ArevaEPRDCPEm Resource

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Subject: Draft - U.S. EPR Design Certification Application RAI No. 300 (3730,3742), FSAR Ch. 16
Attachments: Draft RAI_300_CTSB_3730_3742.doc

Attached please find draft RAI No. 300 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Request for Additional Information No. 300 (3730, 3742), Revision 0

9/23/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 16 - Technical Specifications
Application Section: FSAR Chapter 16

QUESTIONS for Technical Specification Branch (CTSB)

16-310

POTENTIAL OPEN ITEM

Follow-up to RAI Question 16-126

The EPR GTS, Section 4.3, contains bracketed information and a Reviewer's Note regarding the new and spent fuel storage rack final design that is to be provided by potential EPR applicants for construction permits or COLs. Also during its review, the staff noted that the assembly pitch provided in the EPR GTS, Paragraph 4.3.1.1.c does not match the values provided in the spent fuel pool criticality topical report, UN-TR-08-001P. In RAI 16-126 the applicant was asked to provide clarification on the difference. In its response letter dated November , 2008, the applicant stated the storage rack parameters cited in UN-TR-08-001P are site specific and therefore are not appropriate for inclusion in the EPR GTS. However, in recent developments associated with reviews of combined operating license (COL) applications that reference the EPR certified design, COL applicants has indicated that the final design details of the fuel storage racks as provided in UN-TR-08-001P will be incorporated as part of the EPR certified design and will no longer be considered as a COL item. If Areva agrees with the proposed plan by COL applicants, relevant information in UN-TR-08-001P should be incorporated in the EPR FSAR Section 9.1 and the EPR GTS and Bases. This is identified as Open Item 16-126.

16-311

POTENTIAL OPEN ITEM

Provide the additional information and update the following RAI responses for each of the Instrumentation System Tech Spec items identified, based on the results of Audit Meetings between AREVA NP and NRC Staff on 7/30/09, 7/31/09, 8/13/09 and 8/14/09.

Request for Additional Information No. 103 (1270)

16-129

a) Condition C, Required Action C.2 guidance and associated Bases changes.

b) Bases clarification associated with signal processor discussion.

c) Use of “division” rather than “subsystem” in ALU Bases discussion.

16-130

Editorial corrections for misspelling of the word “actuation” in Protection System (PS) Bases B 3.3.1.

16-131

a) Condition V Required Action guidance.

b) Condition V Bases clarification.

c) Condition U applicability.

d) Corrections associated with RCCA Position Indication and RCCA Bottom Position Indication.

16-138

a) Numerous discrepancies associated with Bases discussions describing Permissive signal capabilities.

b) Inconsistency between footnote (i) in Table 3.3.1-2 which states “Below 10% RTP,” and Permissive P6 description in FSAR Section 7.2.1.3.4 which states “P6 permissive is representative of core thermal power above a low-power setpoint value (10 percent power) corresponding to the boundary between the operating ranges of the IRDs and the PRDs.”

c) Table 3.3.1-2 discrepancy associated with the CONDITION specified for ESFAS Function B.1.

16-141

a) Bases enhancements to ensure information accuracy and consistency.

b) Revision to FSAR Section 7.2.1.2.14 to address inconsistencies between the FSAR and Bases regarding postulated accidents/AOOs.

16-144

Table 3.3.1-1 discrepancy associated with the CONDITION specified for Hot Leg Temperature (WR).

16-145

a) Extraneous information regarding Operability included in Permissive P6 Bases discussion.

b) Bases clarification regarding Permissive P16 Reactor Coolant Pump (RCP) operational requirements.

c) Apparent omission of RCP Current sensors in Permissive P16 Bases.

d) Explanation regarding Intermediate Range sensor mode applicability. Applicable modes specified for the Intermediate Range sensors in Table 3.3.1-1 and the Bases are 1, 2, and 3 with the Reactor Control, Surveillance and Limitation (RCSL) System capable of withdrawing an RCCA or one or more RCCA's not fully inserted. Mode 1 applicability for Intermediate Range sensors is typically ≤ 10% RTP.

16-147

a) Discrepancy regarding use of "and" versus "or" in Pressurizer Pressure (NR) Bases discussion associated with Mode Applicability.

b) Discrepancy regarding use of "and" versus "or" in Permissive P12 Bases discussion associated with Mode Applicability.

c) Permissive P12 Bases does not specify all of the affected functions that are automatically activated when Pressurizer Pressure rises above the P12 Permissive value.

d) Bases clarification regarding use of the word "ensures" in Permissive P12 Bases discussion associated with the transition from Hot Shutdown to Cold Shutdown.

e) Bases clarification regarding reference to "Increase in reactor coolant inventory" in Low DNBR Bases discussion associated with Anticipated Operational Occurrences.

f) Pressurizer Pressure (NR) instrumentation mode applicability. Apparent inability of Pressurizer Pressure (NR) instrumentation (1615 – 2515 psia) to support Permissive P12 Operability in Mode 4 with P15 inhibited.

16-149

a) Table 3.3.1-2 mode applicability footnotes for Functions B.3.c, B.11.b and B.11.c.

b) Table 3.3.1-1 mode applicability footnotes for Sensor A.23.

