9.5, "Shutdown Cooling System (SCS) and Coolant Circulation – Low Water Level," does not contain Required Action B.4 which is included in the Deviation Report. Revise B.4 as indicated: "B.4 Initiate actions to ~~make~~ **place** the containment building penetrations in the ~~required~~ status ~~as~~ **specified** in LCO 3.6.7**, "Containment Penetrations - REDUCED RCS INVENTORY Operations."** | Immediately".

    - Required Action A.1 of generic TS 3.9.6, "Refueling Water Level," states, "Suspend CORE ALTERATIONS. | Immediately." The Deviation Report misquotes this statement.

- STS Revision 4 provisions equivalent to generic TS Revision 0 provisions are not correctly identified in Deviation Report:

  - STS 3.4.9, “Pressurizer,” Condition B (“One [required] group of pressurizer heaters inoperable.”) is listed as being equivalent to generic TS 3.4.9 Condition B (“Required Action and associated Completion Time of Condition A not met.”), but is actually equivalent to generic TS 3.4.9 Condition C (“One required group of pressurizer backup heaters inoperable.”).

    STS 3.4.9 Condition A (“Pressurizer water level not within limit.”) corresponds to generic TS 3.4.9 Condition A (which should say: “Pressurizer water level not within limit**s**.”) In addition the generic TS add a new Condition B (quoted above) that specifies Required Action B.1 (“Be in MODE 3 with reactor trip switch gears open. | 6 hours”) and Required Action B.2 (“Be in MODE 4. | 12 hours”), which are almost identical to STS Required Actions A.1 and A.2. The generic TS 3.4.9 Condition A specifies new Required Action A.1 (which should say: “Restore pressurizer water level **to** within limit**s**. | 1 hour”) to make explicit the STS implicit requirement to restore pressurizer water level to within limit. The Deviation Report provided no specific justification for the explicit 1 hour allowance to complete generic TS 3.4.9 Required Action A.1, other than “APR1400 plant-specific operating practice.”

    The applicant is requested to revise the Deviation Report to quote STS 3.4.9 Conditions A, B, C and associated Required Actions, and quote generic TS 3.4.9 Conditions A, B, C, and D and associated Required Actions to more clearly depict the correspondence (1) between STS Action A and generic TS Actions A and B; and (2) between STS Actions B and C and generic TS Actions C and D. The applicant is also requested to add a justification for the 1 hour Completion Time in the Bases for Required Action A.1.

  - STS 3.4.10, “Pressurizer Safety Valves,” does not contain a SR equivalent to SR 3.4.10.1 of generic TS 3.4.10, “POSRVs.” However generic TS SR 3.4.10.3 does correspond to STS SR 3.4.10.1. The applicant is requested to correct the Deviation report, which incorrectly depicts STS SR 3.4.10.1 as equivalent to generic TS SR 3.4.10.1.

  - STS 3.4.11, “Pressurizer Power Operated Relief Valves (PORVs),” is equivalent to generic TS 3.4.16, “Reactor Coolant Gas Vent (RCGV) Function,” for the purpose of mitigating a steam generator tube rupture event. The Deviation Report does not show this correspondence.

- Deviation Report justifications for generic TS differences from STS are not clear, or are invalid:

  - Generic TS 3.4.3, “RCS P/T Limits,” Applicability contains an exception to “At all times” that is not justifiable and is not consistent with STS 3.4.3. The applicant is requested to remove the proposed exception.

  - STS 3.4.5, “RCS Loops – MODE 3,” LCO 3.4.5 states, “[Two] RCS loops shall be OPERABLE and one RCS loop shall be in operation.” The generic TS states LCO 3.4.5 as, “Two RCS loops shall be OPERABLE with steam generators and at least one reactor coolant pump per loop and at least one RCS loop shall be in operation.” The proposed LCO statement is confusing, and the justification in the Deviation Report is invalid (“The meaning of the LCO is practically the same.”). The applicant is

requested to revert to the STS version. Also, ensure the Bases describes what constitutes an operable RCS loop, and the number of operating reactor coolant pumps needed to consider a loop "in operation."

- Generic TS 3.4.6, "RCS Loops – MODE 4," LCO 3.4.6 omits the pressurizer water level upper limit for starting a reactor coolant pump. [SPSB will require SRSB to concur in this difference, and the stated justification, from STS 3.4.6.] In addition, the generic TS LCO 3.4.6 statement includes the phrase "at least" in "... *at least* one loop or train shall be in operation." The Deviation Report does not address this difference.

- Generic TS 3.4.10, "POSRVs" alternate Required Action B.2.2 ("OR Be in MODE 4 on shutdown cooling with the requirements of LCO 3.4.11 met.") is not included in STS 3.4.10 Action B; the justification for this difference in unclear. It states, "The REQUIRED ACTIONs reflect the APR1400 design. When the POSRV(s) are inoperable, LTOP relief valves shall be aligned for OPP. Alignment of LTOP relief valves can be allowed by meeting conditions by reducing the cold leg temperature down to the LTOP enable temperature and by opening SCS isolation valves."

- Generic TS provisions do not reflect system and component design differences between the APR1400 and the CE digital plant assumed in the STS

  - Generic TS 3.7.4, "Main Steam Atmospheric Dump Valves (MSADVs)," LCO 3.7.4 should require four MSADV lines to be OPERABLE because the APR1400 design has two MSADV lines per SG, whereas the CE plant design assumed in STS 3.7.4, "Atmospheric Dump Valves (ADVs)," has one ADV line per SG.

  - Generic TS 3.7.5, "Auxiliary Feedwater System (AFWS)," ACTIONS should reflect the APR1400 design with four AFW trains – two turbine-driven AFW pump trains (one train per SG) and two motor-driven AFW pump trains (one train per SG)

  - Generic TS 3.7.6, "Auxiliary Feedwater Storage Tanks (AFWSTs)," should reflect the APR1400 design with two separate AFWSTs, one for each AFW division and associated SG, and usually with the cross-connect between the two AFWSTs and between the divisional AFW pump suction headers isolated by locked-closed locally operated manual valves.

- **Deviation Report Section I, INTRODUCTION**, states (with staff suggested edits): "The APR1400 **generic** Technical Specifications satisfy 10 CFR 50.36 (Reference 1), "Technical specifications" and ~~applies~~ **are based on** NUREG-1432, Rev. 4.0 (Reference 2)**,** ~~as~~ the Standard Technical Specifications (STS) **for Combustion Engineering digital plants**. The difference between the STS and the APR1400 **generic** Technical Specifications exists only as necessary to reflect advanced design features of APR1400 and to incorporate operational experience into the APR1400." Discuss last sentence; are these the only reasons for differences?

Additional comments on Deviation Report

- **Deviation Report (DR) Section II, GENERAL DEVIATIONS AND JUSTIFICATION**
  - **DR Subsection II.1, Use of Conservative Values**, fourth sentence states, "The values of APR1400 TS that are different from NUREG-1432 are conservative and therefore do not require justification. Discuss the conclusion of this sentence.
  - **DR Subsection II.2, Use of Additional Definitions**. Discuss the following definitions:
    - CORE ALTERATION – differences from pre-TSTF-471-A CE STS definition indicated by markup:

      CORE ALTERATION shall be the movement **or manipulation** of any fuel, sources, ~~or~~ reactivity control components**, or other components** ~~[~~(excluding control element assemblies (CEAs) withdrawn into the upper guide structure)~~],~~ **affecting reactivity** within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.

      In addition, this definition is used in the following requirements in generic TS and Bases. Has this definition been used in all necessary locations in generic TS and Bases? Suggested edits for consistency and clarification as indicated by markups:

      3.3.8 "Containment Purge Isolation Actuation Signal (CPIAS)"

      Applicability ..... "During CORE ALTERATIONS,"

      Condition C ..... "CPIAS **required** Manual Actuation **division**, **required** Actuation Logic **division**, or **required instrument division with** one or more required ~~channels of~~ radiation monitor~~s~~ **channels** inoperable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment."

      Required Action C.2.1 ..... "Suspend CORE ALTERATIONS. | Immediately"

      SR 3.3.8.4 Note..... "~~This SR is only applicable~~ **Only required to be met** during CORE ALTERATIONS or during movement of irradiated fuel assemblies within containment.

      B 3.3.8 LCO section ..... (Page B 3.3.8-3) "Only one ~~manual channel~~ **Manual Actuation division** of CPIAS is required in MODES 1, 2, 3, and 4, since the CPIAS is redundant with the CIAS and SIAS. Only one ~~manual channel~~ **Manual Actuation division** of CPIAS is required during CORE ALTERATIONS and movement of irradiated fuel assemblies, since there are additional means of closing the containment purge valves in the event of a ~~channel~~ **Manual Actuation division** failure."

      B 3.3.8 Applicability ..... (Page B 3.3.8-4) "With the purge valves open during CORE ALTERATIONS or movement of irradiated fuel assemblies

within containment, there is the possibility of a fuel handling accident requiring CPIAS on high radiation in containment."

B 3.3.8 Actions.....(Page B 3.3.8-5) "Condition C applies to the same conditions as are described in Condition A; however, the applicability is during CORE ALTERATIONS or during the movement of irradiated fuel assemblies within containment. Required Action C.1 is to place the containment purge and exhaust isolation valves in the closed position **immediately**. The Required Action immediately performs the isolation function of the CPIAS. Required Actions C.2.1 and C.2.2 may be performed in lieu of Required Action C.1. Required Action C.2.1 requires the suspension of CORE ALTERATIONS **immediately** and Required Action C.2.2 requires suspension of movement of irradiated fuel in containment immediately.

B 3.3.8 SR 3.3.8.4.....(Page B 3.3.8-7) A Note to the SR indicates that this test is only ~~applicable~~ **required to be met** during CORE ALTERATIONS or during movement of irradiated fuel assemblies within containment.

3.3.9 "Control Room Emergency Ventilation Actuation Signal (CREVAS)"

Applicability.....“During CORE ALTERATIONS,”

Condition C .....“CREVAS **required** Manual Actuation **division**, **required** Actuation Logic **division**, or **required instrument division with** one or more required ~~channels of~~ radiation monitor~~s~~ **channels** inoperable during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment.”

Required Action C.2.3 .....“Suspend CORE ALTERATIONS. | Immediately”

B 3.3.9 Applicability..... (Page B 3.3.9-3) “The CREVAS Functions must be OPERABLE in MODES 1, 2, 3, and 4, during CORE ALTERATIONS, and during movement of irradiated fuel assemblies to ensure a habitable environment for the MCR operators.”

B 3.3.9 Actions.....(Page B 3.3.9-4) “Condition C applies to the failure of **the required division of** CREVAS **M**anual **A**ctuation, **the required division of A**ctuation **L**ogic, ~~and~~ **or** required gaseous **radiation** monitor channels during CORE ALTERATIONS or when moving irradiated assemblies. The Required Actions are immediately taken to place one OPERABLE control room area **heating, ventilation, and air-conditiong (**HVAC**)** system train in the emergency radiation protection mode, or to suspend CORE ALTERATIONS, positive reactivity additions, and movement of irradiated fuel assemblies.”

3.9.3 “Containment Penetrations”

Applicability.....“During CORE ALTERATIONS,”

Required Action A.1 .....“Suspend CORE ALTERATIONS. | Immediately”

SR 3.9.3.1 Frequency .....“Within 72 hour**s** prior to the start of movement of irradiated fuel ~~in the~~ **within** containment ~~building~~ AND Once per 7 days during CORE ALTERATIONS or movement of irradiated fuel ~~in the~~ **within** containment ~~building~~.

B 3.9.3 Background.....(Page B 3.9.3-1) “During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, a release of fission product radioactivity within the containment will be restricted from leakage to the environment when the LCO requirements are met.”... “During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least **[**four**]** bolts.”... (Page B 3.9.3-2)”During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, containment closure is required; therefore the door interlock mechanism may remain disabled, but one airlock door must remain capable of being closed.”

B 3.9.3 ASA .....(Page B 3.9.3-3) “During CORE ALTERATIONS or movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident.”...”The requirements of this LCO and LCO 3.9.6, “Refueling Water Level,” and the minimum decay time of 72 hours prior to **movement of irradiated fuel assemblies within containment and** CORE ALTERATIONS ensure that the release of fission product radioactivity subsequent to a fuel handling accident, results in doses that are well within the guideline values specified in 10 CFR Part 100.”

