ArevaEPRDCPEm Resource

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Sent: Monday, January 19, 2009 9:27 AM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 182 (1963), FSAR Ch. 14
Attachments: Draft RAI_182_NARP_1963.doc

Attached please find draft RAI No. 182 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. 182 (1963), Revision 0

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U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.03 - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: Tier 1 ITACC Tables

QUESTIONS for EPR Projects Branch (NARP)

14.03-10

The following comments are provided that identify some: inconsistencies, wording interpretation issues, technical adequacy issues, and NRC "inspectability" issues, related to the organization and wording of the EPR ITAAC, documented in Revision 0.

The following examples should be viewed as representative samples of the broader issues. In each case, there are numerous examples and often different variations of the identified concern that could be discussed. Since almost 50% of the EPR ITAAC have varying degrees of such "inspectability" questions associated with them, all of these ITAAC are not presented below; instead relying on the examples presented. This summary is intended to provide a more general discussion of the topical areas of concern.

It should be understood that that it is the responsibility of the applicant to identify all the ITAAC that need such revision. The examples below should not be viewed as a complete "punch list" of all the ITAAC needing review or revision based upon the stated concerns. The generic areas of concern are noted below, supported by some (but not all) examples. Some specific comments are also documented:

A. ITAAC ID and NUMBERING

NRC Regulatory Issue Summary 2008-05 states in its very first recommendation that, "Applicants should consider using a consistent system to identify and number individual ITAAC within their applications …….. Use of a standard and consistent ITAAC identification system will minimize confusion."

This recommendation does not appear to have been implemented in Revision 0 of the US EPR ITAAC. While a clearly understood and acceptable alphanumeric system (e.g., 1.a.1) is sometimes used, different sections of the ITAAC use different approaches for ITAAC labeling, including parentheses, bullets and separate paragraphs that do not necessarily align across the "Design Commitment", "ITA", "and "AC" columns. Examples of this include Table 2.2.1-5 (Item 3.4b), Table 2.2.2-3 (Item 3.2b), Table 2.2.5-3 (Item 3.3b), and Table 2.5.4-3 (Item3.2) – all of which address piping ITAAC, but illustrate different ways the alphanumeric system is utilized.

(Also as a minor comment, the "Design Commitment" is sometimes noted as the "Commitment" or the "Commitment Wording".)

B. ITAAC INTERPRETATION (Seismic)

A reader (e.g., reviewer or inspector) is required to interpret how the written AC might meet the ITA in different ways for different systems, even though the Design Commitment might be identical for these systems. Examples of this include Table 2.2.1-5 (Item 3.3), Table 2.2.2-3 (Item 3.3), and Table 2.10.1-2 (Item 3.1). All of these ITAAC require the identified equipment to withstand design basis seismic load without loss of safety function, but use differently organized (and potentially confusingly worded) ITA + AC to establish the inspectable requirements.

C. REFERENCE ONLY ITAAC

As another example, Table 2.5.2-3 (Items 5.8 & 5.9) appear to use a "reference-only" notation for the divisional color coding and physical separation of the EUPS cables, but inappropriately reference the same cable criteria in the EPPS of Table 2.5.1-3 (Items 5.9 & 5.10). Implementing these EPPS ITAAC alone does not provide adequate assurance that the EUPS cables have also been installed correctly.

[As noted in the RIS, such inconsistent application of an ITAAC ID and wording protocol could lead to interpretations problems and unnecessary confusion.]

D. I&C LIFE CYCLE

In Table 2.4.1-9 (Item 4.14), the ITAAC for PS hardware and software development identifies the "life cycle" for digital equipment with "bulletized" commitments, ITA requiring both inspections & analysis, and AC indicating alphanumeric criteria which are difficult to align with either the design commitments or the ITA.

E. DEFINITIONS & TERMINOLOGY

1) In the area of the "Definitions" of Section 1.1 of the EPR FSAR, the terms "as-installed " and "as-built" are defined differently. However, the ITAAC usage of these terms often appears to be not only inconsistent, but also inappropriate to the definition. If "as-built" is equivalent to "as-installed" for systems and structures fabricated onsite, why cannot the term "as-installed" be the operative wording – avoiding the confusing interpretation of these definitions? For Table 2.2.1-5, Item 2.1 requires and inspection of the "<u>as-built</u>" RCS, Item 3.3c requires the inspection of the "<u>as-installed</u>" RCS equipment supports, and Item 3.4b requires inspection of the "<u>as-built</u>" piping. What is the point of such defined differentiation?