16-150

a) Bases discrepancies regarding references to Cold Shutdown.

b) Discrepancy regarding use of "and" versus "or" in Function B.3.b Bases discussion associated with Mode Applicability.

c) Bases discrepancy regarding use of the word "automatically" to describe the capability of Permissive P15 to disable Function B.3.b.

d) Revision to FSAR Section 7.3.1.2.1 to address inconsistencies between the FSAR and Bases regarding postulated accidents/AOOs.

16-151

Discrepancy in the RAI response regarding use of the word “automatically” to describe the capability of Permissive P15 to disable Function B.3.b.

16-153

Revision to FSAR Section 7.3.1.2.9 to address inconsistencies between the FSAR and Bases regarding Safeguards Building HVAC reconfiguration.

16-154

Table 3.3.1-1 mode applicability requirements necessary for Sensors A.7 and A.8 to support Table 3.3.1-2 ESF Function B.9.a.

16-162

a) Bases discrepancy regarding the reference to Function B.3.c.

b) Bases discrepancy regarding use of the word “automatically” to describe the capability of Permissive P14 to enable Function B.5.

c) Discrepancy regarding use of “and” versus “or” in Bases discussion describing the capability of Permissive P14 to enable Function B.5.

16-166

Bases enhancements to ensure information accuracy and consistency.

16-167

Bases enhancements to ensure information accuracy and consistency.

16-169

a) Discrepancy regarding the apparent omission of Bases text associated with the isolation of “low load lines.”

b) Relocation of information to enhance Bases presentation.

16-174

a) Inconsistent use of “SSS Feedwater Isolation” in the Bases.

b) Discrepancy regarding the reference to “16-171” in the markup associated with Question 16-174.

16-180

a) Inconsistent use of footnote (f) in Table 3.3.1-1 for Sensor A.6.

b) Discrepancy regarding the applicable modes specified for Sensor A.6 in Table 3.3.1-1, and those necessary for Sensor A.6 to support Permissive P17 in the modes specified in Table 3.3.1-2.

16-182

a) Description inaccuracies associated with Functions B.11.b, B.11.c and B.11.d.

b) Table 3.3.1-2 footnote presentation associated with footnotes (b) and (c) for Functions B.11.c, B.11.d, A.1.a, A.1.b, A.1.c, A.1.d, A.1.e, and A.2.

c) Bases clarification regarding Permissive P7 Reactor Coolant Pump (RCP) operational requirements.

16-185

Contradiction between the FSAR and RCOLA/SCOLAs regarding the LTSP/Setting Basis value for Function B.11.b in Table 3.3.1-2. RAI response states that the LTSP for Function B.11.b is a fixed value. Departure Item 4 in “Part 4 - Technical Specifications and Bases,” of the BBNPP SCOL Application states that the Setting Basis for B.11.b is a cycle-specific parameter value specified in the COLR. CCNPP Reference COL also specifies Function B.11.b Setting Basis as a cycle-specific value residing in the COLR.

16-190

a) Ambiguities associated with RCS Loop Flow sensor Operability requirements in Bases Table B 3.3.1-1 (3 of 4 per division and per loop) and Tech Spec Table 3.3.1-1 (3 per division and per loop) for Functions A.1, A.4 and A.5.

b) Ambiguities associated with RCS Loop Flow sensor Operability requirements in Tech Spec Table 3.3.1-1 (3 per division and per loop).

c) Ambiguities associated with RCP Current sensor Operability requirements in Bases Table 3.3.1-1 for Functions B.4 and Permissive P15.

d) Clarification regarding the number of required RCCA Position Indicators specified in Bases Table B 3.3.1-1 for Function A.1.

e) Clarification regarding the number of required RCCA Bottom Position Indicators in Bases Table B 3.3.1-1 for Permissive P8.

f) Clarification regarding the number of RCCA Units in Bases Table B 3.3.1-1 for Permissive P8.

g) Bases clarification regarding the Low Saturation Margin trip Bases text that states “[t]herefore, the Low Saturation Margin reactor trip function assures that the High Core Power Level trip Function remains valid.”

h) Clarification regarding the Table B 3.3.1-1 Bases discussion and the response to Question 16-190 which state “[i]n general, when a sensor becomes inoperable, the Acquisition and Processing Unit (APU) that receives the signal from the sensor declares the functions supported by that sensor to be valid.”

16-191

a) Table 3.3.1-1 footnote discrepancy associated with Modes 3, 4 and 5 for Actuation Device D.3.

b) Ambiguities associated with the first sentences of the Bases discussions for ACTIONS Q.1 and R.1.

16-193

a) Removal of all technical references associated with the Standard Technical Specifications (STS) regarding the basis and methodology for obtaining allocated sensor, signal processing/conditioning, and actuation logic response times for Protection System (PS) Instrumentation without providing comparable replacement references in the Bases for SR 3.3.1.10.

b) Discrepancy between the revised definition for SENSOR OPERATIONAL TEST (SOT) provided in the response to Question 16-243 of RAI 122, and the definition in Bases Section SR 3.3.1.5.

c) Discrepancy between the revised definition for CALIBRATION provided in the response to Question 16-243 of RAI 122, and the definition in Bases Section SR 3.3.1.6.

d) Potential discrepancies regarding the applicability of SR 3.3.1.8 to Sensors A.24 and A.25, and Manual Actuation Switch B.1 in Table 3.3.1-1.

16-194

Inconsistencies regarding use of the terms “channel” and “division” throughout the Protection System Bases B 3.3.1.