B 3.9.3 Applicability.....(Page B 3.9.3-3) “The containment penetration requirements are applicable during CORE ALTERATIONS ~~or~~ **and during** movement of irradiated fuel assemblies within containment because ~~this is when~~ there is a potential for a fuel handling accident **during these conditions**. In MODES 1, 2, 3 and 4, **c**ontainment **p**enetration requirements are addressed by LCO 3.6.1, “Containment.” In MODES 5 and 6 when CORE ALTERATIONS or movement of irradiated fuel assemblies within containment are not being conducted, the potential for a fuel handling accident does not exist.

B 3.9.3 Actions.....(Page B 3.9.3-4) “This is accomplished by immediately suspending CORE ALTERATIONS and movement of irradiated fuel assemblies within containment.”

B 3.9.3 SR 3.9.3.1.....(Page B 3.9.3-4) “The Surveillance is performed every 7 days during CORE ALTERATIONS or movement of irradiated fuel assemblies within the containment.”

3.9.6 “Refueling Water Level”

Applicability .....“During CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts,”

Required Action A.1 .....“Suspend CORE ALTERATIONS. | Immediately”

B 3.9.6 Background.....(Page B 3.9.6-1) “The movement of irradiated fuel assemblies or performance of CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts, within containment requires a minimum water level of 7 m (23 ft) above the top of the reactor vessel flange.”

B 3.9.6 ASA .....(Page B 3.9.6-1) “During CORE ALTERATIONS or movement of irradiated fuel assemblies, the water level in the refueling pool and refueling canal is an initial condition design parameter in the analysis of

the fuel handling accident in containment postulated by NRC RG 1.183 (Reference 1).

B 3.9.6 Applicability.....(Page B 3.9.6-2) ~~LCO 3.9.6 is applicable during CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts, and when moving irradiated fuel assemblies within containment.~~ **LCO 3.9.6 is applicable when moving irradiated fuel assemblies within containment, and during CORE ALTERATIONS, except during latching and unlatching of control rod drive shafts.**

B 3.9.6 Actions A.1, A.2. .(Page B 3.9.6-2) "With a water level of less than 7 m (23 ft) above the top of the reactor vessel flange, all CORE ALTERATIONS and operations involving movement of irradiated fuel assemblies shall be suspended immediately to ensure a fuel handling accident cannot occur. The suspension of ~~fuel CORE ALTERATIONS and movement~~ **CORE ALTERATIONS and irradiated fuel movement** shall not preclude completion of movement to a safe position."

B 3.9.6 Action A.3. .....(Page B 3.9.6-2) "In addition to immediately suspending CORE ALTERATIONS ~~or~~ **and** movement of irradiated fuel, actions to restore refueling pool water level must be initiated immediately.

- Page 55 of Report incorrectly lists generic TS 3.3.6 as having Applicability of

  MODES 1, 2, 3, and 4,
  During CORE ALTERATIONS,
  During movement of irradiated fuel assemblies within containment.

- LCO SELECTION CRITERIA definition is not needed

- MAXIMUM ALLOWABLE CONTAINMENT LEAKAGE RATE (L_a) definition is not needed

  - Not a defined term in NUREG-1432; Specification 5.5.16.c states:

    The maximum allowable containment leakage rate, L_a at P_a, shall be 0.1 % of containment air weight per day.

  - The phrase "maximum allowable containment leakage rate" appears in Specification 5.5.16.c, and in the "ASA" section of the Bases for Specifications 3.6.1 and 3.6.2.

  - The "ASA" section of the Bases for Specifications 3.6.1 and 3.6.2 **define** L_a and also P_a; therefore, this definition is not needed.

- MIDLOOP

  - KHNP proposes a new definition for an "operation case" when the unit is in MODE 5 with reactor coolant level in the reactor vessel "below the top of the hot legs at their junction with the reactor vessel." The justification in TEC APR1400-K-O-NR-14001-NP, Rev 1 says that "MID-LOOP" is when RCS level is lowered to a level between the hot leg center line and top.

    1. Why does the definition omit the hot leg center line lower boundary of the coolant level range?

2. Please state which level instrument is used to determine when MID-LOOP is entered.
3. Since only LCO 3.1.~~9~~8 uses this definition, why is it needed as a defined term?
4. Why are hot leg junction elevations top, middle and bottom not included in the definition as done for REDUCED RCS INVENTORY definition, which includes defining elevation values?

- **DR Subsection II.3, Use of current Tech. Spec.**
  - Are CTS provisions the same where possible? Which CTS provisions in GTS are less restrictive than STS; which are more restrictive? Does DR identify all GTS provisions that are based on CTS provisions?
  - Days of 1 month – Discuss this incorrect understanding of STS; 30 days is a standard completion time interval; generic TS 3.4.14 Actions should replace 31 day Completion Times with 30 day Completion Times, consistent with STS 3.4.15.
  - Which generic TS Subsections have an Actions end state of MODE 5 instead of the STS end state of MODE 4?
- **DR Subsection II.4, COL Requirements**
  - Discuss what you mean by "These deviations are listed below and will be listed in the COLR later."
  - Discuss use of brackets.
  - Explain why Pressurizer water level ranges in LCO 3.4.9 and Pressurizer safety valve setpoints in LCO 3.4.10 would be provided in the COLR, and not the PTLR.
- **DR Subsection II.5, Different Name of Systems/Components**
  - Table II-3 lists FHEVAS as "Fuel Handling Area Ventilation Actuation System." But generic TS 3.3.10 is entitled "Fuel Handling Area Emergency Ventilation Actuation Signal (FHEVAS)." And generic TS 3.7.13 is entitled "Fuel Handling Area Emergency Exhaust System (FHAEES)"; should these labels be more consistent?

- **Deviation Report Section III. SYSTEM LEVEL DEVIATIONS AND JUSTIFICATION**
  - **DR Subsection III.1, Instrumentation**
    - Discuss RPS and ESFAS design; in particular the various kinds of "logic"
    - Discuss when ESF1 and ESF2 type signals are used for an ESFAS Function.
    - Discuss terms RTSS-1&2, RTSG, and RTCB
    - Discuss ESFAS Actuation logic subgroups and SR 3.3.6.2

- **DR Subsection III.2, Reactor Coolant System**
  - Explain what the following statement (III.2.2.2) means: “In the APPLICABILITY section, the 72 hours exception is based on 18 hours of outage time for each of the four valves (APR1400 adopts 4 POSRVs). The 18-hour period is determined based on operating experience.”
- **DR Subsection III.3, ECCS**
  - (III.3.1) How is SI pump flow throttled to reduce RCS pressure during a small break LOCA to conditions that allow the initiation of shutdown cooling system operation for long-term [cooling] mode?
  - (III.3.2.1) What does EOG stand for?
  - (III.3.2.3) Re: LCO 3.5.4 IRWST. Discuss and clarify the following passage: “The REQUIRED ACTION of the APR1400 TS is determined based on the conservative approach. There is no difference between NUREG-1432 and the APR1400 because the REQUIRED ACTION B.1, E.1 AND E.2 for CONDITION A and C or D in NUREG-1432 are integrated into the CONDITION A or C which is not met for the APR1400.”

    Discuss 3.5.4 Applicability Condition (Why not just say below the vessel flange?):
    “MODE 6 with RCS level < 39.7 m (130 ft 0 in).”

    Discuss 3.5.4 Condition D:
    “Required Action and associated Completion Time of Condition A or B not met in MODE 5 or MODE 6 with RCS level < 39.7 m (130 ft 0 in).”

    Discuss B 3.5.4 Actions section, Bases for Actions D.1 and D.2:
    “The plant must be placed in a condition in which the LCO does not apply if SIS cannot be returned to OPERABLE status within the ~~associated~~ **specified** Completion Time. An RCS level of greater than 39.7m (130 ft) (the top of the reactor vessel flange) will provide a minimum water inventory in the event of a LOCA. In case ~~that~~ the reactor water level is below the reactor vessel flange with the **vessel head removed** ~~off~~ in MODE 6, one safety injection pump is required immediately after **a LOCA** ~~loss of coolant accident~~ at the low power shutdown condition according to the shutdown LOCA safety analysis. If the reactor coolant water level is above the reactor vessel flange with **the vessel** head **removed** ~~off~~ in MODE 6, the low power shutdown risk is negligible because sufficient water inventory in refueling pool is available.”

    “Therefore, the reactor flange water level above the reactor vessel flange with **the vessel** head **removed** ~~off~~ in MODE 6 does not require one safety injection pump after loss of coolant accident at low power shutdown risk. In addition, if RCS water level is below the flange of the reactor vessel, there is a potential of evaporation of the coolant. The reduction of RCS cold leg temperature to less than 57.2 °C (135°F) will provide a reduction in clad temperature. If RCS cold leg temperature reaches above 57.2 °C (135°F), there is a potential to

evaporate. The 24-hour Completion Time limits the time the plant is subject to conditions where the LCO is applicable."

- Discuss the following statement: The **STS SR 3.5.4.1 surveillance column** NOTE **"[Only required to be performed when ambient air temperature is < [40]°F or > [100]°F.]"** is not necessary for the APR1400 **SR 3.5.4.1 "Verify IRWST borated water temperature is ≥ 10 °C (50 °F) and ≤ 49 °C (120 °F). | 24 hours"** since the IRWST is located in **the** reactor containment building and is not affected by changing of the ambient air temperature.

- **DR Subsection III.4, Electrical Power Systems**

  - Discuss statement: "When the GCB is open, power is backed from the transmission system through the MT to the UATs."

  - Two UAT – offsite preferred ac power supply (one per Power Division?)

  - Two SAT – offsite alternate preferred ac power supply (one per Power Division?)

  - Discuss consistent use of divisions, channels, subsystems, and trains (III.4.2.3);

    - (III.4.1.2) "Class 1E 125 Vdc system consists of four independent subsystems, trains A, B, C, and D, each corresponding to one of the four reactor protection instrumentation channels A, B, C, and D ..."

    - (III.4.1.3) "The Class 1E 120 Vac I&C power system is separated into four subsystems, trains A, B, C, and D that supply power to the plant protection system channels A, B, C, and D.

  - Discuss these statements:

    - (III.4.2.1) The unavailability of either one or two EDGs on one division disables one load group to perform its partial or all of the safety functions.

    - (III.4.2.1) Because of the divisional approach of the four EDGs in the APR 1400 design, the condition with three or more AC sources inoperable is divided into two different cases. What are these cases?

  - (III.4.2.4) Bracketed information is contained in SR 3.8.1.4, SR 3.8.1.7, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.15, SR 3.8.1.19, SR 3.8.1.20, SR 3.8.3.4 and SR 3.8.4.2 and LCO 3.8.3; is this designated as COL information related to EDGs assumed in CTS?

  - Discuss the following generic TS 3.8.1 Required Actions:

    - A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. | 24 hours from discovery of no offsite power to one division concurrent with inoperability of redundant required feature(s)

    - B.2 Declare required feature(s) supported by the inoperable EDG(s) inoperable when its redundant required feature(s) is inoperable. | 4 hours from

discovery of Condition B concurrent with inoperability of redundant required feature(s)

- Discuss “EDG(s) on one division” vs “EDG(s) in one division” in 3.8.1 Actions and 3.8.2 Actions.
- Discuss how LCO 3.8.2 supports LCO 3.9.5, and how 3.8.10 Required Action A.2.4 is not a duplication of Required Action A.1.

- **DR Subsection III.5, Refueling Operation**
  - (III.5.2.3) Discuss the two shutdown cooling system charging pumps, and the auxiliary charging pump
  - (III.5.2.3) Explain the statement “Therefore, there is no need to include SIT isolation in the APR1400 Technical Specification. Is there a SR regarding the status of the SIT isolation valves?
  - (III.5.2.3) Regarding the statement “These [LTOP] relief valves have full capacity each and are considered a passive device.” what is “full capacity”?
  - The Frequency modifier of SR 3.9.5.3 would be better presented as a surveillance column Note, “Only required to be met during operation with REDUCED RCS INVENTORY.”
  - (III.5.2.4) Discuss statement “CSP operability during reduced inventory operation is required” by LCO 3.9.5.
  - LCO 3.9.5.b should say “electrical division” instead of “train” because the spray pump and the shutdown cooling pump are powered from separate Class 1E 4160 V buses. That is, “With REDUCED RCS INVENTORY, the containment spray pump in the same ~~train~~ **electrical division** as an operating SCS train shall be OPERABLE.”
  - Consider adding an LCO on decay time since reactor was last made subcritical before irradiated fuel movement is permitted.
- **DR Subsection III.6, Containment Systems**
- **DR Subsection III.7, Plant Systems**
- **Table III-1 Deviations and Justification between Standard Technical Specifications and the APR1400 Technical Specifications**
  - **1.1 Definitions**
    - ESF and RPS Response Time definitions should include “In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.”
    - Discuss statement in SDM deviation justification: “The meaning of length and strength is the same.”

