

NRR-PMDAPEm Resource

From: Feintuch, Karl
Sent: Monday, October 17, 2011 11:29 AM
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Cc: Tam, Peter; Pascarelli, Robert; Tate, Travis; Harrison, Donnie; Blumberg, Mark; Dozier, Jerry
Subject: ME7110 - Chi-over-Q amendment application - Non-acceptance with opportunity to supplement.
Attachments: ME7110 Acceptance RAIs 17Oct2011 clean Rev 1.docx

Your application of August 30, 2011 has been reviewed for acceptance in accordance with the requirements of LIC-109. Attached are a set of items that need to be addressed for the application to successfully exit the acceptance review phase and enter the technical review phase of its processing.

Our next step is to arrange a conference call within the next 5 work days (Re: LIC-109, Rev 1 (ADAMS Accession No. ML091810088), Section 4.1, first paragraph) to discuss these items, currently in draft form.

Please contact me to make arrangements for a conference call, or contact Peter Tam at 301-415-3079 if I am unavailable.

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ME7110 – Amendment Request dated August 30, 2011, ADAMS Accession No. ML11252A521

ME7110 – Licensing Action Acceptance Review Results – Non-acceptable with opportunity for supplementation

The Nuclear Regulatory Commission (NRC) staff has submitted Requests for Additional Information (RAI) items that need to be resolved to enable them to start their reviews. In accordance with the provisions on instruction LIC-109 for the acceptance review of licensing actions prior to acceptance for technical review, the following items need to be addressed:

RAI 1

Attachment 1, Tables 3-2 and 3-3 of the proposed license amendment request (LAR) (Adams Accession Number ML112520670) provides the currently approved design-basis accident calculated radiological consequences and the proposed new design-basis accident radiological consequences, respectively. The waste gas decay tank (WGDT) rupture and volume control tank (VCT) rupture doses are given in units of rem (Roentgen equivalent man) whole body dose, and rem Total Effective Dose Equivalent (TEDE).

The NRC acceptance for these accidents provided in the safety evaluation of Amendment No. 166 (ML030210062) is based upon the doses calculated by the licensee and by the NRC staff that are within relevant dose criteria specified in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.67, "Accident source term" and Standard Review Plan (SRP) 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms," (ADAMS Accession Number ML003734190). These dose criteria are provided only in rem TEDE. Furthermore, the application which provided the information reviewed by the staff for Amendment No. 166 (Adams Accession Number ML020870565) also provides the WGDT and VCT doses in rem TEDE.

Attachment 4, page 5 of the LAR states:

The evaluations documented herein have employed the detailed methodology contained in RG 1.183 [Regulatory Guide] for use in design basis accident analyses for the AST [alternative source term]. The results have been compared with the acceptance criteria contained either in 10 CFR 50.67 (Reference 2) or the supplemental guidance in RG 1.183.

Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accident at Nuclear Power Reactors," (Adams Accession Number ML003716792), Regulatory Position C.1.1.3 states:

In either case, the facility design bases should clearly indicate that the source term assumptions and radiological criteria in these affected analyses have been superseded and that future revisions of these analyses, if any, will use the updated approved assumptions and criteria [emphasis added].

This is consistent with the regulations that do not provide a way to go back to using the acceptance criteria in 10 CFR Part 100, "Reactor Site Criteria" acceptance criterion once a conversion to 10 CFR 50.67 has been completed.

The NRC staff is concerned that the proposed VCT and WGDT rupture accidents were calculated with using both rem whole body (offsite calculations) and rem TEDE (control room). Please explain why this is acceptable or make the calculations consistent with Attachment 4, page 5 above.

RAI 2

Attachment 4, page 5 of the LAR states:

The evaluations documented herein have employed the detailed methodology contained in RG 1.183 [emphasis added] for use in design basis accident analyses for the AST. The results have been compared with the acceptance criteria contained either in 10 CFR 50.67 (Reference 2) or the supplemental guidance in RG 1.183.

During the acceptance review the NRC staff found that exceptions to the methodology in RG 1.183 are taken (see example below). While methods different from RG 1.183 may be found acceptable, the staff needs a full analysis to justify why the proposed assumption is conservative. This information is needed to start staff's review.