16-195

Discrepancy regarding the RAI Block reference associated with the FSAR Markup for Question 16-195 in Table 3.3.1-1.

16-198

RAI reference errors in the response to Question 16-198.

16-200

Discrepancies regarding the reference to "ACTUATION" in SR 3.3.1.3 and SR 3.3.1.8.

16-203

Inaccuracies associated with the response to Question 16-203 regarding the statement "Boron dilution events are protected by the chemical and volume control system (CVCS) charging line isolation function of the anti-dilution mitigation (ADM) system."

16-204

Question 16-204 requested a technical justification regarding omission of the Overtemperature Delta T Reactor Trip function from the U.S.EPR GTS, LCO 3.3.1. The response to 16-204 was reviewed by the Reactor Systems Branch for concurrence. The Reactor Systems Branch was unable to confirm the RAI response on the basis of their review of ANP-10286P, Revision 0, US EPR Rod Ejection Accident Methodology Topical Report. The applicant is requested to provide a qualified determination to substantiate that the fuel is protected against the risk of departure from nucleate boiling during events that lead to a decrease in the DNBR value, in Mode 1 less than 10% power, and in Mode 2.

16-205

Question 16-205 requested a technical justification regarding omission of the Overpower Delta T Reactor Trip function from the U.S.EPR GTS, LCO 3.3.1. The response to 16-205 was reviewed by the Reactor Systems Branch for concurrence. The Reactor Systems Branch was unable to confirm the RAI response on the basis of their review of ANP-10286P, Revision 0, US EPR Rod Ejection Accident Methodology Topical Report. The applicant is requested to provide a qualified determination to substantiate that the fuel is protected against melting at the center of the fuel pellet during events which lead to an increase in the linear power density within the core, in Mode 1 less than 10% power, and in Mode 2.

16-207

Reviewer’s Notes provided in the U.S. EPR GTS allowing the optional approach of specifying a yet to be defined Setpoint Control Program (SCP) Administrative Controls Tech Spec (TS), instead of placing brackets around a fully developed SCP Administrative Controls TS and Surveillance Requirement (SR) or table references to the SCP TS, do not satisfy 10 CFR 52.47(a)(11).

16-208

LCO reference omission from Reporting Requirements Section 5.6.3, CORE OPERATING LIMITS REPORT (COLR).

16-209

LCO reference omission from Reporting Requirements Section 5.6.4, Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR).

16-312

POTENTIAL OPEN ITEM

Provide the additional information and update the following RAI responses for each of the Instrumentation System Tech Spec items identified, based on the results of Audit Meetings between AREVA NP and NRC Staff on 7/30/09, 7/31/09, 8/13/09 and 8/14/09.

Request for Additional Information No. 110 (1295)

16-212

a) Omission of Regulatory Guide 1.97 (Revision 4) and IEEE Standard 492-2002 from the Post Accident Monitoring (PAM) Instrumentation Bases B 3.3.2 REFERENCES Section.

b) NUREG-0737, Supplement1, "TMI Action Items," is listed in the PAM Instrumentation Bases B 3.3.2 REFERENCES Section, but is not included anywhere in the associated Bases. NUREG-0737 is referenced in the PAM Instrumentation Bases B 3.3.3 BACKGROUND Section of the WOG STS.

16-213

Response to Question 16-213 states that "the subject text is now bracketed as described in the response to Question 16-212." The response to Question 16-212 removes the current list of PAM Instrumentation and associated discussions from U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications Section 3.3.2, and U.S. EPR FSAR Tier 2, Chapter 16 Technical Specification Bases B 3.3.2. There does not appear to be any bracketed text associated with the response to Question 16-212.

16-217

a) Inconsistencies between Chapter 15 FSAR Tables 15.0-7 and 15.0-8 regarding the use of "Normal/Degraded" in the "Uncertainty" column header.

b) Clarification regarding Note 6 of Table 15.0-7 for the Low Saturation Margin trip which states "however, it is required to maintain the validity of the high core power level trip."

c) Clarification regarding use of the term "RT check-back" in Table 15.0-8 under the Main Feedwater Isolation Function.

d) Note information associated with the Steam Generator (SG) Pressure Drop setpoint, similar to Note 1 in FSAR Figure 7.2-18, is missing from FSAR Figure 7.3-17 for Startup and Shutdown System (SSS) Feedwater Isolation on SG Pressure Drop Function B.2.c.

e) Potential ambiguity associated with the bolding of initiating condition "SIS Actuation signal (Stage 1)" under the Containment Isolation Function in Table 15.0-8.

f) First paragraph of B 3.3.1 Bases text on page B 3.3.1-14 of Interim Revision 2 states that "credited functions are tabulated in FSAR Tables 15.0-7, 15.0-8, and 15.0-9." It does not appear that all functions specified in the referenced tables are actually credited.

16-219

Bases enhancement to ensure the accuracy and completeness of information.

16-223

Potential discrepancy regarding the response to Question 16-223 which states "the hardwired logic will be periodically tested as part of U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Surveillance Requirements (SR) 3.3.1.3 (for reactor trip functions) and 3.3.1.8 (for ESF functions)." SR 3.3.1.8 is currently specified for Sensors A.24, A.25, Manual Actuation Switches B.1, B.2, B.3, and Actuation Device D.1 in Table 3.3.1-1. Components A.25 and B.1 do not appear to be associated with ESF functions.