- **2.0 Safety Limits**

  - In 2.1.1.2 explain the extra phrase, indicated in bold font: "2.1.1.2 In MODES 1 and 2 the peak fuel centerline temperature shall be maintained at < 2,804.4 ℃ (5,080 ℉), decreasing by 32.2 ℃ (58 ℉) per 10,000 MWD/MTU **for burnup** and adjusted for burnable poison per CENPD-275-P, Revision 1-P-A."

- **3.0 LCO & SR Applicability**

  - Deviation Report should also list LCO 3.0.9

  - Justification for SR 3.0.4 should cite TSTF-359-A, 'Increase Flexibility in Mode Restraints," which is not being adopted. Also, the quoted specifications discussion should be stated for in LCO 3.0.4, and the specifications for SR 3.0.4 should be inserted.

  - The statement that ends SR 3.0.4 is appropriate foir the pre-TSTF-359-A versions of LCO 3.0.4 and SR 3.0.4. However, this means that STS Rev. 2.1 along with its reviewer's notes and exceptions to LCO 3.0.4 / SR 3.0.4 stated in Notes in individual Specifications must be compared against the generic TS to ensure any differences are addressed / justified. Exceptions to LCO 3.0.4 are found in Actions tables of Specifications 3.3.1, 3.3.5, 3.3.11, 3.3.12, and 3.4.15; and one exception to SR 3.0.4 is found in SR 3.7.1.1.

- **3.1 Reactivity Control Systems**

  - Deviation Report needs revising to reflect merging of 3.1.1 and 3.1.2 SDM LCOs (response to **RAI-Question 16-59**)

  - Staff disagree with adding a Section 1.1 definition for k_{N-1}, as proposed in response to **RAI-Question 16-60**. Better to define it in LCO 3.1.1.b, as follows: "**The effective neutron multiplication factor** calculated by considering the actual CEA configuration and assuming that the fully or partially inserted full strength CEA of highest worth is fully withdrawn **(k_{N-1})** shall be < 0.99."

  - Discuss use of RTCB in LCO 3.1.1.c and its Bases, and in the Bases for Subsections 3.3.2, 3.3.12, and 3.3.14, while RTSG is used everywhere else.

  - **See Section II.4 (RAI-Question 16-61**) regarding COLR limit for lower (negative) value of the MTC in LCO 3.1.4 and SR 3.1.~~4~~**3**.2. *In the LCO, instead of "within the limits specified in the COLR" suggest saying "within the lower limit specified in the COLR" to be consistent with SR 3.1.~~4~~**3**.2 and the RAI response. Also, why not use same phrase in LCO (a maximum positive limit) as in SR 3.1.~~4~~**3**.1 (upper limit)? Also, SR 3.1.4.1 could say, for clarity: "Verify MTC is within the upper limit **specified in LCO 3.1.4**." Alternately, the linear relationship that defines the upper limit in the LCO could be moved to SR 3.1.~~4~~**3**.1.*

  - Improve grammar of SR 3.1.~~5~~**4**.5 by inserting "is" before the phrase "≤ 4 seconds."

- (eRAI Question 8524-29095-draft) The applicant is requested to rephrase SR 3.1.~~5~~**4**.5 so that its meaning is clearer and consistent with the Bases, as follows: "Verify each full strength CEA drop time **from the fully withdrawn position to the** ~~at~~ 90% inserti**on**~~ed~~ position **is** ≤ 4 seconds."

- (eRAI Question 8524-29095-draft) Regarding SR 3.1.~~5~~**4**.5, the Deviation Report states: "This SR confirms the required CEA drop time assumed in the safety analysis This CEA drop time is in Figure 4.2-14 of DCD Tier2." The applicant should add FSAR Section 4.2 as Reference number 4 to the References section of the Bases for Subsection 3.1.**4**.

- (eRAI Question 8524-29095-draft) Regarding the Bases for SR 3.1.~~5~~**4**.5, second paragraph, suggest revising the first sentence to reflect that 4 seconds is the upper limit for an operable CEA drop time, as follows: "The 4 second CEA drop time is the maximum time ~~it takes~~ **allowed** for a fully withdrawn individual full strength CEA to reach its 90% insertion position when electrical power is interrupted to the CEA drive mechanism with RCS T_{cold} greater than or equal to [286.7 °C (548 °F)] and all reactor coolant pumps operating." Also, do the square brackets around the temperature criterion imply this is a COL Action Item?

- (eRAI Question 8524-29097-draft) On page 30, the Deviation Report justifies adding RPS Functions 3.3.1.2, 3.3.1.14, 3.3.1.15, and 3.3.2.1 to the list of excepted LCO requirements in DCD Revision 0, generic TS LCO 3.1.10, as follows:

  > RPS bypass setpoint change was determined as a STE during a previous plant startup test. RPS bypass setpoint changes need to prevent unnecessary reactor trip by RPS during criticality test. The criticality test and related SR are added.

  Applicant is requested to explain in more detail what this paragraph means.

  - Describe the changes to RPS bypass setpoints, and how that applies to including these Functions in the LCO 3.1.10 exception list;
  - Describe the issue related to the criticality test that lead to a need for RPS bypass setpoint changes;
  - Explain why APR1400 needs this exception while CE STS does not.

- (eRAI 8524) Defined terms must be in all upper case letters. For example, the Applicability for Specification 3.1.**11** needs to make "Thermal Power" all upper case letters.

- (eRAI Question 8524-29096-draft) In LCO 3.1.**11** of Specification 3.1.**11** "Special Test Exceptions (STE) – Reactivity Coefficient Testing," replace the last phrase "limits specified in their LCOs" with:

  > "... may be suspended, provided Linear Heat Rate (LHR) and Departure from Nucleate Boiling Ratio (DNBR) do not exceed the limits specified in**:** ~~their LCOs.~~

LCO 3.2.1, "Linear Heat Rate (LHR)"; and
LCO 3.2.4, "Departure from Nucleate Boiling Ratio (DNBR)."

- (eRAI Question 8524-29096-draft) The generic TS Bases for SR 3.1.**11**.1 says: "If COLSS is not available, LHR and DNBR can be continuously monitored using any OPERABLE CPC channel. Continuous monitoring is required to ensure that the LHR and DNBR limits are satisfied at all times." However, SR 3.1.**11**.1 says: "Verify LHR and DNBR do not exceed limits by performing SR 3.2.1.1 and SR 3.2.4.1. | Continuously". But SR 3.2.1.1 and SR 3.2.4.1 are both phrased so that **all operable LHR and DNBR channels must show these parameters are within limits in order to meet these SRs**.

  In addition, if COLSS is out of service, it is impractical to specify a Frequency of "Continuously". The applicant is requested to specify a short-interval surveillance Frequency to replace "Continuously." The applicant is also requested to clarify that if the Section 3.2 surveillances are being performed to comply with SR 3.1.**11**.1, with COLSS out of service, then just one channel for each parameter is needed to meet SR 3.1.**11**.1.

- (eRAI Question 8524-29100-draft) The Deviation report justifies including LCO 3.4.1.b in the LCO 3.1.**11** exception list by stating: "The LCO for cold leg temperature is narrow for the APR1400, so the LCO 3.4.1.b may be suspended." LCO 3.4.1.b states

  > RCS departure from nucleate boiling (DNB) parameters for pressurizer pressure, cold leg temperature, and RCS total flow rate shall be within the limits specified below:
  >
  > b. RCS cold leg temperature (T_{cold})
  > ≥ 286.7 °C (548 °F) and ≤ 293.3 °C (560 °F) for < 90 % RTP
  > ≥ 289.4 °C (553 °F) and ≤ 293.3 °C (560 °F) for ≥ 90 % RTP

  This means that below 90% RTP there is a 12 degree F band, and at or above 90% RTP there is a 7 degree F band. The applicant is requested to discuss how these temperature bands compare with the CE plant design assumed in CE STS 3.4.1. {SPSB needs SRSB concurrence on the proposed exception.}

- Also, do we have a satisfactory explanation for all of the APR1400 generic TS special test exception LCO differences from the STS special test exception LCOs?

  STS .....GTS

  3.1.8, STE – SDM (Digital) .....3.1.**9**, STE - SDM
  3.1.9, STE – MODES 1 and 2 (Digital). ....3.1.**10**, STE – MODES 1 and 2
  None. .....3.1.**11**, STE – Reactivity Coefficient Testing
  3.4.17, STE – RCS Loops. .....None

- **3.2 Core Operating Limits**

- **3.3 Instrumentation**

  - The Deviation Report Justification for generic TS 3.3.1 Action B includes the statement, 'The NOTE shall be changed to "LCO 3.0.4 is not applicable".' Revision 0 of generic TS 3.3.1 includes no such Note.

- **3.4 Reactor Coolant System**

  - Discuss whether generic TS 3.4.11 should include a SR to verify charging pump flow restrictor limits flow rate from both charging pumps to the flow of one charging pump. (DR page 73)

  - Discuss omission of requirement for SIT isolation by LCO 3.4.11; DR page 73 states: "SIT operating pressure is 610 psig and SIT discharge cannot pressurize over LTOP limit pressure, 625 psia. It is because RCS pressure can be assumed to be less than 450 psia (SCS cut in pressure), and RCS volume is larger than SIT. Therefore, there is no need to include SIT isolation in the APR1400 Technical Specification."

    This discussion seems inconsistent with LCO 3.4.11.a which requires SCS suction line relief valves with lift settings ≤ 37.3 kg/cm2 (530 psig). Explain.

  - On DR page 74, justfication for omission of STS 3.4.12 Actions table Note should mention that TSTF-359-A, which added the Note, is not being adopted in generic TS 3.4.11.

  - Revise 3.4.11 Condition C to refer to Condition A or B (Required Action and associated Completion Time of Condition A or B not met.) (DR page 75)

  - Correct the DR page 75 justification for generic TS 3.4.11, Required Action C.1, which incorrectly refers to SCS suction isolation valve instead of SCS suction line relief valve.

  - Regarding generic TS 3.4.11, since there is no overpressure protection interlock to prevent opening SCS to RCS before RCS pressure is below LTOP lift pressure, and no automatic isolation of SCS upon RCS pressure increasing above LTOP lift pressure, discuss how not over-pressurizing the SCS is ensured while transitioning between MODE 4 and MODE 3 or during the transition to or from SC operation. (DR page 77 – "There is no auto-closure interlock in the APR1400. OPP for SCS is performed by LTOP relief valves.")

  - Generic TS 3.4.14 and Bases – new draft comments (Le)
    - Condition A should say "Required containment sump monitor inoperable" instead of "One or more required channel(s) inoperable"
    - Required Action B.2.1 should say "Restore required containment atmosphere radioactivity monitor to OPERABLE status" instead of "Restore required containment sump monitor to OPERABLE status"
    - Delete Required Action B.2.2, since it duplicates Required Action B.2.1
    - Delete Condition D Note which reads "Only applicable when the containment atmosphere gaseous radiation monitor is the only OPERABLE monitor." The gaseous radiation monitor is not listed in the LCO 3.4.14 statement

- Revise Required Actions D.1 and D.2 to read similar to those for Condition E for a different combination of inoperable monitors
- Revise the phrase "of **the** required containment … monitor" in all SR statements
- Revise Subsection B 3.4.14 to reflect not only the above changes, but also the inclusion of the containment humidity monitor as a part of the LCO statement.

- **3.5 Emergency Core Cooling Systems**

- **3.6 Containment**

  - (RAI-Question 8530-29226 draft) On DR page 90, generic TS SR 3.6.2 1 includes the following:

    The acceptance criteria for air lock testing are:

    a. Overall air lock leakage rate is ≤ 0.05 L_a when tested at ≤ P_a [3.77 kg/cm2 (53.6 psig)].

    b. For each door seal leak rate is ≤ 0.01 L_a when tested at ≤ P_a [3.77 kg/cm2 (53.6 psig)].

