Comments on Calvert Cliffs Site-Specific ITAAC

The following comments are provided to reconcile some perceived inconsistencies and language interpretation issues relating to NRC "inspectability" concerns with the site-specific ITAAC for the EPR plant planned for construction at Calvert Cliffs. Some of these comments may arise as a result of an incomplete or improper understanding of the wording or intent of the ITAAC. While such situations might be corrected with verbal explanations, it is suggested that all comments be addressed with appropriate wording/content revisions to facilitate a common, shared understanding of the meaning and intent of the subject ITAAC. Such "understanding" will be necessary for adequate communication and closure activities involving the ITAAC during and following plant construction.

The following examples should be viewed as representative samples of the larger issues that apply. In each case, there may be different variations of the identified ITAAC wording concerns and varying degrees of "inspectability" questions. While this summary is written to highlight the general concerns, it should be understood that it is the responsibility of the applicant to not only identify all the site-specific ITAAC that need to be similarly revised, but also apply these principles to all future ITAAC submittals. Therefore, while the comments below apply to several ITAAC (as noted), it is recommended that the applicant perform its own "quality control" check for completeness.

Finally, it is also recommended that NRC Regulatory Issue Summary (RIS) 2008-05 be reviewed by all COL applicants. While the issues summarized in this RIS were primarily directed toward the generic ITAAC documented in the available DCDs, it is noted that the intent of the RIS is to reduce unnecessary regulatory burdens for both the NRC staff and applicants, including those seeking a COL. While some of the RIS 2008-05 principles generically apply to some of the comments noted below, the recommendations that follow are more specifically directed to the Calvert Cliffs site-specific ITAAC. A broader view of these issues could and should also be taken, as applicable, for all future applications; i.e., not just for the site-specific ITAAC at Calvert Cliffs or for plants using the EPR design.

I. Proper Specification of the ITA

An ITAAC specifies the "inspections, tests, and analyses" that need to be implemented to verify that the approved "acceptance criteria" are met. 10 CFR 52.99(e) requires the NRC staff to ensure that the prescribed ITA are performed. In several examples identified below, the site-specific ITAAC prescribe "inspections" to verify acceptance criteria that would be more appropriately confirmed by a "test" or "analysis" or some suitable combination of these three ITA activities:

- ITAAC 2.4.2.1, 2.4.3.1, 2.4.4.1 (and all the others requiring "the as-installed waterproofing membrane eliminates direct contact of ground

water chemicals") are written to imply that an ITA "inspection" can adequately verify the AC. While an inspection can confirm a waterproofing membrane is properly installed, it cannot (by itself) establish that this membrane "eliminates" chemical contact with the concrete. If this is an important requirement, maybe qualification (thru test and/or analysis) of the selected membrane type should be listed as a related, but separate ITAAC.

- ITAAC 2.4.7.2, 2.4.7.3 (and others requiring structures meeting Seismic Category I or II criteria) imply two separate provisions in each one of these ITAAC. First the structure must be "designed" to withstand the required loads; then it must be "constructed" to design requirements. This should be written as two separate ITAAC – the first identifying an analysis to validate, while the second can be verified by an as-built inspection. As currently written, the ITAAC inappropriately implies that "inspection" alone can check for seismic loading capability.
- ITAAC 2.4.7.1c illustrates a like concern in implying that an "inspection" alone can adequately verify a new bulkhead retaining wall can resist the impact of wave forces.
- ITAAC 2.4.7.6 & 2.4.8.4 have a similar "design" vs. "construction" issue, as noted in the preceding comment, with the loads being the "forces associated with a flood". Again, "inspection" alone is not sufficient to satisfy the intent of these ITAAC.
- ITAAC 2.4.9.8 is another case where "inspection" can only verify the existence of pipe "wrapping or coating", but cannot establish that the as-built material effectively meets expected "waterproof" criteria, since none are listed or validated by test and/or analyses.
- ITAAC 2.4.21.5 and 2.4.22.5 state in the Commitment Wording that the subject system is "designed" and "constructed" to the applicable ASME Code. As previously noted, the ITA "inspection" cannot validate "design" criteria. Additionally, without a referenced Table or Drawing the scope of the equipment intended for ASME Code conformance is not specified and must be assumed.
- ITAAC 2.4.29.3 indicates that independent, electrical circuits need to be properly "sized" for supply of the Emergency Power divisions. This cannot be verified by the ITA "inspection" alone. Either more detailed criteria needs to be documented or test/analyses may be required to supplement this ITA.