   Furthermore, for some ITAAC (e.g., Table 2.2.6-3, Item 7.2), the wording is explicit to require that the "as-installed "CVCS valves change positions; while the IRWSTS containment isolation valves of Table 2.2.2-3 (Item 7.2) are appropriately provided <u>closure</u> times, but not noted to be "as-installed".

2) Another “Definition” concern arises with the term “As-built Reconciliation”. While the definition itself appears appropriate, this term does not appear to be used in the ITAAC themselves. Specifically, for ASME piping systems (e.g.., Table 2.2.1-5 for the RCS), there appears to be no ITAAC written to check the “As-built Reconciliation” of the “as-built” piping to assure that the design requirements have been met. [Note that additional ASME ITAAC issues are discussed in a latter comment.]

3) Additional comments relating to Definitions and terminology involve the inappropriate interchange of an “inspection” and a “test”. Examples of this include Items 7.6 & 7.7 of Table 2.2.2-3 where the supply of IRWST water is more appropriately “tested” and not “inspected”.

4) Also, Table 2.5.2-3 (Item 5.2) specifies an “inspection” of the separation (by isolation device) non-safety loads connected to the EUPS. A properly controlled “test” is more appropriate to verifying the adequacy of Class 1E isolation devices. This also focuses on the adequacy of “electrical isolation”. Table 2.4.2-2 (Item 4.3) specifies ITA that include “inspections, type tests, tests, analyses or a combination of tests and analyses”, while the AC only requires that ‘electrical isolation devices exist”. Table 2.4.1-9 (Item 4.9) specifies only an “inspection” for the ITA, but the same AC that only verified the existence of the isolation devices. What verifies that the electrical isolation devices are adequate?

5) As an example of too liberal an interpretation of terminology, in several ITAAC sections (e.g., Table 2.1.1-7, Items 4.2 & 4.6) the ITA specifies an inspection or verification of “construction records”. The inspection requirement should be applied to the actual construction of the SSC (as documented in the QA records), but not of the “records” alone.

6) Finally, in the use of terminology, care should be taken with regards to the use of terms like “components”, “equipment”, and “piping” depending upon the EPR system. While a reader is likely to logically infer what is meant when these terms are used in reference to a Table or Figure, it is noted the ASME B&PC Code, Section III, NCA-9000 provides a definition of a “component” that includes a “piping system”. Since the EPR Definitions do not define these terms, their inappropriate interchangeability could create unnecessary interpretation problems.

F. <u>ASME B&PV SECTION III REQUIREMENTS</u>

RIS 2008-05 identified the need for clear use of ASME references (e.g.., design reports vs. data reports) and application of the criteria for proper “construction” (and not just “design”) IAW the ASME B&PV Code, Section III, requirements. This was effectively implemented by GEH in a recent revision to the ESBWR ITAAC by developing six separate ITAAC (three each for ASME components and ASME piping) for each system. These three ITAAC covered (1) the SSC design; (2) the design reconciliation of the as-built SSC; and (3) the fabrication, installation, inspection, & testing IAW the ASME Code. The EPR ITAAC appear to address the ASME Code requirements in an inconsistent and incomplete manner, as follows (using Table 2.2.1-5 for the RCS as a representative example):

1) ITAAC 3.1: The ITA lists NDE for the components, but the AC does not identify the need for acceptable NDE results.

2) ITAAC 3.4a: The ITAAC identifies analysis of the as-designed piping (e.g., stress reports), but there is no corresponding ITAAC for either the constructed piping (e.g., data reports) or the design reconciliation of the as-built piping (e.g., the design reports referenced by the data reports).

3) ITAAC 3.4b: The ITAAC lists pipe welding and hydrostatic testing criteria, but acceptable NDE are not listed in the AC and hydrostatic test results are not specified.