16-226

Potential discrepancy regarding the deletion of "manual actuation switches" from the second paragraph of Bases page B 3.3.1-15, Interim Revision 2.

16-227

The ≤ sign associated with the LTSP/Design Limit of 36.3 psia for Function B.9.c was not included in Table 3.3.1-2 of Interim Revision 2. The ≤ was incorporated into Revision 1 of the DCD and is specified in the FSAR Markup for RAI 110, Question 16-227.

16-234

a) Discrepancies regarding omission of the Note in SR 3.3.3.2 (NUREG-1431) from EPR GTS surveillance requirement SR 3.3.2.1, and deletion of the associated Bases discussion in EPR Bases Section SR 3.3.2.1.

b) Discrepancy regarding the omission of Bases text associated with Core Exit thermocouples in Bases Section SR 3.3.3.2 (NUREG-1431), from EPR Bases Section SR 3.3.2.1.

16-313

POTENTIAL OPEN ITEM

Provide the additional information and update the following RAI responses for each of the Electrical Power System Tech Spec items identified, based on the results of Audit Meeting between AREVA NP and NRC Staff on 6/24/09.

Request for Additional Information No. 74 (953)

16-11

The applicant is requested to include mode restriction information in EPR Surveillance Requirement (SR) 3.8.1.10 and associated Bases section. EPR SR 3.8.1.10 omits bracketed NOTE 1 in WOG SR 3.8.1.10 which addresses mode restrictions associated with performance of the surveillance. EPR Bases omits discussion of the Note presented in the corresponding WOG Bases as well.

16-18

The applicant is requested to enhance the AC Sources - Operating Bases (B 3.8.1) discussion associated with Required Actions C.1 and C.2 in order to provide a clearer understanding of the ability of these actions to ensure the availability of sufficient standby AC sources to 1) power the minimum required ESF Functions, and 2) achieve completion of required safety functions following an AOO or postulated accident, regardless of which two diesels are inoperable.

16-22

The applicant is requested to include mode restriction information in EPR Surveillance Requirement (SR) 3.8.1.12 and associated Bases section. EPR SR 3.8.1.12 omits bracketed NOTE 2 in WOG SR 3.8.1.12 which addresses mode restrictions associated with performance of the surveillance. EPR Bases omits discussion of the Note presented in the corresponding WOG Bases as well.

16-23

a) The applicant is requested to include mode restriction information in EPR Surveillance Requirement (SR) 3.8.1.13 and associated Bases section. EPR SR 3.8.1.13 omits the bracketed NOTE in WOG SR 3.8.1.13 which addresses mode restrictions associated with performance of the surveillance. EPR Bases omits discussion of the Note presented in the corresponding WOG Bases as well.

b) Question 16-23 response states “this test is a logic function test that is performed without the EDG operating.” It appears that the test could actually be conducted with the EDG in service (i.e. during performance of LOP/LOCA testing IAW SR 3.8.1.18 for example), which is a common practice in the operating fleet. Designation of SR 3.8.1.13 as strictly a logic function test may be overly restrictive. In addition, there is no mention in the Bases of the test being a logic function test that is performed without the EDG operating. The applicant is requested to evaluate the testing strategy for SR 3.8.1.13 and make any necessary changes.

16-26

The applicant is requested to include mode restriction information in EPR Surveillance Requirement (SR) 3.8.1.9 and associated Bases section. EPR SR 3.8.1.9 omits bracketed NOTE 1 in WOG SR 3.8.1.9 which addresses mode restrictions associated with performance of the surveillance. EPR Bases omits discussion of the Note presented in the corresponding WOG Bases as well.

16-27

Inconsistencies exist throughout Technical Specifications and the FSAR regarding appropriate use of the words “Engineered Safety Features (ESF) Systems.” The response to Question 16-27 states “the systems that perform the ESF functions (e.g., emergency feedwater, control room air conditioning, and medium head safety injection, etc) are considered to be separate systems and are not part of the PS. There is no “Engineered Safety Features System” in the U.S EPR design. However, the Bases will be clarified to state that both the Protection System and systems that perform Engineered Safety Features functions are operable.” “Engineered Safety Features Systems” is cited throughout the FSAR. Section 7.3 of the FSAR for example, is titled “Engineered Safety Features Systems” and Chapter 15 includes references to ESF Systems. The applicant is requested to resolve the inconsistencies, clarify the response, and make any necessary changes.

16-29

a) The applicant is requested to correct an inaccuracy associated with the response to Question 16-29 regarding the reference to "Chapter 16, Technical Specifications Section 3.8.3, “Diesel Fuel Oil, Lube Oil, and Starting Air.” The indicated reference is not being revised as stated in the response and should be removed.

b) The applicant is requested to resolve inconsistencies identified in Bases B 3.8.3 regarding the Diesel Lube Oil System. The revision 1 Bases discussions associated with the fourth paragraph on page B 3.8.3-1 and SR 3.8.3.2 on page B 3.8.3-5 appear to contain conflicting information.

16-33

The applicant is requested to correct an inaccuracy associated with the response to Question 16-33 regarding the statement "The chemical and volume control system (CVCS) charging line isolation on anti-dilution mitigation (ADM) at shutdown conditions (reactor coolant pump (RCP) not operating) engineered safety feature (ESF) function is shown on U.S. EPR FSAR Tier 2, Figure 7.3-22." The CVCS charging line does not isolate on ADM.