II. Use and Consistency of Qualitative Criteria

The language used in the Design Commitment (or "Commitment Wording") of an ITAAC should align with the specific language of both the ITA and the AC in meeting the overall intent of the ITAAC. In the examples noted below, the use of "qualitative" terms or inadequate and incomplete descriptors not only makes such alignment difficult, but also requires an inspector to interpret the intent of the final acceptance requirements:

- ITAAC 2.4.2.2, 2.4.3.2, 2.4.4.2 (and all others indicating an "improved concrete mixture design" involves "supplementary cementitious material appropriate for the exposure condition") are written to suggest: (1) that the concrete design is "improved" (when the question would be – compared to what?), and (2) that "appropriate" is a defined and "inspectable" criterion. The use of such qualitative attributes should be avoided. If tests are needed to verify specific parameters (which are know to be part of the design), why can't such parameters be listed in the AC? If the "parameters" are dependent upon specific as-found soil exposure conditions, the ITAAC should be written in a way that allows for such "analysis" and for the "tests" to validate the mix design that is approved.
- ITAAC 2.4.7.1b establishes design provisions for a new bulkhead retaining wall in the Commitment Wording that are more quantitative, yet less rigorous than the requirements in the acceptance criterion. Is the intent of this ITAAC only to check the extent of the lower elevation or additional design commitments? Is an inspector expected to check the design or only inspect the as-built retaining wall to its design requirements or inspect the entire intake "structure" configuration?
- ITAAC 2.4.7.7a, 2.4.8.5a, & 2.4.12.4a all specify 3-hour rated fire barriers in the Design Commitment, but fail to specify the required "3-hour rating" for the applicable penetration seal assemblies listed in the sub-elements of the Acceptance Criteria.
- ITAAC 2.4.14.2 implies that there is "controlled" access to the plant thru the Security Access Building. However, the Acceptance Criteria only states that "access" be provided. Furthermore, if the adjective "controlled" were applied to this "access", what attributes would the inspection be checking to assess the adequacy of such controls?
- ITAAC 2.4.21.6c, 2.4.22.6c and 2.4.23.1b & c list equipment, piping, and ducting as the applicable ITAAC population in the Commitment Wording, but then apply the generic term "equipment" to specific sub-parts of the ITA and AC. It is assumed that the "inspections" are intended for all equipment, piping, and ducting, and not just the "equipment".
- ITAAC 2.4.31.2 indicates in the Commitment Wording that main control room displays are "retrievable", while the AC states that such displays merely "exist". Besides the lack of consistency of terms, retrievable displays might correctly imply "functionality", which is lacking in the AC wording that such displays "exist".
- ITAAC 2.4.31.3 does not have the above consistency problem since the requirement for controls to "exist" is noted in both the Commitment Wording and the AC. Instead, is "proper functionality" really the intent of this ITAAC? The use of the word "exist" can be misinterpreted to imply a "control" that is in place, does has not been demonstrated to perform all design functions.

III. Clarification and Consistency of Functional Requirements

The scope of the ITAAC is not always adequately defined. This issue was similarly found to be prevalent in the generic DCD ITAAC. In some cases, a specific word (e.g., "exists") may be interpreted as more limiting than intended. In other cases, a certain ITAAC term may be inappropriately applied. Furthermore, the equipment or components to which the ITA & AC requirements apply should be clearly defined. As noted below, these examples could create uncertainty as to the full requirements of the ITAAC:

- ITAAC 2.4.21.3, 2.4.22.3, & 2.4.24.4 all indicate in the Acceptance Criteria (AC) that "electrical isolation exists", as checked by as-built inspections. Is this adequate, or as implied by the term "electrically independent" in the Commitment Wording, should not the AC more specifically require the isolation function to be verified?
- ITAAC 2.4.21.4, 2.4.22.4, and 2.4.24.2 all use the terms "powering" or "powered" to establish the separate Class 1E divisions of equipment. Does this imply that the equipment must actually be started and run during such testing? If it was intended that simulated signals could instead be used to verify this ITAAC, the "powering" terms should be revised.
- ITAAC 2.4.24.7 (which al ready included in a comment above about "inspection" adequacy) also has its AC written in a nonsensical way where it cannot possibly fail its inspection.
- ITAAC 2.4.24.8, 2.4.24.10, 2.4.24.12, 2.4.26. 5a & b, and both the 2.4.27 & 2.4.31 multiple ITAAC all are not written clearly to establish the list of specific "components" or "piping" and/or "equipment" (as applicable) that are the subject of the noted ITA &AC requirements.
- ITAAC 2.4.24.21 indicates in the AC that each check valve performs the "required function". Use of such generic terminology is not generally appropriate for the AC. In this case, the specific check valve functions appear to be noted in the Commitment Wording. Such details should be documented in the AC.

IV. Use of Bounding Analysis

Where appropriate, the as-built configurations for the installation of SSC and ITAAC construction are "bounded" by the design and not required to exactly match some specific design parameter or criterion. This principle applies to several of the site-specific ITAAC, specifically where qualification testing or analyses applies, but the construction details are less specific. While the following two ITAAC exemplify this issue, is should be generically considered is developing all ITAAC where a "bounding" design is more appropriate a consideration than specific design details.

- ITAAC 2.4.29.2 documents in the ITA the appropriate need for "analyses" to determine the electrical load requirements. However, neither the ITA, nor the AC is clear in documenting the need for verification that the as-built load supply capability "bounds" the electrical load demand requirements.
- ITAAC 2.4.31.1c states that the as-built equipment supports and restraints are installed as designed. Since the Commitment Wording implies that this electrical distribution equipment is seismically qualified by type testing and analyses, it is highly likely that the subject support configurations will have been "bounded" by the design qualification. Particularly for electrical supports where "cookbook" design configurations are pre-approved, it is likely more appropriate to use of require inspections that check that the installed supports are bounded in the AC, rather than exactly installed "as designed".

V. Miscellaneous ITAAC Comments

The examples below represent ITAAC with unclear wording, typographic errors, or alphanumeric problems:

- ITAAC 2.4.1.4 documents a "decimal" typographical error in the Acceptance Criteria (AC) for the backfill shear wave velocity and fails to note this velocity as a "minimum".
- ITAAC 2.4.7.8a contains a typographical error in identifying the AC as "c".
- ITAAC 2.4.12.1 uses the term "contiguous" in the Commitment Wording and in the AC. It is unclear what this technically infers; e.g., can there be a concrete construction joint or might there be a seismic "shake" space between the two buildings? Could a better "understood" term be used?
- ITAAC 2.4.21.7 documents a typographical error in the omission of a "greater than or equal to" symbol before the 41 degrees F in the AC.
- ITAAC 2.4.23.3 documents an incomplete sentence in the Commitment Wording.
- ITAAC 2.4.24.16 incorrectly omits the adjective "design" between "system and "conditions" in the AC.
- ITAAC 2.4.24.20 could be better worded to describe expected MOV motion upon receipt of actuation signals. For example, do all MOVs receive the isolation signal or just those that are open (as implied in the Commitment Wording)?
- ITAAC 2.4.28.4 could be better worded with more detail regarding the acceptability of structural welds; e.g., NDE, including visual examination (VT) where required. Are these ASME structural welds or is ASME Section IX only invoked as an additional requirement of the qualification of the welding procedures?

- ITAAC 2.4.28.10 should be identified as item “9” or ITAAC 2.4.28.9 is missing.
- ITAAC 2.4.31.1c requires inspection of the “as-installed” supports in the ITA, while the AC addresses the “as-built” supports. Since “as-installed” and “as-built” different definitions in the EPR DCD, the same term should be used within any ITAAC unless the use of these separate terms has some definite technical meaning.