Example

Attachment 4, page 109 of the LAR, provides the following assumption:

Activity released from the break is assumed to participate with 50% of the turbine building volume.

Credit for the turbine building volume appears to conflict with the intent of RG 1.183, Regulatory Positions C 5.1.2 and 6.4 in Appendix A. Since this assumption is not consistent with the RG 1.183, additional information is needed to perform the review.

As a minimum, the staff needs a justification for methods different than those provided in RG 1.183 and those different than the current licensing bases. The methodologies and inputs used should also be provided so that staff can make a determination whether they are conservative.

RAI 3

Attachment 1, Page 28 of the LAR states:

DEK [Dominion Energy Kewaunee, Inc.] is proposing to adopt TSTF -312 [Technical Specification Task Force], "Administratively Control Containment Penetrations."

Attachment 1, Page 30 of the LAR states:

Specifically, consistent with TSTF-312, the proposed change to allow the containment equipment hatch to be open to the outside atmosphere during movement of recently irradiated fuel assemblies within containment is based on:

2. *A commitment to implement acceptable administrative procedures that ensure, in the event of a refueling accident that the equipment hatch can and will be promptly closed [emphasis added] following containment evacuation...*

Attachment 3, page B 3.9.6-3 and B 3.9.6-4 of the LAR states:

If it is determined that closure of the equipment hatch and/or containment penetrations would represent a significant radiological hazard to the personnel involved, the decision may be made to forgo [emphasis added] closure of the hatch and/or penetrations.

The above language from Attachment 3 is not contained in TSTF-312 nor does it appear to be consistent with the intent of the commitment cited above. No explanation is provided to justify this proposed deviation.

For each proposed deviation from the referenced TSTF models please provide a justification for why the deviation is conservative.

RAI 4

The following is proposed to be added to the bases for to Technical Specification (TS) 3.7.10, "Control Room Post Accident Recirculation (CRPAR) System":

This Note only applies to openings in the CRE boundary that can be rapidly restored to the design condition, such as doors, dampers, hatches, floor plugs, and access panels.

This change appears to be consistent to TSTF-448, Revision 3, "Control Room Habitability" (ML062210095). Per the staff's safety evaluation for TSTF-448, Revision 3 (ML063460558), the allowance of this note was found acceptable because the administrative controls will ensure that the opening will be quickly sealed to maintain the validity of the licensing basis analyses of design basis accident (DBA) consequences.

For the Kewaunee the proposed DBA safety analyses does not appear to consider doors, dampers, floor plugs or access panels to be open at the time the accident occurs or the time to isolate them after an accident occurs. For each of the openings allowed to be open by the proposed note provide an analysis which justifies that the time to close these openings will not impact the design basis accident consequences and that 10 CFR 50.67 will continue to be met.

RAI 5

The following note is proposed to be added to TS 3.7.10:

The CRE shall be isolated during movement of recently irradiated fuel assemblies.

The note is added to an existing note which states that the control room can be opened intermittently under administrative controls.

The LAR states:

As a result of the analyses documented in this LAR, the alternate control room intake will be restricted from use. This restriction is required because of the X/Q that would result due to the close proximity of the alternate intake to various release points; one of which is < 10 m from the alternate intake. Administrative controls will be in place to assure the alternate control room

intake is closed and prohibit its use during normal operation, following an accident, or while moving recently irradiated fuel.

RG 1.183 states:

5.1.2 Credit for Engineered Safeguard Features

Credit may be taken for accident mitigation features that are classified as safety-related, are required to be operable by technical specifications, are powered by emergency power sources, and are either automatically actuated or, in limited cases, have actuation requirements explicitly addressed in emergency operating procedures. The single active component failure that results in the most limiting radiological consequences should be assumed. Assumptions regarding the occurrence and timing of a loss of offsite power should be selected with the objective of maximizing the postulated radiological consequences.

