U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

July 26, 2012

ITAAC INSPECTABILITY EPR RAI 469

Meeting Discussion Points

- RAI 469 and this meeting's discussion points focus on ITAAC "inspectability".
- Inspectability revisions should not impact technical content. ITAAC technical adequacy is not specifically in question, except for cases with lack of clarity or detail.
- The following issues (as with the RAI 469 questions) only represent examples of questionable ITAAC. An "extent of condition" review is expected from AREVA to fully capture all issues.
- Since RAI 469 was first issued, the EPR ITAAC may have undergone several revisions. It is unclear what the total effect of recent changes has been on the acceptability of the ITAAC and AREVA's RAI response.
- Examples here are based on markups included in draft response to RAI 469.

Guidance on ITAAC

- RIS 2008-05 Rev. 1 – Communicates good practices and lessons learned in ITAAC review (ML102500244)
  - Format and Content
  - Nomenclature and Language
  - Inspection Focus, Logic & Practicality
  - Standardization and Review
  - ITAAC Scope
- ITA completion must be verified by the staff [10 CFR 52.99(e)] and all AC met prior to operation [10 CFR 52.103(g)].
- Attendance at Construction Inspection Program Category III Public Meetings and future public discussions on ITAAC technical bases is advisable.

The ASME ITAAC

- The ESBWR ITAAC for ASME criteria represent a good starting point to base ITAAC development.
- This model establishes separate ITAAC for (1) design, (2) construction (including fabrication, installation testing & inspection), & (3) design reconciliation of the as-built SSC.
- From an “inspectability” perspective, the EPR ASME ITAAC appear to have adopted an acceptable format.
- Other issues may remain

MOV ITAAC (RAI 496)

- MOV ITAAC provided as part of RAI 496 (14.03.03-51, July 19, 2011) were not included in the December 2011 “snap-shot.”
- Future ITAAC submitted should be consistent with RAI 496.

Severe Accident ITAAC

- More specificity is needed.
- The SRP Section 14.3 indicates that, “detailed supporting information on what should be present to conclude that an item ‘exists’ and meets the design description is contained in the appropriate sections of the SSAR [Standard Safety Analysis Report].”
- Drawings or other ITAAC references need to contain key, verifiable dimensions or other significant design details. IAW SRP section 14.3, a “graded” approach can establish this level of detail. However, a minimum amount of key information is required in order for an ITAAC to be “inspectable.”.

Severe Accident ITAAC (Cont'd)

- If this level of detail is already presented in Tier 2 of the FSAR, certain key details and significant information can be included in the Tier 1 ITAAC scope of reference.
- If such design details are currently unavailable, the following approach is suggested:
  - One ITAAC specifies the development of design criteria IAW the overall committed design principles
  - A Second ITAAC then confirms construction IAW the approved design
- Without detailed ITAAC information, what would be expected in a licensee's ITAAC Closure Notification? A mere statement that the related SSCs "exist" would be unacceptable.

Severe Accident (Cont'd)

- The Referenced Figure has little information to verify:

Number	DC	ITA	AC
2.1.1-8 Item 2.1	Six rib support structures are provided at the bottom of the reactor cavity as shown in Figure X	Inspection of the reactor vessel cavity will be performed	Six rib support structures are provided at the bottom of the reactor cavity as shown in Figure X

- There is no reference to any figure:

  {Note – the term "as-built" is deleted – discussed on next slide}

Number	DC	ITA	AC
2.3.2-1 Item 2.2	The CMSS has a melt plug and gate.	Inspections of the ~~as-built~~ cavity gate will be <u>performed</u> ~~conducted~~.	The CMSS has a melt plug and gate in room number X.

As-Built Usage

- The term “as-built” was deleted extensively.
- NEI 08-01 has an entire section dedicated to a definition of the proper use of the term “as-built” and exceptions to that definition. However, the NEI 08-01 guidance is applicable only when the as-built term is present in the ITAAC.
- Many EPR ITAAC revisions appear to misinterpret this guidance and inappropriately delete the “as-built” term.

As-Built (Cont'd)

- Page 1.0-7 of the Draft Response, Section 2.1.1.10, No. 2.1, the AC is revised as follows:

  a. A report ~~exists which reconciles deviations during construction and~~ concludes that the ~~as-built~~ SB structures ~~conform to the approved design and~~ will withstand the design basis loads specified without loss of structural integrity or safety-related functions.

  b. A report reconciles deviations to the design.

- Removing "as-built" can imply part "a" verifies the design only, and part "b" reconciles differences, but then there is no confirmation that the construction has been inspected in accordance with the design.
- "Report" ITAAC is an ongoing discussion topic at CIP Category III Public Meetings.