    This information is not included in STS SR 3.6.2.1, but is included in STS 5.5.16.d.2. It is also included in generic TS 5.5.16.d.2, but the individual door leak rate criterion is:

    d. Leakage rate acceptance criteria are:

    2. Air lock testing acceptance criteria are:

    ii. For each door, leakage rate is ≤ 0.01 L_a when pressurized to ≥ 10 psig.

    In addition, generic TS 5.5.16.b states:

    b. The calculated peak containment internal pressure for the design basis loss of coolant accident, P_a is 51.77 psig. The containment design pressure is 60 psig.

    The program specification values for P_a and the airlock door test pressure differ from the values stated in the Deviation Report and generic TS SR 3.6.2.1.

    The applicant is requested to remove the criteria from SR 3.6.2.1 and verify the airlock leak test acceptance criteria values are consistent with DCD Tier 2 Chapter 6 values. Also make any necessary conforming changes to the Bases for SR 3.6.2.1.

- **3.7 Plant Systems**

  - The Note below the Subsection title of Specification 3.7.11, "Control Room HVAC System (CRHS)" is not appropriate for the Specification; put this design detail in the Bases Background section. The inclusion of this Note is not described on DR page 105. The Note states: "The CRHS consists of two

divisions of control room emergency makeup air cleaning system (CREACS) and control room supply and return system (CRSRS)."

- "HVAC" needs to be defined whenever first used in each Specification and Bases subsection.
- LCO 3.7.11 in generic TS rev. 0 states, "Two CRHS divisions shall be OPERABLE." but DR page 106 quotes LCO 3.7.11 as "The CRHS shall be OPERABLE with: *a. Two CREACS divisions OPERABLE; and* b. Two AHUs in two CRSRS divisions OPERABLE." (Text in italics is a guess.)
- Modify the phrase in SR 3.7.12.4 as indicated: "...can be maintained at a **pressure of** ≤ -6.35 mm (-0.25 inches) water gauge with respect to the adjacent areas..."

- **4.0 Design Features**
  - RAI-Question 16-24, Item 14, eRAI 7977
- **5.0 Administrative Controls**
  - Need more details about differences in Section 5.5 programs than given in DR.

3. Combined License (COL) Action Items

4. Bases RAIs

5. Specification 5.5.14, TS Bases Control Program (§52.98 vs §50.59)

6. General RAIs (TSTFs, Units, §50.36(c)(2)(ii) LCO criteria)

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RAI Q #	eRAI #	eQuestion ID & resp. #	Sub-question #	Tech Branch Reviewer, Response ACN	Review Document Section	eRAI Status	State Waiting for Response (WFR)	DNRL PM Assigned To	Current Review Start Date	Current Review Due Date
16-xxx	8530	29114	–	SPSB - Harbuck	3.7.5 Action C - AFW	draft	Chapter PM Review	Ward, Bill		
16-xxx	8530	29116	–	SPSB - Harbuck	3.6.2, SR 3.6.2.1, airlock door leak test conditions	draft	Chapter PM Review	Ward, Bill		
16-xxx	8530	29126	1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17.a(1) 17.a(2) 17.a(3) 17.a(4) 17.a(5) 17.b 17.c(1) 17.d 17.e(1) 17.e(2) 17.f(1) 17.f(2) 17.f(3) 17.f(4) 17.f(5) 17.f(6) 17.f(7) 17.f(8) 17.g	SPSB - Harbuck	3.3.8, B 3.3.8 - CPIAS	draft	Chapter PM Review	Ward, Bill		
16-xxx	8530	29127	1 2 3 4 5 6 7	SPSB - Harbuck	3.3.9, B 3.3.9 - CREVAS	draft	Chapter PM Review	Ward, Bill		

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16-xxx	8530	29128	1 2 3 4 5 6 7 8	SPSB - Harbuck	3.3.10, B 3.3.10 - FHEVAS	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29095	–	SPSB - Harbuck	(as renumberd) SR 3.1.4.5	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29096	–	SPSB - Harbuck	(as renumberd) SR 3.1.11.1, 2	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29097	–	SPSB - Harbuck	(as renumberd) LCO 3.1.10 STE for 3.3.1 RPS Functions 2, 14, 15 and 3.3.2 RPS Function 1 – criticality test – Dev. Report page 30	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29098	–	SPSB - Harbuck	1.1 definition of ESF Response Time	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29099	1. 2. 3. 4. 5. 6.	SPSB - Harbuck	1. LCO 3.3.13 2. 3.3.13 Applicability 3. B 3.3.13 – SR 3.3.13.2 4. B 3.3.13 – SR 3.3.13.2, 3 5. B 3.3.13 – Action A 6. B 3.3.13 – Action A.1	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29100	–	SPSB - Harbuck	• (as renumberd) LCO 3.1.11 STE to LCO 3.4.1.b • (as renumberd) B 3.1.11 Applicable Safety Analyses section	draft	Chapter PM Review	Ward, Bill		
16-xxx	8524	29101	1. 2.	SPSB - Harbuck	1. LCO 3.0.9 2. Exceptions to LCO 3.0.4; 1.4 Example 1.4-5	draft	Chapter PM Review	Ward, Bill		
16-106	8289	28185	a) b) c) d)	EEB – Som (SPSB – Tjader) resp.	a) SR 3.8.1.6 Frequency – why 92 days instead of 31 days? b) SR 3.8.1.14 – include load criteria in terms of kW c) SR 3.8.4.3 designator missing d) SR 3.8.6.5 Frequency – why 92 days instead of 31 days?	Open	Issued - WFR	Ciocco, Jeff	09/28/15 10/14/15	10/28/15 11/13/15

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RAI Q #	eRAI #	eQuestion ID & resp. #	Sub-question #	Tech Branch Reviewer, Response ACN	Review Document Section	eRAI Status	State Waiting for Response (WFR)	DNRL PM Assigned To	Current Review Start Date	Current Review Due Date
16-107	8289	28186 resp. 24865	a) b)	EEB – Som (**SPSB – Tjader**) ML15351A182	a) SR 3.8.1.4 day tank fuel volume limit discrepancy with useable volume value stated in DCD Table 9.5.4-1 b) SR 3.8.3.4 – starting air receiver pressure criteria basis	Open	In Evaluation resp. 12/17/15	Ciocco, Jeff	09/28/15 12/23/15	10/28/15 01/22/16
Need to make sure that response to **RAI-Question 16-44** includes the following values as bracketed COL Action Items: SR 3.8.1.4, EDG day tank fuel volume limit, and SR 3.8.3.4, EDG starting air receiver pressure limits.										
16-109	8263	28034 resp. 25085	1 2	SPSB – Harbuck ML16006A511	1. LCO 3.2.4; B 3.2.4 LCO Section – there are eight CEACs, not two 2. Request draft of COLR	Open	In Evaluation resp. 1/6/16	Ciocco, Jeff	10/20/15 11/05/15 01/19/16	11/19/15 12/05/15 02/18/16
►In COLR Figure 3.2.4-2, "DNBR Margin Operating Limit based on the Core Protection Calculators (COLSS out of Service, Minimum of One CEAC Operable in each operable CPC channel)" ►In LCO 3.2.4.b.2 and COLR Figure 3.4.2-3, "DNBR Margin Operating Limit based on the Core Protection Calculators (COLSS out of Service, Both CEAC Inoperable in any operable CPC channel)," and LCO section of Bases, it is unclear whether all four Operable CPC channels have both CEACs inoperable.										
16-110	8263	28035 resp.	1 2 3 4	SPSB - Harbuck	1. B 3.3.1 Background Section 2. B 3.3.1 Background Section 3. B 3.3.1 Background Section 4. B 3.3.1 Background Section	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-111	8263	28036 resp.	1 2 3 4 5 6 7 8 9 10 11 12	SPSB - Harbuck	1. 3.3.5 Required Action C.2.2 2. 3.3.5 Required Actions A.2 and C.2.2 Completion Times 3. 3.3.5 Condition C 4. 3.3.5 Actions E and F, Required Action Notes 5. 3.3.5 Action B, Required Action Note 6. 3.3.5 Required Actions C.2.1 and C.2.2 Logical Connector indentation 7. 3.3.5 Action D, Required Action Note 8. 3.3.5 Required Actions C.1 and D.1 unclear 9. SR 3.3.5.2, SR 3.3.5.3 10. Table 3.3.5-1 11. 3.3.5 omission of Mode 4 from Applicability of Functions 3a and 3b 12. 3.3.5 Actions E and F, Required Action Note placement .	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15

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RAI Q #	eRAI #	eQuestion ID & resp. #	Sub-question #	Tech Branch Reviewer, Response ACN	Review Document Section	eRAI Status	State Waiting for Response (WFR)	DNRL PM Assigned To	Current Review Start Date	Current Review Due Date
16-112	8263	28037 resp.	 1 2 3.a 3.b 4 5 6	SPSB - Harbuck	B 3.3.5 Background Section: 1. page 3.3.5-4, ESFAS “logics” vs. “logic” 2. page B 3.3.5-5 suggested edits 3.a page B 3.3.5-5 logic description 3.b page B 3.3.5-5, ESF-CCS component list descriptions 4. page B 3.3.5-5, ESFAS Function subgroups 5. page B 3.3.5-5 suggested edits 6. page B 3.3.5-5 suggested edits	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-113	8263	28385 resp. 25085	 1 2 3 4 5 6 7 8	SPSB – Harbuck ML16006A511	 1. 3.3.13, 3.3.14, 3.9.2, B 3.3.13, B 3.3.14, B 3.9.2, source range neutron flux monitor nomenclature, boron dilution alarm system (BDAS) 2. 3.3.14 Applicability 3. 3.3.14 Applicability for Mode 6; LCO 3.9.2, 3.9.2 Actions A and B 4. B 3.1.2~~1~~**1** Applicability Section; inadvertent boron dilution event; why no Section 3.9 LCO to lock shut makeup source in Mode 6? 5. 3.3.14 Required Action column Note placement for Actions A and B, boron concentration verification required action test interval completion times in COLR 6. 3.3.14 Surveillance Require-ments table placement 7. 3.3.14 SRs 8. SR 3.3.14.1 Channel Check; B 3.3.14 SR Section for SR 3.3.14.1 and SR 3.3.14.3	Open	In Evaluation resp. 1/6/16	Ciocco, Jeff	10/20/15 11/05/15 01/19/16	11/19/15 12/05/15 02/18/16

1. The GTS 3.3.14 markup needs correction, as follows: • LCO 3.3.14 should say: “Two Boron Dilution Alarm System (BDAS) channels shall be OPERABLE.” • Condition A should say: “One BDAS channel inoperable.” • Condition B should say: “Two BDAS channels inoperable.” • In B 3.3.14 Background section third paragraph, use “BDAS” only, because acronym is already defined in first paragraph. Also, third paragraph must define first use of ENFMS. • In B 3.3.14 LCO section second paragraph, the second change should be same as first change; i.e., use “startup channels of the ENFMS.” • In B 3.3.14 Applicability section third paragraph the first sentence should not refer to a Note. Revise sentence to say, “The Appliocability specifies that the BDAS is required in MODE 3 within 1 hour after . . .” ► In B 3.3.14 Actions section first paragraph, the second sentence says: “These [OPERABILITY] criteria are outlined in the LCO section of the Bases.” However, no BDAS channel operability criteria are stated in the LCO section; please add a description of the criteria to the LCO section. ► In B 3.3.14 Actions section second paragraph, in the first sentence, replace “prohibit” with “prevent” which better conveys the intended meaning.