16-36

Inconsistencies exist throughout Technical Specifications and the FSAR regarding appropriate use of the words “Engineered Safety Features (ESF) Systems.” The response to Question 16-36 references the response to 16-27 which states “the systems that perform the ESF functions (e.g., emergency feedwater, control room air conditioning, and medium head safety injection, etc) are considered to be separate systems and are not part of the PS. There is no “Engineered Safety Features System” in the U.S EPR design. However, the Bases will be clarified to state that both the Protection System and systems that perform Engineered Safety Features functions are operable.” “Engineered Safety Features Systems” is cited throughout the FSAR. Section 7.3 of the FSAR for example, is titled “Engineered Safety Features Systems” and Chapter 15 includes references to ESF Systems. The applicant is requested to resolve the inconsistencies, clarify the response, and make any necessary changes.

16-39

Inconsistencies exist throughout Technical Specifications and the FSAR regarding appropriate use of the words “Engineered Safety Features (ESF) Systems.” The response to Question 16-39 references the response to 16-27 which states “the systems that perform the ESF functions

(e.g., emergency feedwater, control room air conditioning, and medium head safety injection, etc) are considered to be separate systems and are not part of the PS. There is no “Engineered Safety Features System” in the U.S EPR design. However, the Bases will be clarified to state that both the Protection System and systems that perform Engineered Safety Features functions are operable.” “Engineered Safety Features Systems” is cited throughout the FSAR. Section 7.3 of the FSAR for example, is titled “Engineered Safety Features Systems” and Chapter 15 includes references to ESF Systems. The applicant is requested to resolve the inconsistencies, clarify the response, and make any necessary changes.
16-40

a) CONDITION A of LCO 3.8.8, Inverters - Shutdown, states “one or more required inverters inoperable.” The applicant is requested to clarify what is meant by the word “required” in terms of operable inverters for the U.S. EPR Electrical System design and to evaluate the technical accuracy of CONDITION A and the REQUIRED ACTIONS specified, considering that 1) the wording associated with CONDITION A of comparable LCO 3.8.8 in the WOG STS is similar, and 2) the WOG design has two inverters per train (total of four inverters), whereas the EPR design has one inverter per division (total of four inverters). The response to Question 16-40 states that “two divisions of Class 1E power are required to mitigate the consequences of an accident or an anticipated operational occurrence (AOO) in cold shutdown or refueling modes.”

b) The applicant is requested to correct an inaccuracy associated with the response to Question 16-40 regarding the statement "The chemical and volume control system (CVCS) charging line isolation on anti-dilution mitigation (ADM) at shutdown conditions (reactor coolant pump (RCP) not operating) engineered safety feature (ESF) function is shown on U.S. EPR FSAR Tier 2, Figure 7.3-22." The CVCS charging line does not isolate on ADM.

16-42

Inconsistencies exist throughout Technical Specifications and the FSAR regarding appropriate use of the words “Engineered Safety Features (ESF) Systems.” The response to Question 16-42 references the response to 16-27 which states “the systems that perform the ESF functions (e.g., emergency feedwater, control room air conditioning, and medium head safety injection, etc) are considered to be separate systems and are not part of the PS. There is no “Engineered Safety Features System” in the U.S EPR design. However, the Bases will be clarified to state that both the Protection System and systems that perform Engineered Safety Features functions are operable.” “Engineered Safety Features Systems” is cited throughout the FSAR. Section 7.3 of the FSAER for example, is titled “Engineered Safety Features Systems” and Chapter 15 includes references to ESF Systems. The applicant is requested to resolve the inconsistencies, clarify the response, and make any necessary changes.

16-43

Inconsistencies exist throughout Technical Specifications and the FSAR regarding appropriate use of the words “Engineered Safety Features (ESF) Systems.” The response to Question 16-43 references the response to 16-27 which states “the systems that perform the ESF functions (e.g., emergency feedwater, control room air conditioning, and medium head safety injection, etc) are considered to be separate systems and are not part of the PS. There is no “Engineered Safety Features System” in the U.S EPR design. However, the Bases will be clarified to state that both the Protection System and systems that perform Engineered Safety Features functions are operable.” “Engineered Safety Features Systems” is cited throughout the FSAR. Section 7.3 of the FSAR for example, is titled “Engineered Safety Features Systems” and Chapter 15

includes references to ESF Systems. The applicant is requested to resolve the inconsistencies, clarify the response, and make any necessary changes.

16-46

The applicant is requested to enhance the AC Sources - Shutdown Bases (B 3.8.2) LCO discussion regarding the requirement for two diesels to reside within the same divisional pair, as opposed to one Operable EDG residing in each of two separate divisional pairs. The referenced Bases section does not currently address the potential inability of two emergency diesels in separate divisional pairs to supply the necessary electrical power for the various combinations of subsystems, equipment, and components required Operable by LCO 3.8.10 with the alternate feeds not aligned. This is relevant information which needs to be captured in the Bases.