- a) RG 1.183, Regulatory Position 5.1.2 provides credit for mitigation features that are required to be operable by technical specifications. Justify why the proposed note is considered a technical specification which would require the system to be operable.
- b) The two notes appear to conflict with one another since the control room cannot be both isolated and opened at the same time. Which note takes priority and how does the operator know which note takes priority?
- c) How is the need for fresh air satisfied and how is this incorporated in the analysis used to demonstrate compliance with 10 CFR 50.67?

RAI 6

Page 65, Attachment 4 of the LAR states:

A critical parameter in the radiological-impact analysis is the definition of a proper Partition Coefficient (PC) for the iodines in the RWST water. The PC applicable to the iodines in the RWST water was based on information in A. K. Postma, L. F. Coleman and R. K. Hilliard (Reference 26), "Iodine Removal from Containment Atmospheres by Boric Acid Spray," Report No. BNP-100, Battelle Memorial Institute, Pacific Northwest Laboratories (PNL), Richland, WA 99352 (7/1970). Use of BNP-100 is discussed in SRP 6.5.2 (Reference 22). For this application, the RWST is assumed to behave like a closed system for the establishment of equilibrium conditions between the water and air. This is the same method Dominion has employed at Millstone Unit 3 and North Anna submittals (References 33 and 34) for RWST releases due to sump back-leakage.

The LAR uses the Reference 26 report to calculate decontamination factor for the Reactor Water Storage Tank (RWST).

Standard Review Plan (SRP) 6.5.2 states:

...Experiments with fresh sprays with no dissolved iodine were found to be quite effective at scrubbing elemental iodine at a pH as low as 5 (References 18 and 15)[Reference 15 is the BNP-100 report]. Solutions with dissolved iodine such as the sump solutions that recirculate after an accident may revolatilize iodine if the solutions are acidic (References 17 and 10).

[emphasis added] Chemical additives in the spray solution have no significant effect on aerosol particle removal because this removal process is largely mechanical.

The NRC safety evaluations for Millstone Unit 3 and North Anna submittals cited do not appear to explicitly mention or provide an NRC evaluation of the Reference 26 methodology. The NRC staff has the following concerns regarding the methodology in Reference 26:

- The impact of radiation and pH do not appear to have been considered in the modeling of the RWST release pathway. The RWST solution is acidic (due to the presence of boric acid) and may revolatilize iodine as described above in SRP 6.5.2. More recent studies than Reference 26 (NUREG/CR-5950 and NUREG/CR-4697) have shown that the formation of volatile iodine as elemental iodine is dependent on radiation and the solution pH.
- The cited Reference 26 was not developed for the RWST.

Please address these concerns in a justification why the Reference 26 methodology is applicable for use with the RWST backleakage or consider these concerns in the analysis. Please provide the pH vs. time for the RWST liquid.

RAI 7

This application is not risk-informed (even in Attachment 5) and DRA/APLA should not be involved in the review.

For reasons stated below the application is non-acceptable with an opportunity to supplement:

7.1 - The licensee needs to review its utilization of Standard Review Plan (SRP) 19.2, Appendix D. The appendix is specifically for the staff to consider in determining if an application that is not risk-informed should be risk-informed because of "special circumstances." It is not for the licensee to use to justify not being risk-informed. This application is not acceptable with this discussion included.

7.2 – The NRC staff notes that in Section 3.1 of Attachment 5, counter to their earlier statement in Step 1 of not being risk-informed, in Step 2 the licensee cites the definition from Regulatory Guide (RG) 1.200 (a PRA RG) on core damage to support their position. However, their interpretation of this definition is not complete and is flawed (that is, it is correctly quoted, but not correctly interpreted). Since Probabilistic Risk Assessments (PRAs) do not model the specifically identified design bases accidents DBAs (Fuel Handling Accident (FHA) and Locked Rotor Accident (LRA)) related to control room habitability, they should not use the "estimated importance measure" since it needs an estimate of risk importance (and the needed PRA does not exist). Rather, the licensee should do the generic Human Action (HA) Method. The HAs need to be addressed/reviewed in a traditional, deterministic manner.

Based on the above comments, NRC staff recommends not accepting this application for review until the above issues are resolved.