continued

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16-113 (continued) 2. In the markup of GTS 3.3.14, remove the extra line in the Applicability statement. Also, indent of continuation line is 1.82 inches from left page margin. 3. Since the applicant is planning new Subsection 3.9.7 in response to Jeffrey Schmidt's **RAI 216-8221 27860 Question 15.04.06-7; resp. 24805 ML15345A378 12/11/15** to prohibit dilution in MODE 6, SPSB concludes that the BDAS channel operability is not needed in MODE 6. 4. Staff does not understand how the response addresses Sub-question No. 4 regarding the conservatism of assuming 30 minutes instead of 15 minutes before initiating manual action to terminate a boron dilution event. • In the markup of GTS B 3.9.2 Background section, the ENFMS and BDAS acronyms should be defined on first use such that the first two sentences say: "The installed startup channels of the **Ex-Core Neutron Flux Monitoring System (**ENFMS**)** and **the B**oron **D**ilution **A**larm **S**ystem **(BDAS)** are used during refueling operations to monitor **the** core reactivity condition. The startup channels are a part of the ENFMS and related indicators and recorders. **The neutron flux** detectors **of these startup channels** are located external to the reactor vessel and detect neutrons leaking from the core." In addition, discuss how the startup channels are a part of the "related indicators and recorders." • Suggest adding the following sentence to the B 3.9.2 LCO section: "The BDAS is not required to be OPERABLE in MODE 6 because sufficient time is available for the operator to detect and terminate a boron dilution event, and because such an event is precluded by LCO 3.9.7, "Unborated Water Source Isolation Valves" which requires the flow paths for unborated makeup water sources be locked closed in MODE 6." • The B 3.9.2 ASA section says "Each **startup channel of the ENFMS** provides visual indication in the **main control room (**MCR**)** and an audible alarm to alert operators to a possible dilution accident." **Is the audible alarm the BDAS channel, or a separate alarm?** 5. Response is acceptable based on included markups of Subsections 3.3.14 and B 3.3.14. SRSB should technically look at COLR tables 3.3.14-1 through 3.3.14-5 in the response. 6. Response is acceptable based on included markups of Subsections 3.3.14 and B 3.3.14. 7. Since NUREG-1492 has no LCO for BDAS startup channels, and CE System 80+ 3.3.12 is not referenced by the application, the response is acceptable based on included markups of Subsections 3.3.14 and B 3.3.14. 8. The surveillance column Note for SR 3.3.14.1, Channel Check of BDAS channels, proposed revision is not consistent with the STS convention for Notes that actually modify the surveillance frequency, not the applicability of the surveillance. The Note should say: "Not required to be performed until 1 hour after neutron flux is within the startup range **in MODE 3**."									
16-114	8263	28386 resp.	1 2 3a 3b 3c 3d 4 5	SPSB - Harbuck	1. 3.3.6 Functions 3a and 3b Applicability omits Mode 4 2. 3.3.6 Action E and F Required Action Note placement; omission of Functions 2 and 7; edit of Conditions E and F. 3a. LCO 3.3.6 omits explicit inclusion of Diverse Manual ESF Actuation; B 3.3.6 LCO Section. 3b. B 3.3.6 for Required Action D.1 3c. 3.3.6 Action D; Actions table Note omits explicit inclusion of Diverse Manual ESF Actuation Functions 3d. Table 3.3.6-1 Functions 7e and 7f - request shorter restoration Completion Time for Required Action D.1 4. B 3.3.6 for Required Actions E.1, E.2, F.1, F.2 and Notes 5. SR 3.3.6.1 and SR 3.3.6.2 surveillance column Notes suggested edits	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15

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16-115	8263	28387 resp.	1	SPSB - Harbuck	1. SR 3.3.6.2 Note 2; B 3.3.6 for SR 3.3.6.2 - ESFAS Actuation Logic subgroups; TeR TeR APR1400-Z-J-NR-14001-P	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
			2		2. B 3.3.6 upgrades					
			3		3. B 3.3.6 Background and Action Sections – "trip leg" as used in Required Actions B.1 and B.2					
			4a		4a. B 3.3.5 and B 3.3.6 Background Section para 1					
			4b		4b. B 3.3.5 and B 3.3.6 ordered list					
			4c		4c. B 3.3.5 and B 3.3.6 Background Section para 4					
			4d		4d. pages B 3.3.5-1 & 2, and page B 3.3.6-2 – suggested edits					
			4e		4e. pages B 3.3.5-2 & 3 – change "Bistable Logics" to "Bistable Logic Processors"					
			4f		4f. page B 3.3.6-2 and page B 3.3.5-4 – suggested edits; global consistency of Section B 3.3 Background sections					
			4g		4g. pages B 3.3.6-2 and -3 suggested edits					
			4h		4h. page B 3.3.6-3, suggested edits					
			5a		5a. B 3.3.6 Background section – discuss Diverse Manual ESF Actuation Functions					
			5b		5b. B 3.3.6 ASA Section - discuss Diverse Manual ESF Actuation Functions					
			5c		5c. B 3.3.6 LCO Section - discuss Diverse Manual ESF Actuation Functions					
			5d		5d. B 3.3.6 Applicability Section - discuss Diverse Manual ESF Actuation Functions					
			6		6. Why no LCO for automatic Diverse ESF Actuation Functions					
16-116	8263	28388 resp.	–	SPSB - Harbuck	3.3.6 – explain inclusion of priority logic, which is implemented in the LC and the CIM, for 3.3.6 Functions 1c, 2c, 3c, 4c, 5c, and 6c	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15

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16-117	8263	28389 resp.	(1)	SPSB - Harbuck	(1) B 3.3.6 – explain how loss of (vital ac) electrical power to two PPS divisions initiates SIAS, CSAS, CIAS, MSIS, and AFAS	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
			(2)		(2) B 3.3.6 - explain how loss of (vital ac) electrical power to two PPS divisions affects an enabled operating bypass					
			(3)		(3) B 3.3.6 and DCD Tier 2 Chapters 7 and 8 - explain how loss of (vital ac) electrical power to two PPS divisions initiates SIAS, CSAS, CIAS, MSIS, and AFAS					
			(4)		(4) B 3.3.6 and B 3.3.7 – revise to explain how SIAS, CSAS, and AFAS initiate EDG start					
			(5)		(5) B 3.3 – explain affect on an enabled operating bypass if associated PPS division loses ac power					
16-118	8263	28391 resp.	–	SPSB - Harbuck	page B 3.3.4-4 suggested edits of RTSS description	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-119	8263	28405 resp.	–	SPSB - Harbuck	page B 3.3.6-5, ASA Section discussion of ASAF suggested edits and technical accuracy	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-120	8263	28406 resp.	–	SPSB - Harbuck	page B 3.3.6-8 AFAS-2 discussion in ASA Section - correct error in required number of coincidence logic channels	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-121	8263	28407 resp.	–	SPSB - Harbuck	B 3.3.6 Applicability Section – Mode 4 applicability for ESFAS logic functions	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15

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RAI Q #	eRAI #	eQuestion ID & resp. #	Sub-question #	Tech Branch Reviewer, Response ACN	Review Document Section	eRAI Status	State Waiting for Response (WFR)	DNRL PM Assigned To	Current Review Start Date	Current Review Due Date
16-122	8263	28408 resp.	1	SPSB - Harbuck	1. B 3.3.1, B 3.3.4, B 3.3.5, and B 3.3.6 SRs Section, para 1, suggested edits - ITP	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
			2		2. B 3.3.5 SRs Section, for SR 3.3.5.2 – five paragraphs – suggested edits					
			3		3. B 3.3.6 SRs Section, for SR 3.3.6.1 – six paragraphs – suggested edits					
			3a		3a. Explain and clarify the last sentence of the 6th paragraph					
			3b		3b. Explain why the LCL, initiation logic, and actuation logic tests are described in the above Bases discussions as being performed sequentially, without any discussion of overlap					
			3c		3c. Descriptions of the ESFAS Actuation Logic are unclear					
			3d		3d. List all component groups, subgroups, which ESF-CCS ESFAS Actuation Logic Division is associated with the components in each subgroup, and testing MODE constraints					
			3e		3e. B 3.3.6 SRs Section, clarify basis statement of Frequency for SR 3.3.6.2					
			3f		3f. Applicability of SR 3.3.6.1 and SR 3.3.6.2 to 3.3.6 Function 7 is ambiguous					

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16-123	8263	28417 resp. Note that related RAI-Questions 7.5-1 and 7.5-6 need to be resolved as part of the resolution of this question.	1. 2. 3. 4. 5.	SPSB - Harbuck	1. Table 3.3.11-1 PAM Function List conformance to RG 1.97 Rev 4; B 3.3.11 consistency with • DCD Tier 2 Chapter 15 events regarding credited operator actions – Type A variables • DCD Tier 2 Section 7.5 PAM variables list and descriptions 2. B 3.3.11 consistency with DCD Table 7.5-1 3. AMI (PAM) varaible selection process 4. DCD Table 7.5-1 5. B 3.3.11 – do not use CHANNEL by itself	Open	Issued - WFR	Ciocco, Jeff	10/20/15 11/05/15	11/19/15 12/05/15
16-108	8215	27866 resp.	1 2 3 4 5 6 7 8 9 10 11	SPSB - Le	1. B 3.4.10 Background Section – describe operation of POSRV 2. B 3.4.11 Background and ASA Sections omit STS B 3.4.10 discussions of SCS suction line relief valves and the RCS vent opening. 3. B 3.4.11 Background – operator action in response to RCS pressure increase 4. B 3.4.11 ASA Section – shutdown overpressure event 5. B 3.4.11 Applicability Section – cooldown or heatup? 6. B 3.4.11 Actions Section – Required Actions A.1 and B.1 7. 3.4.16 Required Action B.1 Completion Time justification 8. SR 3.4.16.3 9. 3.7.4 Condition A, LCO should be “Two MSADV lines per SG” 10. 3.7.4 bogus Condition 11. 3.7.12 Actions provide no Condition for loss of function as does STS 3.7.13 Actions	Open	Issued - WFR	Ciocco, Jeff	09/28/15 11/03/15	10/28/15 12/03/15
16-46	8108	27533 resp. 24683	–	SPSB – Tjader ML15341A355	B 3.5.1 Background Section – SIT isolation valve automatic open actuation signals	Open	In Evaluation resp. 12/7/15	Ward, William	08/03/15 12/10/15	09/02/15 01/09/16

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Bases Subsection B 3.5.1 should add a discussion of when electrical power is and is not removed from the safety injection tank (SIT) motor operated isolation valves, similar to that provided in the RAI-Question response.										
16-47	8108	27535 resp. 24684	–	SPSB – Tjader ML15341A355	B 3.5.1 Actions Section – Required Action B.1 discussion unclear	Open	In Evaluation resp. 12/7/15	Ward, William	08/03/15 12/10/15	09/02/15 01/09/16
16-48	8108	27536 resp. 24685	–	SPSB – Tjader ML15341A355	B 3.5.2 Condition A and Condition C – bases should explain diagonal SI trains	Open	In Evaluation resp. 12/7/15	Ward, William	08/03/15 12/10/15	09/02/15 01/09/16
The Bases should reference the FSAR discussion provided in the response, describing that full flow from two diagonal SIS trains is credited because the safety analysis criteria cannot be satisfied should a cold leg break occur on one of the two adjacent DVI nozzles due to core bypass flow that could occur."										
16-87	8076	27469 resp. 25221	–	SPSB – Harbuck ML16028A482	3.3.1, the Actions Table Notes placement	Open	Resolved resp. 1/28/16	Ciocco, Jeff	09/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-88	8076	27470 resp. 25222	–	SPSB – Harbuck ML16028A482	3.3.1, the Actions Table Note 2 3.3.2, the Actions Table Note 2 3.3.5, the Actions Table Note 2	Open	Resolved resp. 1/28/16	Ciocco, Jeff	09/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-89	8076	27773 resp. 25223	–	SPSB – Harbuck ML16028A482	3.3 – surveillance scope and terminology inconsistent with DCD Sections 7.2 and 7.3	Open	In Evaluation resp. 1/28/16	Ciocco, Jeff	09/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-90	8076	27774 resp. 25224	–	SPSB - Harbuck ML16028A482	3.3 - automatic operating bypass removal function channel(s) associated with RPS and ESFAS instrument[ation] Functions	Open	In Evaluation resp. 1/28/16	Ciocco, Jeff	09/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
3.3.1 Required Action C.1 says "Disable bypass channel"; it should say "Disable **automatic operating** bypass **removal** channel." 3.3.1 Requirted Action C.2.2 should say "Restore **automatic** operating bypass removal channel and associated automatic trip channel to OPERABLE status." 3.3.1 Required Action D.1 says "Disable bypass channels"; it should say "Disable **automatic operating** bypass **removal** channels."										
16-91	8076	27775 resp. 25225	–	SPSB - Harbuck ML16028A482	B 3.3.1 - Trip Path Tests discussion - clarification requested	Open	Resolved resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-92	8076	27776 resp. 25226	–	SPSB - Harbuck ML16028A482	Table 3.3.1-1 Footnotes (a) and (c) for RPS Functions 2, 14, 15	Open	In Evaluation resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-93	8076	27777 resp. 25227	–	SPSB - Harbuck ML16028A482	B 3.3.1 SR Section – for SR 3.3.1.9 Channel Calibration	Open	Resolved resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-94	8076	27778 resp.	–	SPSB - Harbuck	SR 3.3.1.6 surveillance column Note	Open	Issued - WFR	Ciocco, Jeff	9/28/15 10/09/15	10/28/15 11/08/15
16-95	8076	27779 resp.	–	SPSB - Harbuck	B 3.3.1 SR Section – for SR 3.3.1.4 and SR 3.3.1.8 – calorimetric terminology consistency	Open	Issued - WFR	Ciocco, Jeff	9/28/15 10/09/15	10/28/15 11/08/15