16-49

a) The applicant is requested to include applicable WOG B 3.8.2 LCO Bases information associated with automatic load sequencing, in the EPR B 3.8.2 LCO Bases Section. The proper sequencing of loads (even though achieved through the Protection System) ensures that sufficient time exists for the diesel to restore voltage and frequency before the next load is applied. As such, load sequencing has the potential to affect diesel operability.

b) The applicant is requested to evaluate the technical accuracy of the EPR B 3.8.1 LCO Bases statement on page B 3.8.1-4 that reads “proper sequencing of loads is a required function for EDG OPERABILITY.” It appears that the bracketed phrase “including tripping of nonessential loads” in the comparable WOG B 3.8.1 LCO Bases statement, may be applicable to the referenced EPR Bases statement as well, on the basis of EPR surveillance requirement SR 3.8.1.11.b which verifies load shedding from the emergency buses on either an actual or simulated loss of offsite power signal.

16-51

The applicant is requested to enhance the Distribution Systems - Operating Bases (B 3.8.9) LCO discussion regarding the ability of redundant equipment with divisional pairs to maintain safety-related functional capabilities when alternate power feed cross tie breakers are closed. The Bases does not adequately describe the capabilities of the inter-divisional alternate feed protection and coordination scheme to provide protection so that a fault on one division does not degrade the other division below an acceptable level with a tie breaker closed.

16-53

U.S. EPR safety analysis assumptions are satisfied with three operable EDGs and the alternate feed established. The divisional pair concept in application of implementing the alternate feed provides a standby source of power to safety-related components when an EDG is out of service. By maintaining divisional pairs physically and electrically separate, and selecting diverse power sources between the divisional pairs to accomplish required safety functions, the electrical distribution contains the required independence and redundancy to perform the required safety functions assuming a single failure. Although the alternate feed alignment is not a temporary modification in that it is part of the actual design, the referenced condition is not the normal alignment and is aligned when in a Tech Spec Action Statement that is intended to be

temporary. CTSB requested the Electrical Engineering Technical Branch (EEB) review the 120-day Required Action Time for concurrence.

EEB raised the following concerns based on their review:
In RAI No. 11, Question 08.03.01-13, the staff expressed that the 120-day completion time currently specified for LCO 3.8.1, REQUIRED ACTION B.5, for restoration of a single inoperable diesel is excessive. In the response to RAI No. 11, Question 08.03.01-3, the applicant stated that the alternate feed configuration will be used only during specific maintenance activities, and cited EDG maintenance as an example. Provide a detailed list of maintenance activities that would require a EDG to be out of service for a period of 120 days, the associated maintenance time needed for each activity, and state that how frequently those maintenance activities will be needed (e.g., every 10 years). In addition, provide what type of compensatory measures would be in effect during the 120 days, and what control configuration management would be in place for an additional EDG failure. The applicant is requested to provide the additional information necessary to assure the staff that use of the alternate feed configuration required to support EDG maintenance will be infrequent.

16-314

POTENTIAL OPEN ITEM

Provide the additional information and update the following RAI response for the Electrical Power System Tech Spec item identified, based on the results of Audit Meeting between AREVA NP and NRC Staff on 6/24/09.

Request for Additional Information No. 110 (1331)

16-237

a) FSAR Markup for AC Sources - Operating Bases B 3.8.1, SURVEILLANCE REQUIREMENTS, states “this value allows for a combined variation in voltage and frequency of 60% when considering voltage drop to the terminals of 6600 V motors whose minimum operating voltage is specified as 90% or 5940 V.” The combined variation in voltage and frequency should be 10% instead of 60%.

b) FSAR Markup for AC Sources - Operating Bases B 3.8.1, SURVEILLANCE REQUIREMENTS, specifies “NEMA MG 1-2006 (Ref. 1).” The Reference number should be 11 instead of 1.

16-315

POTENTIAL OPEN ITEM

Provide the additional information and update the following RAI response for Post Accident Monitoring (PAM) Instrumentation Tech Spec 3.3.2.

Request for Additional Information No. 110 (1295)

16-212

The response to Question 16-212 removes the current list of PAM Instrumentation and associated discussions from U.S. EPR FSAR Tier 2, Chapter 16 Technical Specifications Section 3.3.2, and U.S. EPR FSAR Tier 2, Chapter 16 Technical Specification Bases B 3.3.2, on the basis that PAM variable selection criteria in RG 1.97, Rev. 4, depend on prior development of Emergency Procedure Guidelines (EPGs), Emergency Operating Procedures (EOPs), and Abnormal Operating Procedures (AOPs) (guidelines and procedures that cannot be completed prior to COL issuance).

The staff has reviewed its current position, as stated in the STS Reviewer's Note, regarding which accident monitoring instrumentation should be in technical specifications, in comparison to Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4, June 2008. It is the NRC staff's position that technical specifications should include (1) all Regulatory Guide 1.97, Revision 4, Type A instruments, and (2) all Regulatory Guide 1.97, Revision 4, Type B and Type C instruments in accordance with the unit's Regulatory Guide 1.97 Safety Evaluation Report. Therefore, a COL applicant should include a technical specification that meets this staff position if the applicant references Regulatory Guide 1.97, Revision 4.

Identification of Regulatory Guide 1.97, Revision 4, Type A, Type B, and Type C accident monitoring instrumentation functions depends on development of emergency operating procedures (EOPs) and abnormal operating procedures (AOPs), which is a post-COL activity. Therefore COL applicants implementing Regulatory Guide 1.97, Revision 4, should use guidance from DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications When a Combined License Is Issued," December 2008, in order to complete the plant-specific technical specification list of PAM instrumentation functions. This guidance provides three options:

- Option 1 involves the use of plant-specific information. Option 1 appears impracticable for PAM instrumentation technical specifications because the list of Type A, Type B, and Type C PAM instrumentation functions cannot be finalized before COL issuance.