As-Built (Cont'd)

- "As-built" should be used OR words like "during construction" (ITA) & "final" (AC) should not be deleted.

Number	DC	ITA	AC
2.1.1.8 Item 2.13	The RCB has a minimum containment free volume ~~that is confirmed after construction~~	~~During construction, dimensional deviations from the RCB and RB internal structures concrete outline drawings will be analyzed for impact on~~ An analysis will be performed of the minimum containment free volume ~~value~~.	The ~~final~~ RCB minimum containment free volume is greater than or equal to X ~~after all volumetric changes resulting from dimensional deviations to the RCB and RB internal structures concrete outline drawings have been reconciled.~~

Functional Arrangement

- In general, EPR “functional arrangement” acceptance criteria only refer to a Figure and a Table.
- In line with the NEI 08-01 and NRC position, “Functional Arrangement” includes all Tier 1 figures, tables, and the Tier 1 Design Description/Narrative.
- No I&C Functional Arrangement ITAAC

Lower Tier Referencing

- "Construction drawings" should not be referenced because they can change without a Tier 1 protocol; referencing the "approved design" might be more appropriate.

  {Note also the term "as-built" appears to be needed.}

Number	DC	ITA	AC
2.1.5 Item 3.2	The ESWBs have tornado-generated missile protection shields provided for the safety-related fans and pipes as shown on Figure XX.	a. An analysis of the tornado-generated missile protection shields in the ESWB structures for the design basis loads will be performed b. An inspection of the ~~as-built~~ tornado-generated missile protection shield structures versus final **construction drawings** will be performed	a. ~~The~~ A report concludes that the ESWBs ~~have~~ tornado-generated missile protection shields provided for the safety-related fans and pumps as shown on Figure XX will withstand the design basis loads specified without loss of structure integrity or safety-related functions. b. The ~~as-built~~ missile protection shields conform to the **construction drawings.**

ITAAC Mismatch & Records Review

- There is a mismatch between the DC-ITA-AC, and use of the term, “inspection”.
- ITA should not just verify the existence of “records” or “reports.” This comment applies generically to other inappropriate ITAAC references (e.g., for the “existence of Specifications”). There is a need to verify that the proper specification requirements were implemented correctly.

Number	DC	ITA	AC
2.1.1.8 Item 2.26	Thermal properties of the RCB Concrete Mix Design are as defined in the Construction Specification.	a. Inspections will be performed for the existence of ASME Code Section III, Division 2, Construction Specification(s) defining the thermal properties of the RCB Mix Design. b. Testing of the Concrete Mix Design will be performed.	a. ASME Code Section III, Division 2, test records exist for the RCB Concrete Mix Design. b. ASME Code Section III, Division 2, test records exist for the RCB Concrete Mix Design and conclude that it meets the thermal properties specified.

Examples of Questionable Terminology

- FSAR Tier 1, Section 2.9.3, Item 7.1, needs more information regarding the “activated charcoal.” While the acceptance criteria specifies the minimum amount (5,440 lbs) of activated charcoal, the acceptance criteria does not specify the mesh size or bulk density, nor does it require the use of nuclear grade activated charcoals.
- Page 1.0-14, Section 2.1.1.8, item 2.19, what defines or provides the criteria for a “missile restraint”?
- Page 3.0-1, Section 3.0-1, item 3.3a, what is meant by “analytical assumptions”?
- Page 4.0-6, Section 2.9.4, item 4.1, where are the noted “preset limits” established and documented?
- Table 2.1.1-8, ITAAC 2.10b. What is included in the walkdown of “essential equipment?”

Proper ITA

- Use the appropriate ITA for the Design Commitment.
- “Inspection”, “Test”, & “Analysis” are all defined in Tier 1 and these activities should be appropriately matched to the ITAAC verification task.
- If an “inspection” is appropriate, inspect the activity and not the report/record.
- A “test” is the preferred action.