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16-96	8076	27780 resp. tbd	 a **b**	SPSB - Harbuck ML16028A482	 a. SR 3.3.1.7 surveillance column Note 1 deviation from STS b. Use of RTSG for RTCB	Open	 a. Resolved resp. 1/28/16 b. In Evaluation resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16

- On page 3.3.2-4, markup of Footnote (b) of Table 3.3.2-1, make RTCBs to be singular: "With any reactor trip ~~switchgears (RTSGs)~~ **circuit braker (RTCB)** closed, any control element assembly (CEA) capable of being withdrawn, and fuel loaded in reactor."
- On page 3.3.4-1, markup of LCO 3.3.4, make "Reactor Trip Circuit Breakers (RTCBs)" lower case: "reactor trip circuit breakers (RTCBs)"
- On page 3.3.4-1, markup of LCO 3.3.4, Applicability should say "with any RTCB closed and any control element assembly (CEA) capable of being withdrawn" instead of "with any RTCBs closed and any control element assemblies capable of being withdrawn" to be consistent with LCO 3.3.2 Applicability
- On page B 3.3.1-2, markup of Bases Background, third paragraph, first sentence of list item c, should say "RPS logic - provides trip signal to ~~RTSG~~ **reactor trip circuit breakers (RTCBs)** after performing 2/4 logic based on bistable trip status of four channels."; list item d should say "~~RTSG~~ **Reactor Trip Switchgear System (RTSS)** – opens ~~trip switchgear~~ **RTCBs** based on trip signal from RPS logic. ~~RTSG consists of~~ **Each RTCB has** undervoltage trip equipment and shunt trip equipment. The PPS interfaces with the undervoltage trip device of ~~RTSS breakers~~ **the RTCBs**. The DPS interfaces with the shunt trip device of the ~~RTSS breakers~~ **RTCBs**."
- On page B 3.3.1-8, in markup of Bases Background section, fourth paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
- On page B 3.3.1-9, markup of Bases Background, last paragraph on page, the last two sentences should say "Each RTSS channel consists of two ~~reactor trip switchgears (RTSGs)~~ **RTCBs**. The eight ~~RTSGs~~ **RTCBs** are connected ~~with~~ **in a** 2-out-of-4 **logic** configuration."
- On page B 3.3.2-2, markup of Bases Background, third paragraph on page, list item d, "Reactor trip switchgears (RTSGs)" should be replaced by Reactor trip circuit breakers (RTCBs) for consistency.
- On page B 3.3.3-2, markup of Bases Background, first paragraph on page, list item d, "RTSG" should be replaced by "Reactor trip circuit breakers (RTCBs)" for consistency.
- On page B 3.3.4-2, markup of Bases Background, third paragraph on page, list item d, "RTSG" should be replaced by "Reactor trip circuit breakers (RTCBs)" for consistency.
- On page B 3.3.4-3, in markup of Bases Background section, fifth paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
- On page B 3.3.4-6, in markup of Bases LCO section, third paragraph on page, last sentence, "one switchgear in RTSG in turn" should be changed to "one RTCB in turn"; not "one breaker in RTCB in turn."
- On page B 3.3.4-11, in markup of Bases SR section, under SR 3.3.4.2, third and fourth sentences, for consistency, suggest replacing "RTSS breakers" with "RTCBs"

16-97	8076	27781 resp. tbd	–	SPSB - Harbuck ML16028A482	B 3.3.1 LCO Section – suggested clarifying edits	Open	Resolved resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-98	8076	27782 resp. tbd	 1 2	SPSB – Harbuck ML16028A482	 1. B 3.3.1 Actions Section first paragraph 2. B 3.3.1 – do not need "SCP" to modify "AV"	Open	resp. 1/28/16 1. Resolved 2. Resolved	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16

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16-99	8076	27783 resp. tbd	 1 2 3 4 5 6 7 8	SPSB - Harbuck ML16028A482	1. 3.3.1 Required Action A.2 and B 3.3.1 Actions Section 2. 3.3.1 Required Actions A.2 and C.2.2 Completion Time 3. 3.3.1 Condition B 4. 3.3.1 Conditions C and D 5. 3.3.1 Required Action B.1 Note 6. 3.3.1 Required Actions C.2.1 and C.2.2 Logical Connector 7. 3.3.1 Action D 8. 3.3.1 Required Actions C.1 and D.1 unclear	Open	resp. 1/28/16 1. Resolved 2. Resolved 3. Resolved 4. Resolved 5. Resolved 6. Resolved 7. Resolved 8. In evaluation– same as 16-106.8	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
• Sub-question 8 response is unclear because “disable [automatic operating] bypass [removal] channel(s)” does not mean “restore [automatic operating] bypass [removal] channel(s) to OPERABLE status.” Also, it is not clear how the phrase “except for the case that the bypass is not in effect” is relevant to the question asked.										
16-100	8076	27784 resp. tbd	–	SPSB - Harbuck ML16028A482	SR 3.3.2.4 Channel Calibration SR 3.3.2.1 Channel Check SR 3.3.2.2 Channel Functional Test - automatic bypass removal • Logarithmic Power Level – High • SG Pressure #1 – Low, and • SG Pressure #2 – Low	Open	Resolved resp. 1/28/16	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-101	8076	27785 resp. tbd	 1 2 3 4	SPSB – Harbuck ML16028A482	1. 3.3.4 SR table title 2. SR 3.3.4.4 duplicate 3. SR 3.3.4.3 and Bases 4. B 3.3.4 for SR 3.3.4.1 - Local coincidence logic (LCL) test description	Open	resp. 1/28/16 1. Resolved 2. Resolved 3. Resolved SE 4. Resolved	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
Sub-question 3 – In SR 3.3.4.3 Bases added text, need to find a better phrase than “The 31-day Surveillance period is determined by operating experience and shows that equipment can meet the Surveillance requirement condition when equipment is tested at this Surveillance period.”										
16-102	8076	27786 resp. tbd	 1 2 3a 3b	SPSB – Harbuck ML16028A482	1. LCO 3.3.4, SR 3.3.4.3 2. 3.3.4 Applicability format 3a. 3.3.4 Condition D phrasing 3b. 3.3.4 Condition D suggested rephrasing	Open	resp. 1/28/16 1. Resolved 2. Resolved 3a Unsatisfactory 3b Resolved	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
Sub-question 3a response does not resolve the question because Condition D does not include the case of “two channels of Manual Trip, RTCB, or RPS logic *inoperable for reasons other than Condition C. However, the Sub-question 3b response’s revised second condition statement of Condition D is correct – so 16-102 is resolved.*										
16-103	8076	27871 resp. tbd	 Question 1 Question 2	SPSB – Harbuck ML16028A482	1. 3.3.3 Actions A and B 2. 3.3.1 Actions	Open	resp. 1/28/16 1. Resolved 2. Resolved	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16

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16-104	8076	27872 resp. tbd	–	SPSB – Harbuck ML16028A482	LCO 3.3.1, LCO 3.3.2, and LCO 3.3.5 statements suggested clarifications	Open	resp. 1/28/16 Resolved – deferred to 16-90 resolution	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-105	8076	27873 resp. tbd	 1 2 ~~3~~ 4 ~~5~~ 6 ~~7~~ 8	SPSB – Harbuck ML16028A482	 1. 3.3.2 Required Actions A.2 and B.1 2. 3.3.2 Required Actions A.2 and C.2.2 Completion Tmes ~~3.~~ 4. automatic bypass removal ~~5.~~ 6. 3.3.2 logical connector between Required Actions C.2.1 and C.2.2 ~~7.~~ 8. 3.3.2 Required Actions C.1 and D.1 unclear	Open	resp. 1/28/16 1. Resolved 2. Resolved -- 4. Resolved - 6. Resolved - 8. In evaluation – same as 16-99.8	Ciocco, Jeff	9/28/15 10/09/15 02/05/16	10/28/15 11/08/15 03/06/16
16-1	8075	27367 resp. 24091	1 2	SPSB - Le ML15236A367	1. 4.3.1.1.b deviation from STS 2. 4.3.1.1.f deviation from STS	Open	In Evaluation resp. 8/24/15	Ciocco, Jeff	07/10/15 08/28/15	08/09/15 09/27/15
The response dated 8/24/15 is incomplete. Responses to **RAI 7977, RAI-Question 16-24 Sub-question 14** is neeed to assess the need for a follow-up RAI.										
16-2	8073	27352 resp. 24293	–	SPSB – Tjader ML15266A517	3.8.1 Condition F	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-3	8073	27353 resp. 24294	–	SPSB – Tjader ML15266A517	SR 3.8.1.3 acceptance criteria	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-4	8073	27354 resp. 24295	–	SPSB – Tjader ML15266A517	SR 3.8.1.7 Notes 2, 3, and 4	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-5	8073	27355 resp. 24296	–	SPSB – Tjader ML15266A517	3.8.2 missing STS 3.8.2 Actions table Note that LCO 3.0.3 is N/A	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-6	8073	27356 resp. 24297	–	SPSB – Tjader ML15266A517	B 3.8.2 LCO Section missing STS B 3.8.2 paragraph	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
In adding a requested statement to Subsection B 3.8.2, the applicant also added the reference, "1. DCD Tier 2, Section 8.2." In accordance with Question 16-45, the reference should refer to the FSAR section, instead of the DCD Tier 2 section.										
16-7	8073	27357 resp. 24298	–	SPSB – Tjader ML15266A517	B 3.8.1 refers to EDG trains B 3.8.3 refers to EDB subsystems	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
In addressing the difference between EDG subsystem and EDG train, adding a discussion to the Bases, perhaps in Bases section B 3.8.1, containing a description similar to that provided in the Deviation Report between NUREG-1432 Rev. 4.0 and APR1400 Technical Specifications, APR1400-K-O-NR-14001-NP, Section III Paragraph 4.2.1, would be appropriate.										
16-8	8073	27358 resp. 24299	–	SPSB – Tjader ML15266A517	3.8.4 Required Actions D.1 and D.2 Logical Connector should be "AND"	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-9	8073	27359 resp. 24300	–	SPSB – Tjader ML15266A517	SR 3.8.4.3 typo omission of "3.8.4.3"	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15