- Option 2 involves the use of useable bounding information. Option 2 may be practical if the COL applicant is able to develop a truly bounding list of Type A, Type B and Type C PAM instrumentation functions to be included in the plant-specific technical specifications. However, if a Regulatory Guide 1.97, Revision 4, analysis considering plant-specific EOPs and AOPs, which are based on the as-built plant, shows that additional PAM instrumentation functions are necessary, then the COL holder would need to request a license amendment to make changes to the plant-specific technical specification PAM instrumentation required functions list. The NRC would need to approve this amendment before the COL holder would be allowed to load fuel.

- Option 3 involves an administrative program to control PAM instrumentation functions. Option 3 would require establishing a plant-specific administrative controls program technical specification that would require using an NRC-approved methodology to determine the required PAM instrumentation functions, and maintaining the list of required PAM instrumentation functions in a specified document with appropriate regulatory controls. Option 3 may be practical because the approved methodology, Regulatory Guide 1.97, Revision 4, is already established, and FSAR Section 7.5.2.2.1 already commits the COL holder to establish a list of all types of PAM instrumentation. This approach is advantageous because COL holders would not necessarily need to

request a license amendment to make changes to the PAM instrumentation required functions list post COL. However, the program technical specification would need to be developed prior to COL issuance.

The applicant is requested to propose changes as described in the Attachment 1.

Attachment 1

The standard technical specifications (STS) for Westinghouse pressurized water reactors (PWRs) include a specification, STS 3.3.3, to govern post-accident monitoring (PAM) instrumentation. The bases for STS 3.3.3, which is based on Regulatory Guide 1.97, Revision 3, state:

> PAM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii). Category 1, non-Type A, instrumentation is retained in the Technical Specifications because it is intended to assist operators in minimizing the consequences of accidents. Therefore, these Category 1, non-Type A variables are important for reducing public risk.

STS 3.3.3 contains a Reviewer's Note for applicants or licensees who propose to incorporate STS 3.3.3 into their plant's technical specifications. The Note requires replacing the bracketed list of PAM functions in STS Table 3.3.3-1 with a list of all Regulatory Guide 1.97 Type A instruments, and the Category 1, non-Type A instruments specified in the plant's Regulatory Guide 1.97 Safety Evaluation Report.

STS 3.3.3 and bases, and the STS Table 3.3.3-1 Reviewer's Note are based on the May 9, 1988, T.E. Murley (NRC) to R. A. Newton (Westinghouse Owners' Group) letter, which presented the NRC staff position regarding which accident monitoring instrumentation must be in technical specifications. This letter is known as the "Split Report."

The staff has reviewed its current position, as stated in the STS Reviewer's Note, regarding which accident monitoring instrumentation should be in technical specifications, in comparison to Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4, June 2008. It is the NRC staff's position that technical specifications should include (1) all Regulatory Guide 1.97, Revision 4, Type A instruments, and (2) all Regulatory Guide 1.97, Revision 4, Type B and Type C instruments in accordance with the unit's Regulatory Guide 1.97 Safety Evaluation Report. Therefore, a COL applicant should include a technical specification that meets this staff position if the applicant references Regulatory Guide 1.97, Revision 4.

Identification of Regulatory Guide 1.97, Revision 4, Type A, Type B, and Type C accident monitoring instrumentation functions depends on development of emergency operating procedures (EOPs) and abnormal operating procedures (AOPs), which is a post-COL activity. Therefore COL applicants implementing Regulatory Guide 1.97, Revision 4, should use guidance from DC/COL-ISG-8, "Necessary Content of Plant-Specific Technical Specifications When a Combined License Is Issued," December 2008, in order to complete the plant-specific technical specification list of PAM instrumentation functions. This guidance provides three options:

- Option 1 involves the use of plant-specific information. Option 1 appears impracticable for PAM instrumentation technical specifications because the list of Type A, Type B, and Type C PAM instrumentation functions cannot be finalized before COL issuance.

- Option 2 involves the use of useable bounding information. Option 2 may be practical if the COL applicant is able to develop a truly bounding list of Type A, Type B and Type C PAM instrumentation functions to be included in the plant-specific technical specifications. However, if a Regulatory Guide 1.97, Revision 4, analysis considering plant-specific EOPs and AOPs, which are based on the as-built plant, shows that additional PAM instrumentation functions are necessary, then the COL holder would need to request a license amendment to make changes to the plant-specific technical specification PAM instrumentation required functions list. The NRC would need to approve this amendment before the COL holder would be allowed to load fuel.

- Option 3 involves an administrative program to control PAM instrumentation functions. Option 3 would require establishing a plant-specific administrative controls program technical specification that would require using an NRC-approved methodology to determine the required PAM instrumentation functions, and maintaining the list of required PAM instrumentation functions in a specified document with appropriate regulatory controls. Option 3 may be practical because the approved methodology,

Regulatory Guide 1.97, Revision 4, is already established, and DCD Section 7.5.2.2.1 already commits the COL holder to establish a list of all types of PAM instrumentation. This approach is advantageous because COL holders would not necessarily need to request a license amendment to make changes to the PAM instrumentation required functions list post COL. However, the program technical specification would need to be developed prior to COL issuance.