4) ITAAC 3.10: The ITAAC indicates ASME “design” of the piping supports, but there are no ITAAC for proper “construction” of the ASME supports. (Additional Question: If ITAAC 3.4a specifies that piping be designed IAW ASME Section III requirements, including seismic loads, does this not also cover adequate design of the piping supports? This then would render ITAAC 3.10 as redundant.)

5) ITAAC 3.11: Similar question for “fatigue analysis” of the ASME Components – is this not covered by ITAAC 3.1 relative to the design of the components IAW the ASME Code?

6) ITAAC 3.12, 3.13, 3.14, & 3.15: These ITAAC require the existence of “specifications” for ASME components, piping, supports, and core support structures. However, the existence of “specifications” is only a “means to the correct end”; i.e., that the components, piping, supports, and core support structures are designed, constructed, inspected, and reconciled with the ASME B&PV Code, Section III. If that is what these ITAAC are meant to convey, they should be re-written as such. Otherwise, the mere existence of “specifications” may be meaningless and could be redundant to other ITAAC.

G. <u>ITAAC SPECIFICITY & DETAIL</u>

Several EPR ITAAC are written without sufficient specificity or detail that provides meaningful acceptance criteria or attributes that can be assessed and verified by independent inspection. Examples follow:

1) Table 2.2.5-3 (Item 2.3) & Table 2.2.7-3 (Item 2.3) require “physical separation” between Divisions, without specifying the amount of required separation. Whereas Table 2.4.1-9 (Item 2.2) & Table 2.4.2.2 (Item 2.2) identify the adequate inspection criteria establishing separation.

   [This comment is generic to ITAAC where “separation” and “gaps” are referenced without quantifying the details.]

2) Table 2.5.3-2 (Item 2.2) requires a test of the SBODG equipment controls listed in Table 2.5.3-1. However, there is no detail on the function of these controls and how they would be tested acceptably. Table 2.7.6-1 (Item 3.2) indicates that “controls exist in the MCR”, with no specificity as to what controls.

3) Table 2.7.1-3 (Items 4.4 thru 4.9) apply generic wording to the AC for using simulated signal to test an interlock function. The test requirements and design conditions are specified in the "Commitment Wording", which is not part of the "legal" ITAAC. [This comment appears applicable to almost all ITAAC listing "interlock" and "bypass" functions.]

4) Table 2.5.1-3 (Item 6.4) indicates that the EPSS loads are sequentially energized during a LOOP or LOCA, but does not specify or refer to the details of the correct, expected sequence of the loads.

5) In Table 2.2.4-3 (Items 7.2 & 7.4) the ITAAC require "analyses" for the applicable EFWS flowrates, but then specify quantitative design flowrates in the AC, which would appear to align with a "test", not "analysis". Similarly, in Table 2.5.4-3 (Items 3.9 & 3.10) the ITA specify "inspections", which do not comport with the AC requirements of fuel oil needs during EDG operation.

6) Table 2..4.5-2 (Item 4.1) provides an ITA requiring the performance of operational tests to verify the order of priority of PACS automatic functions, without specifying in the AC the specific functions or the precise priority order.

H. BOUNDING ANALYSIS

Where several EPR ITAAC systems (e.g., IRWSTS in Table 2.2.2-3, Items 3.3 & 6.1) require seismic design and environmental qualification (EQ), the AC are written to indicate installation that conforms with design, when a "bounding" analysis is more appropriate. In contrast with this apparent inconsistency is the RCS ITAAC of Table 2.2.1-5 (Item 3.3), which appears to correctly identify as-installed equipment that is "seismically bounded by tested or analyzed conditions."

I. INCOMPLETE ITAAC

1) In Table 2.6.1-3 (Item 6.1), the "Commitment Wording" (which is a Tier 1 Design Commitment) specifies that the CRACS maintain ambient conditions and a positive pressure. However, both the ITA & the AC only test for the positive pressure.

2) In the FSAR Tier 1 Section 2.4.8 for the Leakage Detection System, there is no statement of whether ITAAC exist for this system.

Summary

It is requested that AREVA perform a comprehensive review of all ITACC, and make the appropriate revisions to addresses the concerns identified above.