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16-10	8073	27360 resp. 24301	–	SPSB – Tjader ML15266A517	3.8.5 Condition A format	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-11	8073	27361 resp. 24302	–	SPSB – Tjader ML15266A517	3.8.5 Condition B bracketed text - brackets not needed	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-12	8073	27362 resp. 24303	–	SPSB – Tjader ML15266A517	3.8.5 Action B Required Action Logical Connectors indentation	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-13	8073	27363 resp. 24304	–	SPSB – Tjader ML15266A517	3.8.6 Condition C Note and Required Action C Note deviation from STS 3.8.6	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-14	8073	27364 resp. 24305	–	SPSB – Tjader ML15266A517	B 3.8.6 SR Section, SR 3.8.6.6 Mode 3 and Mode 4 applicability	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-15	8073	27365 resp. 24306	–	SPSB – Tjader ML15266A517	3.8.7, LCO 3.8.7 omits STS LCO 3.8.7 Note	Open	In Evaluation resp. 9/22/15	Ciocco, Jeff	07/10/15 09/28/15	08/09/15 10/28/15
16-16	8069	27330 resp. 24137	–	SPSB – Tjader ML15246A069	3.5.1 Actions differences	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-17	8069	27332 resp. 24138	–	SPSB – Tjader ML15246A069	SR 3.5.1.4 Frequency rewrite	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-18	8069	27335 resp. 24139	–	SPSB – Tjader ML15246A069	3.5.2 Actions rewrite	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
An adequate response would be to rewrite Specification 3.5.2 Required Action A.1 to read: "Restore train(s) to OPERABLE status," with a 72 hour Completion Time.										
16-19	8069	27337 resp. 24140	–	SPSB – Tjader ML15246A069	SR 3.5.2.1 valve list formatting	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-20	8069	27339 resp. 24141	–	SPSB – Tjader ML15246A069	3.5.3 Action B	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-21	8069	27341 resp. 24142	–	SPSB – Tjader ML15246A069	B 3.5.3 Actions section for Action B	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-22	8069	27347 resp. 24143	–	SPSB – Tjader ML15246A069	3.5.4 and B 3.5.4 – use of term "borated" with IRWST water temperature and volume	Open	In Evaluation resp. 9/3/15	Ciocco, Jeff	09/10/15	10/10/15
16-33	8067	27321 resp.	–	SPSB - Tjader	LCO 3.0.8 adoption; TSTF-372 adoption	Open	Issued - WFR (**due 1/26/15**)	Ciocco, Jeff	07/21/15 08/07/15	08/20/15 09/06/15
16-34	8067	27322 resp. 24955	–	SPSB – Tjader ML15357A434	LCO 3.0.9 adoption; TSTF-427 adoption	Open	In Evaluation resp. 12/23/15	Ciocco, Jeff	07/21/15 12/30/15	08/20/15 **01/29/15**
16-35	8067	27323 resp. 24956	–	SPSB – Tjader ML15357A434	B 3.0 LCO reference to LCO 3.0.1 to LCO 3.0.9	Open	In Evaluation resp. 12/23/15	Ciocco, Jeff	01/04/16	**02/03/16**
(16-34 & 16-35) LCO 3.0.8 pertaining to snubbers and supported system operability, and LCO 3.0.9 pertaining to barriers and supported system operability, both require a generic risk assessment that are to be completed in the third quarter of 2016. These RAIs will need to be reevaluated at that time to confirm that these LCOs are applicable at that time to APR1400 TS.										
16-36	8067	27324 resp. 24420	–	SPSB – Tjader ML15294A548	B 3.0 LCO – reference to LCO 3.7.14	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15

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16-37	8067	27325 resp. 24421	–	SPSB – Tjader ML15294A548	B 3.0 LCO – LCO 3.0.4 difference	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15
16-38	8067	27326 resp. 24422	–	SPSB – Tjader ML15294A548	B 3.0 LCO – LCO 3.0.5 differences	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15
16-39	8067	27327 resp. 24423	–	SPSB – Tjader ML15294A548	B 3.0 LCO – LCO 3.0.6 reference to GTS 5.5.15, SFDP	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15
16-40	8067	27328 resp. 24424	–	SPSB – Tjader ML15294A548	B 3.0 LCO – LCO 3.0.6 differences	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15
16-41	8067	27329 resp. 24425	–	SPSB – Tjader ML15294A548	B 3.0 LCO – LCO 3.0.1 differences	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	10/29/15	11/28/15
16-26	8065	27313 resp. 24196	–	SPSB – Tjader ML15258A618	Rationale for deviations from STS; Remove Section 1.1 definition of LCO SELECTION CRITERIA	Open	In Evaluation resp. 9/15/15	Ciocco, Jeff	07/17/15 09/17/15	08/16/15 10/17/15
16-27	8065	27315 resp. 24426	–	SPSB – Tjader ML15294A532	Conform to STS 1.1 definition of LEAKAGE in GTS 1.1	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	07/17/15 10/29/15	08/16/15 11/28/15
16-28	8065	27317 resp. 24427	–	SPSB – Tjader ML15294A532	1.1 definition of MAXIMUM ALLOWABLE CONTAINMENT LEAKAGE RATE (L_a) – not needed	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	07/17/15 10/29/15	08/16/15 11/28/15
16-29	8065	27318 resp. 24428	–	SPSB – Tjader ML15294A532	1.1 definition of MODE	Open	In Evaluation resp. 10/21/15	Ciocco, Jeff	07/17/15 09/17/15	08/16/15 10/17/15
16-30	8065	27319 resp. 24197	–	SPSB – Tjader ML15258A618	1.1 definition of OPERABLE - OPERABILITY	Open	In Evaluation resp. 9/15/15	Ciocco, Jeff	07/17/15 09/17/15	08/16/15 10/17/15
The definition of Operability needed explanation with justification was not received nor included in the Deviation Report between NUREG-1432 Rev. 4.0 and APR1400 Technical Specifications, APR1400-K-O-NR-14001-NP, Rev. 1 of December 2015.										
16-42	8064	27305 resp.	–	SPSB - Harbuck	LCO selection process and process to achieve high quality Bases	Open	Issued - Waiting for Response	Ciocco, Jeff	07/21/15	08/20/15
16-43	8064	27306 resp.	–	SPSB - Harbuck	Request to update and docket Deviation report and discuss adopted TSTFs	Open	Issued - Waiting for Response	Ciocco, Jeff	07/21/15	08/20/15
16-44	8064	27307 resp.	–	SPSB - Harbuck	Use of brackets and identification / enumeration of COL Action items	Open	Issued - Waiting for Response	Ciocco, Jeff	07/21/15	08/20/15
16-45	8064	27308 resp.	–	SPSB - Harbuck	Suggest replacing DCD with FSAR	Open	Issued - Waiting for Response	Ciocco, Jeff	07/21/15	08/20/15
16-53	8059	27297 resp. 24620	–	SPSB – Scully ML15321A500	5.5.12.b	Open	In Evaluation resp. 11/17/15	Ward, William	08/04/15 11/20/15	09/03/15 12/20/15
16-54	8059	27298 resp. 24621	–	SPSB – Scully ML15321A500	5.5.13.c	Open	In Evaluation resp. 11/17/15	Ward, William	08/04/15 11/20/15	09/03/15 12/20/15

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16-55	8059	27300 resp. 24622	–	SPSB – Scully, Harbuck ML15321A500	5.5.19 Setpoint Control Program	Open	In Evaluation resp. 11/17/15	Ward, William	08/04/15 11/20/15	09/03/15 12/20/15
Listing of setpoint methodology reports should be in 5.5.19.b to be more consistent with the SCP Specifications in the generic TS for the AP1000 and ESBWR certified designs.										
16-56	8059	27301 resp. 24623	–	SPSB – Scully ML15321A500	5.6.1 and 5.6.2 Reviewer's Notes	Open	In Evaluation resp. 11/17/15	Ward, William	08/04/15 11/20/15	09/03/15 12/20/15
16-57	8059	27303 resp. 24624	–	SPSB – Scully, Harbuck ML15321A500	5.6.7 Steam Generator Tube Inspection Report	Open	In Evaluation resp. 11/17/15	Ward, William	08/04/15 11/20/15	09/03/15 12/20/15
Need to verify that 5.6.7 is consistent with TSTF-510; see **RAI-Question 16-43 (RAI 8064)**										
16-81	8058	27292 resp. 24398	–	SPSB – Scully ML15292A550	SR 3.2.2.1 Frequency	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-82	8058	27293 resp. 24399	–	SPSB – Scully ML15292A550	3.2.3 Action B, RA Note	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-83	8058	27507 resp. 24400	–	SPSB – Scully ML15292A550	B 3.2.1 for SR 3.2.1.2 Freq B 3.2.3 for SR 3.2.3.2 Freq B 3.2.4 for SR 3.2.4.2 Freq	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-84	8058	27508 resp. 24401	–	SPSB – Scully ML15292A550	B 3.2.1 Background section	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-85	8058	27509 resp. 24402	–	SPSB – Scully ML15292A550	B 3.2.1 Actions section	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-86	8058	27512 resp. 24403	–	SPSB – Scully ML15292A550	B 3.2.3 Actions section	Open	In Evaluation resp. 10/19/15	Ward, William	08/04/15 10/23/15	09/03/15 11/22/15
16-59	8057	27279 resp. 24570	–	SPSB – Scully ML15315A035	3.1.1, 3.1.2 – merge into one TS	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-60	8057	27280 resp. 24571	–	SPSB – Scully ML15315A035	3.1.1, 3.1.2 – define term k_{N-1}	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-61	8057	27281 resp. 24572	–	SPSB – Scully ML15315A035	SR 3.1.4.1, COLR	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16.62	8057	27283 resp. 24573	–	SPSB – Scully ML15315A035	Figure 3.1.5-1 Note	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-63	8057	27284 resp. 24574	–	SPSB – Scully ML15315A035	SR 3.1.6.1 Frequency	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-64	8057	27286 resp. 24575	–	SPSB – Scully ML15315A035	SR 3.1.7.1 Note	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-65	8057	27288 resp. 24576	–	SPSB – Scully ML15315A035	LCO 3.1.9 phrasing	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15

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16-66	8057	27289 resp. 24577	–	SPSB – Scully ML15315A035	3.1.9 RA Note and B 3.1.9	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-67	8057	27290 resp. 24578	–	SPSB – Scully ML15315A035	3.1.10 Action A, table format	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-68	8057	27291 resp. 24579	–	SPSB – Scully ML15315A035	SR 3.1.10.2 missing Note	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-69	8057	27447 resp. 24580	–	SPSB – Scully ML15315A035	B 3.1.1 Actions section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-70	8057	27448 resp. 24581	–	SPSB – Scully ML15315A035	B 3.1.~~3~~2 Background section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-71	8057	27450 resp. 24582	–	SPSB – Scully ML15315A035	B 3.1.~~5~~4 ASA section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-72	8057	27452 resp. 24583	–	SPSB – Scully ML15315A035	B 3.1.~~5~~4 SR section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-73	8057	27454 resp. 24584	–	SPSB – Scully ML15315A035	B 3.1.~~6~~5 Actions section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-74	8057	27471 resp. 24585	–	SPSB – Scully ML15315A035	B 3.1.~~8~~7 ASA section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-75	8057	27472 resp. 24586	–	SPSB – Scully ML15315A035	B 3.1.~~8~~7 ASA section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-76	8057	27474 resp. 24587	–	SPSB – Scully ML15315A035	B 3.1.~~9~~8 Background, ASA, Action, and SR sections	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-77	8057	27475 resp. 24588	–	SPSB – Scully ML15315A035	B 3.1.~~10~~9 ASA section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-78	8057	27477 resp. 24589	–	SPSB – Scully ML15315A035	B 3.1.~~10~~9 ASA section B 3.1.~~11~~10 ASA section B 3.1.~~12~~11 ASA section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-79	8057	27478 resp. 24590	–	SPSB – Scully ML15315A035	B 3.1.~~10~~9 SR section, SR 3.1.9.3	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-80	8057	27480 resp. 24591	–	SPSB – Scully ML15315A035	B 3.1.~~11~~10 LCO section	Open	In Evaluation resp. 11/11/15	Ward, William	08/04/15 11/18/15	09/03/15 12/18/15
16-58	8056	27277 resp. 24340	–	SPSB – Scully ML15280A326	SL Violation Bases	Open	In Evaluation resp. 10/7/15	Ward, William	08/04/15 10/15/15	09/03/15 11/14/15
16-49	8055	27264 resp. 2443~~8~~	–	SPSB – Scully ML15301A207	DCD 16 - COL information	Open	In Evaluation resp. 10/28/15	Ciocco, Jeff	08/10/15 10/30/15	09/09/15 11/29/15
16-50	8055	27265 resp. 24439	–	SPSB – Scully ML15301A207	Use “NOTES” when there are 2 or more notes	Open	In Evaluation resp. 10/28/15	Ciocco, Jeff	08/10/15 10/30/15	09/09/15 11/29/15