Proper ITA (Cont'd)

- "Testing" is more appropriate – check each load path:

Number	DC	ITA	AC
2.10.1 Item 3.2	The containment polar crane main hoist is equipped with a dual load path reeving system and redundant holding brakes.	An inspection of the ~~as-built~~ polar crane load train assembly will be performed.	The polar crane is equipped with a dual load path from the hook to the hoist brakes with each reeving system capable of holding the load independently

- Again, "testing" is more appropriate:

Number	DC	ITA	AC
2.4.5 Item 4.4	The input wiring from other I&C systems to the PACS is properly connected.	~~Inspections~~ An inspection will be performed to verify that the input wiring from other I&C systems to the PACS is properly connected.	The input wiring from other I&C systems to the PACAS is properly connected.
2.4.1 Item 4.9	The PS uses TXS system communication messages that are sent with a specific protocol.	~~Inspections~~ An inspection will be performed on PS equipment to verify that PS communication messages are sent with a specific protocol	~~Inspections identify that the~~ The TXS system communication messages use a specific…

Mismatching DC/ITA/AC

- AC does not agree with DC:

Number	DC	ITA	AC
2.4.7 Item 3.1	The SMS system can compute the CAV and provides a **display** of the CAV in the MCR.	a. Type tests… b. Tests will be performed …	a. The SMS can compute the CAV. b. ~~Indications~~ **Displays** and **alarms** from CAV are indicated ~~can be retrieved~~ in the MCR.

- Also, "indicated" is a subjective term. Other designs use the term, "retrieved" and define this term in the Tier 1 general provisions.
- Another DC Applicant defined "**Inspect for Retrievability** of a display means to visually observe that the specified information appears on a monitor when summoned by the operator."

Numbering

- Ensure each step/subpart is numbered/lettered
- This ITAAC has “specificity” issues. See next Slide.

Number	DC	ITA	AC
2.1.1.8 Item 2.8	The following provisions are provided…: -As shown in Figure X, RCB rooms which are adjacent to the IRWST contain wall openings ~~slightly above the floor~~ to allow water flow into the IRWST -As shown in Figure Y, RCB rooms which are directly above the IRWST, contain ~~trapezoidal shaped~~ openings in the floor to allow water flow into the IRWST…	Inspection of the RCB will be performed	The as-built RCB configuration includes…: -As shown on Figure X, the two rooms labeled Areas for MHSI, LHSI & SAHRS pipe penetrations contain wall openings ~~slightly above the floor~~ to allow water flow into the IRWST -As shown in Figure Y, ~~the~~ RCB rooms which are directly above the IRWST, ~~labeled RCP Oil Collection Tank Areas for each loop~~ contain ~~trapezoidal shaped~~ openings in the floor. ~~and~~ The floor openings are provided with weirs and racks.

Specificity

- Wall openings “slightly above the floor” are not defined. The solution is NOT to delete the words, but define it with a minimum value or range of acceptable values.
- Also, is the deletion of the “trapezoidal shaped” criterion appropriate if not replaced by other pertinent detail?

Number	DC	ITA	AC
2.1.1.8 Item 2.8	The following provisions are provided…: -As shown in Figure X, RCB rooms which are adjacent to the IRWST contain wall openings ~~slightly above the floor~~ to allow water flow into the IRWST -As shown in Figure Y, RCB rooms which are directly above the IRWST, contain ~~trapezoidal shaped~~ openings in the floor to allow water flow into the IRWST…	Inspection of the RCB will be performed	The as-built RCB configuration includes…: -As shown on Figure X, the two rooms labeled Areas for MHSI, LHSI & SAHRS pipe penetrations contain wall openings ~~slightly above the floor~~ to allow water flow into the IRWST -As shown in Figure Y, ~~the~~ RCB rooms which are directly above the IRWST, ~~labeled RCP Oil Collection Tank Areas for each loop~~ contain ~~trapezoidal shaped~~ openings in the floor. ~~and~~ The floor openings are provided with weirs and racks.

Generic Inspectability

- This ITAAC was improved with the replacement of the term “exist” with the action word, “perform”.
- However, what defines the number or type of “controls”?

{Note – specifies MCR, not the RSS (assumed to be typo).}

Number	DC	ITA	AC
2.4.1 Item 4.15	Controls ~~exist~~ on the SICS in the RSS ~~that allow~~ perform manual actuation of RT.	Tests will be performed ~~to verify the correct functionality of the~~ using controls on the SICS in the RSS	Controls on the SICS in the **MCR** perform manual actuation of RT. ~~The correct actuation signals are present at the RT devices after the corresponding controls on the SICS in the RSS are manually activated.~~

Summary

- The above issues and examples are typical of the RAI 469 request and not indicative of the entire set of NRC “inspectability” questions applicable to all EPR ITAAC.
- RIS 2008-05 (Rev. 1) and NEI 08-01 provide guidance that should be generally helpful in the development of acceptable ITAAC.
- The NRC Technical Staff may have other issues/concerns related to the EPR ITAAC.
- Attend the Construction Inspection Program Periodic Category III Public Meetings AND upcoming ITAAC Ambiguity Meetings.