As noted above, NRC staff has concluded that accident monitoring instrumentation Type A, Type B and Type C, as defined Regulatory Guide 1.97, Revision 4, are similar to the Type A and the Category 1, non-Type A defined in Regulatory Guide 1.97, Revision 3. Since standard technical specifications (STS) for Westinghouse pressurized water reactors (PWRs) include a technical specification to govern post-accident monitoring (PAM) instrumentation, the staff concludes that requirements for PAM instrumentation must be included in the EPR generic technical specifications. The staff believes the following is an option for such a set of generic technical specification requirements:

(1) Revise Generic Technical Specification 3.3.2, "Post-Accident Monitoring (PAM) Instrumentation," to include a table that specifies the required PAM functions (Table 3.3.2-1). The specified PAM functions should be consistent with Westinghouse Standard Technical Specification Table 3.3.3-1.

(2) Place brackets around Generic Technical Specification Table 3.3.2-1, which lists the required PAM functions.

(3) Add a Reviewer's Note to Generic Technical Specification Table 3.3.2-1 to be consistent with Regulatory Guide 1.97, Revision 4, and the reviewer's note for STS Table 3.3.3-1. Also add a second Reviewer's Note to explain that in lieu of the table listing the PAM functions in the technical specifications, a COL applicant may adopt Specification 5.5.xx (as noted in item 6 below), and include the list of PAM instrumentation functions in a document as described in FSAR Section 7.5.2.2.1.

(4) Replace Generic Technical Specification Limiting Condition for Operation (LCO) 3.3.2 with:

> The [required number of channels of each] Type A, B, and C PAM instrumentation Function[s] [in Table 3.3.2-1] shall be OPERABLE.

(5) Make suitable conforming changes to the bases for Generic Technical Specification 3.3.2, consistent with the bases for STS 3.3.3. The LCO section of the bases for Generic Technical Specification 3.3.2 should contain bracketed discussions of the specified Type A, Type B, and Type C PAM instrumentation functions. Revise the Background and the Applicable Safety Analysis sections of the bases to also include discussions of PAM instrumentation types (Type A, B, and C).

(6) Establish a bracketed new specification in Generic Technical Specification Section 5.5 similar to the following model. This would enable COL applicants to choose Option 3 of DC/COL-ISG-8 to complete the technical specifications for PAM instrumentation without having to obtain an exemption from the generic technical specifications.

> The following programs shall be established, implemented, and maintained.
>
> [5.5.xx <u>Post-Accident Monitoring (PAM) Instrumentation Program</u>
>
> This program provides controls to establish accident monitoring instrumentation functions that are required by Specification 3.3.2, "Post-Accident Monitoring (PAM) Instrumentation." These instrumentation functions shall be those designated as Type A, B, and C, as defined in Regulatory Guide (RG) 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4, June 2006, and shall be listed in the PAM function list as described in FSAR Section 7.5.2.2.1. Changes to the list of Type A, B, and C functions shall be made in accordance with the provisions of 10 CFR 50.59 and RG 1.97, Revision 4.]

These recommendations result in a PAM instrumentation generic technical specification that includes a COL item. As discussed in DC/COL-ISG-8, a COL applicant may complete the plant-specific technical specification list of required PAM instrumentation functions either by using the bounding approach, Option 2, or by using the programmatic approach, Option 3, with a plant-specific technical specification administrative program requiring that the list of technical specification required PAM instrumentation functions be determined in accordance with an NRC approved methodology.

In the alternative, instead of each COL applicant having to choose an option to complete the PAM COL item, the technical specification administrative program approach (DC/COL-ISG-8, Option 3) could be implemented in the generic technical specifications. This approach would better promote standardization of PAM requirements in plant-specific technical specifications because the administrative program technical specification would be developed on a generic basis for the design center, instead of for each COL applicant. Also, since PAM requirements would no longer be a COL item, the guidance in DC/COL-ISG-8 would not apply, and COL applicants could incorporate by reference the generic administrative program technical specification for PAM instrumentation into the plant-specific technical specifications. Therefore, Areva is requested to consider the alternative of revising PAM instrumentation requirements in the EPR generic technical specifications as follows.

(1) Establish a new specification in Generic Technical Specification Section 5.5 similar to the following model:

The following programs shall be established, implemented, and maintained.

5.5.XX <u>Post-Accident Monitoring (PAM) Instrumentation Program</u>

This program provides controls to establish accident monitoring instrumentation functions that are required by Specification 3.3.2, "Post-Accident Monitoring (PAM) Instrumentation." These instrumentation functions shall be those designated as Type A, B, and C, as defined in Regulatory Guide (RG) 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," Revision 4, June 2006, and shall be listed in the PAM function list as described in FSAR Section 7.5.2.2.1. Changes to the list of Type A, B, and C functions shall be made in accordance with the provisions of 10 CFR 50.59 and RG 1.97, Revision 4.

(2) Replace Generic Technical Specification Limiting Condition for Operation (LCO) 3.3.2 with:

The required number of channels of each Type A, B, and C PAM instrumentation Function shall be OPERABLE.

(3) Make suitable conforming changes to the bases for Generic Technical Specification 3.3.2, consistent with the bases for STS 3.3.3. The LCO section of the bases for Generic Technical Specification 3.3.2 need not discuss the specified Type A, B, and C PAM instrumentation functions. Revise the Background and the Applicable Safety Analysis sections of the bases to also include discussions of PAM instrumentation types (Type A, B, and C).