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16-51	8055	27269 resp. 24440	—	SPSB – Scully ML15301A207	Logical Connector indentation in Actions tables – 3.8.5, 3.5.2, 3.1.7	Open	In Evaluation resp. 10/28/15	Ciocco, Jeff	08/10/15 10/30/15	09/09/15 11/29/15
Response contains error that needs correcting. (Editorial Comment 3.4.14-1 about Logical Connector formatting.)										
16-52	8055	27274 resp. 24441	—	SPSB – Scully ML15301A207	Applicability statement format – 3.3.4, 3.3.7	Open	Resolved resp. 10/28/15	Ciocco, Jeff	08/10/15 10/30/15	09/09/15 11/29/15
6.3-6	7997	27499 resp. 24238		SRSB – Thomas ML15260B338	3.5.1 SIT atmospheric vent valve position verification SR		In Evaluation resp. 9/17/15	Ciocco, Jeff	09/22/15	10/22/15
In the applicant's response to RAI 158-7997, Question 06.03-6, the applicant stated that any problem caused by the SIT vent valves can be detected by Surveillance Requirement 3.5.1.3. The staff believes that SR 3.5.1.3 does not verify that the vent valves are locked closed and power removed, as specified in Tier 2 Section 6.3.2.1.1. The staff is unable to verify the adequacy of the existing scope of the surveillance requirements per 10 CFR 50.36(c)(3). The staff would like to discuss the applicant's approach forward regarding this issue. Verifying the vent valves are locked closed could not be done during normal power operation; however, verifying the vent valves are locked closed could be done during refueling outages. Verifying power is removed from the vent valves could be done every 31 days.										
6.3-7	7997	27502 resp. 25072		SRSB – Thomas ML16007A083	3.5.1, 3.5.4, need for SR to verify atom percent Boron-10 in boric acid		In Evaluation resp. 1/7/16	Ciocco, Jeff	01/19/16	02/18/16
1. DCD 9.3.4.2.2 details the APR1400 capability for boron recycling. The RAI response indicates that recycling is not used in the APR1400. Apparent disconnect. 2. KHNP claims that b-10 mass-spectroscopy is performed administratively at each refueling outage. They claim that the measured b-10 atom percent is used in the post-LOCA sump mixture calculation ensuring long-term sub-criticality. Need to confirm this is what is done. Operating experience shows that b-10 atom percent is 19.6, which indicates that recycling is used as well. KHNP is not being clear here. In the applicant's response to RAI 158-7997, Question 06.03-7, the applicant stated that boron recycling operations are not used for the APR1400. The staff noted that in Tier 2 DCD Section 9.3.4.2.2, "Boron Recovery Subsystem," the APR1400 design provides for a means of recycling boron. The staff needs the applicant to clarify if boron recycling is used in the APR1400. The applicant also states that B-10 mass spectroscopy is administratively controlled and confirmation of B-10 atom percent of the IRWST and SIT is done at each refueling outage. The staff needs to confirm that the applicant uses the measured B-10 atom percent at each refueling outage in its post-LOCA sump mixture calculation which ensures post-LOCA sub-criticality. Does the additional uncertainty of 1000 pcm (140 ppm) account for B-10 depletion? Or is 1000 pcm (140 ppm) just calculational uncertainty not accounting for B-10 depletion?										
6.3-8	7997	27503 resp. 24239		SRSB – Thomas ML15260B338	3.5.4 IRWST – why no HVT trash rack SR? SR 3.5.2.8.		Resolved resp. 9/17/15	Ciocco, Jeff	12/02/15	01/01/16
6.3-9	7997	27505 resp. 24240		SRSB – Thomas ML15260B338	DCD 6.3.1.4, minimum safety injection flow rate requirements; 3.5.2 Actions; diagonal SIPs		In Evaluation resp. 9/17/15	Ciocco, Jeff	09/22/15	10/22/15
The response proposed changes to second paragraph of DCD 6.3.1.4 Functional Design Bases (page 6.3-3). It does not appear that the changes address the principal concern: How does APR1400 design ensure that "the credited safety flow from the 2 SIPs is indeed from 2 diagonal SIPs during any given break where only 2 SIPs are capable of providing safety injection flow"? LCO 3.5.2, "SIS – Operating," Condition A, second condition statement ("Two trains inoperable and diagonally oriented with respect to reactor vessel.") means that for any LOCA break location, assumming no single failure occurs (allowed when in TS Actions) there will be two diagonal DVI lines supplied with SI pump flow from IRWST. For a DVI line break (small break LOCA) on one of these two DVI flow paths, flow from one SI pump and three SI Tanks is available. For a cold leg break (large break LOCA) adjacent to one of the two diagonal DVI lines with SI pump flow available, flow from four SI Tanks and {one/two} SI pump{s} is available. However the Condition says "Two [SIS] trains inoperable ..." The LCO section of Bases says "An SIS train consists of an SI pump, the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the IRWST on an SIAS from PPS or DPS." LCO 3.5.1 requires four SI Tanks to be operable. In Condition C, if one SI Tank is inoperable for a reason other than boron concentration or the inability to verify level or pressure, the SIT must be returned to OPERABLE status within 1 hour. In this Condition, the required contents of four SITs cannot be assumed to reach the core during a LBLOCA. It is not clear that on a LBLOCA, how much of the SI flow from the adjacent DVI line is credited for reaching the core and how much goes out the cold leg break.										

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16-31	7978	26973		SPSB – Le		Open	Issued - WFR	Ciocco, Jeff	07/17/15	08/16/15
		resp.	1		1. 3.9.2 RA A.2		1.	1.	08/07/15	09/06/15
			2		2. LCO 3.9.3.a, B 3.9.3		2.	2.		
			3		3. 3.9.3		3.	3.		
			4		4. LCO 3.9.3		4.	4.		
			5		5. LCO 3.9.4		5.	5.		
			6		6. 3.9.4 RA A.3		6.	6.		
			7		7. page 3.9.4-2		7.	7.		
			8		8. 3.9.5 RA A.1, A.2		8.	8.		
			9		9. 3.9.5 RA b.1		9.	9.		
			10		10. LCO 3.9.5.b		10.	10.		
			11		11. pages 3.9.4-2, 3; logical connector indentation		11.	11.		
			12		12. SR 3.9.5.1		12.	12.		
			13		13. 3.9.6		13.	13.		
			14		14. B 3.9.6 ASA section		14.	14.		
			15	15. – Harbuck	15. LCO for decay time limit		15.	15.		
16-32	7978	27456 resp.	—	SPSB - Harbuck	SR 3.9.3.1 Frequency grammar	Open	Issued - WFR	Ciocco, Jeff	07/17/15 08/07/15	08/16/15 09/06/15
16-24	7977	27123		SPSB - Le		Open	Issued - WFR	Ciocco, Jeff	07/10/15	08/09/15
		resp.	1		1. Table 3.7.1-2 Note				07/27/15	08/26/15
			2		2. 3.7.5 Action A					
			3		3. LCO 3.7.5; DCD 10.4.9.1, 2					
			4		4. SR 3.7.5.4 Note b					
			5		5. B 3.7.5 Background section					
			6		6. page B 3.7.5-2					
			7		7. B 3.7.5 LCO section					
			8		8. SR 3.7.8.1 Note					
			9		9. LCO 3.7.11					
			10		10. 3.7.11					
			11		11. B 3.7.11 Applicability section					
			12		12. 3.7.11 toxic gas protection					
			13		13. SR 3.7.11.5					
			14		14. LCO 3.7.16, Figure 3.7.16-1, B 3.7.16, 4.3					
			15		15. LCO 3.7.17 Note 1					
Resolution of Question 16-1 depends upon acceptability of response to **RAI-sub-question 16-24.14**										

Font Color Key **Black** – draft, WFR **Brown** - Responded **Maroon** - Followup **Red** - Open **Blue** - Resolved **Green** – Confirmed
RAI Q # & eRAI #

RAI Q #	eRAI #	eQuestion ID & resp. #	Sub-question #	Tech Branch Reviewer, Response ACN	Review Document Section	eRAI Status	State Waiting for Response (WFR)	DNRL PM Assigned To	Current Review Start Date	Current Review Due Date
16-23	7976	27125 resp.:		SPSB – Le		Open	In Evaluation / WFR	Ciocco, Jeff	07/10/15	08/09/15
		1.	1		1. 3.4.1		1.		1.	1.
		2	2		2. SR 3.4.1.4		2		2	2
		3	3		3. SR 3.4.1.4		3		3	3
		4	4		4. B 3.4.1-1		4		4	4
		5	5		5. B 3.4.1 LCO section		5		5	5
		6	6		6. B 3.4.1 SR section		6		6	6
		7	7		7. 3.4.2		7		7	7
		8	8		8. LCO 3.4.5 Note		8		8	8
		9	9		9. LCO 3.4.5, SR 3.4.5.3		9		9	9
		10	10		10. LCO 3.4.6 Note 1		10		10	10
		11	11		11. LCO 3.4.6 Note 2		11		11	11
		12	12		12. SR 3.4.6.3		12		12	12
		13	13		13. LCO 3.4.7 Note 1		13		13	13
		14	14		14. LCO 3.4.7 Note 3		14		14	14
		15	15		15. LCO 3.4.7 Note 1, SR 3.4.7.3		15		15	15
		16	16		16. LCO 3.4.8 Note 1		16		16	16
		17	17		17. Page 3.4.8-3, SR 3.4.8.?		17		17	17
		18	18		18. LCO 3.4.8 Note 3, RA B.3		18		18	18
		19	19		19. SR 3.4.10.6		19		19	19
		20	20		20. B 3.4.10-2, -4, B SR 3.4.10.2		20		20	20
		21	21		21. B 3.4.10 References section		21		21	21
		22	22		22. LCO 3.4.16, Action C, SR 3.4.16.1 Frequency		22		22	22
		23. 24262	23	ML15265A596	23. 3.4.17, 5.5.9, TSTF-510		23. resp. 9/22/15		23. 9/24/15	23. 10/24/15
		24.	24		24. 3.4, add LCO for SCS		24		24	24
16-25	7975	27126		SPSB - Le		Open	Issued - WFR	Ciocco, Jeff	07/10/15	08/09/15
		resp.	1		1. B 3.6.1, B3.6.2					
			2		2. B 3.6.1					
			3		3. B 3.6.6					
			4		4. B 3.6.7					
			5		5. B 3.6.7					

Regarding **RAI-Question 16-89** response

Components (As depicted on Figure 7.2-11)	Figure 7.2-11, "PPS Testing Overlap"	DCD 7.2.2.5	Generic TS Surveillance * performed at power ** 18 month Frequency
RPS and ESFAS			
Process Sensor & Transmitter	Manual Transmitter Test	a. Sensor Check (ITP)	CHANNEL CHECK CHANNEL CALIBRATION
RPS CPCS	• *CPCS Test*	c. CPCS test	CPC System Event Log check CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
CEACS	• *CPCS Test (?)*	(MTP)	*CHANNEL FUNCTIONAL TEST **CHANNEL FUNCTIONAL TEST (Continuous Self monitoring)
TU Switch	Manual Transmitter Test		CHANNEL CHECK CHANNEL CALIBRATION
BP Rack AI Module A/D [Converter]	Manual Transmitter Test Analog Input Test		CHANNEL CHECK CHANNEL CALIBRATION
Bistable Processor (BP) – partial trip signal	Bistable Logic Test	b. Bistable logic test c. CPCS test	*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
SDL to Local Coincidence Logic (LCL) Rack	Bistable Logic Test		*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
RPS	• *Manual Trip Test* • *Trip Path Test*	f. Manual trip test (MTP) e. Initiation logic and circuit test (MTP)	
LCL Rack - SDL Signal Distribution	Bistable Logic Test		*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
Local Coincidence Logic (LCL) RPS 2/4 → RPS (coincidence) Initiation Signal	RT LCL Logic Test	d. LCL test	*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
RPS Digital Output	RT LCL Logic Test RT Initiation Test		*CHANNEL FUNCTIONAL TEST *CHANNEL FUNCTIONAL TEST
Hard wire (?) to RT Initiation Logic (selective two-out-of-four)	RT LCL Logic Test RT Initiation Test	e. Initiation logic and circuit test (MTP)	*CHANNEL FUNCTIONAL TEST *CHANNEL FUNCTIONAL TEST
Interposing Relay & contacts	• *Manual Trip Test?*		
RTSS-1 and RTSS-2	• *Manual Trip Test?*		
RTCB Undervoltage Trip Device	• *Manual Trip Test?*		
ESFAS			
LCL Rack - SDL Signal Distribution	Bistable Logic Test		*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
Local Coincidence Logic (LCL) ESFAS 2/4 → ESFAS (coincidence) Initiation Signal	ESF LCL Logic Test	d. LCL test	*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
SDL to Group Controller (GC) Station (ESF-CCS)	ESF LCL Logic Test		*CHANNEL FUNCTIONAL TEST CHANNEL CALIBRATION
GC Station – 2/4 Logic	?		
SDL to Loop Controller (Component Control Logic)	?		
Component Interface Module (CIM)	?		
Priority Logic	?		
ESFAS Actuation Signal	?		
Component Actuator	?		