
From: MARK MORGAN <Mark.Morgan@sce.com>
Sent: Monday, March 25, 2019 11:01 AM
To: Brookhart, Lee; Piotter, Jason; Simpson, Eric; Smith, Chris; Wise, John; Davis, Marlene; Katanic, Janine; Howell, Linda; Doug Bauder; DONNA FAASS; ALBERT BATES
Cc: MARK MORGAN
Subject: [External_Sender] RE: Response to NRC question on ASME Code Application

My apologies, see attached document.

Mark
(949) 368-6745

From: MARK MORGAN
Sent: Monday, March 25, 2019 8:22 AM
To: Brookhart, Lee <Lee.Brookhart@nrc.gov>; Piotter, Jason <Jason.Piotter@nrc.gov>; Simpson, Eric <Eric.Simpson@nrc.gov>; Smith, Chris <Chris.Smith@nrc.gov>; Wise, John <John.Wise@nrc.gov>; Davis, Marlene <Marlene.Davis@nrc.gov>; Katanic, Janine <Janine.Katanic@nrc.gov>; linda.howell@nrc.gov; Doug Bauder <Doug.Bauder@sce.com>; DONNA FAASS <DONNA.FAASS@sce.com>; ALBERT BATES <AL.BATES@sce.com>
Cc: MARK MORGAN <Mark.Morgan@sce.com>
Subject: Response to NRC question on ASME Code Application

All,

Attached is SONGS' latest response to the questions regarding the ASME Code application.

Please let me know if you have any questions regarding this.

Thanks,
Mark
(949) 368-6745

NRC Review Question Response Form

Note 1: Complete a separate form for each inspector question.

Note 2: The item tracking number will be generated when the record is entered into the inspection database.

Question Title: Clarification of ASME Section 3 in Licensing Basis

Tracking Number: 11A AR Number: 0319-53473-3 Date Initiated: 03/21/2019

Holtec Support Required: Yes__ or No __

Question description:

Appendix B Technical Specification 3.3 requires, that the AMSE BPVC, 2007, is the governing Code for the MPC. Additionally, Appendix B Table 3-1 tie the canister and FSAR to the requirements of ASME Section III in many areas.

The original FSAR statement for no scratches mirrored the CoC/TS design basis that no scratches would ensure the code adherence to ASME Section III.

Now under 72.48, a design change is needed to deviate to allow scratches. But instead of using ASME BPVC code criteria to inspect the canister and properly disposition the defects which would maintain conformance to the code, the calculation utilizes Archard's wear equation to bound the condition. I just don't see how that meets CoC.

Now I understand, how SCE has argued, it is not a methodology. I think it is more of CoC and Appendix B change, myself. Essentially, the change is adding an alternative to the code to not have to do inspections and repair these new defects. Alternatives to the code can only be done via license amendment. Or maybe per TS Appendix B 3.3.2.

NB-4131 "Material originally accepted on delivery in which defects exceeding limits of NB-2500 are known or discovered during the process of fabrication or installation is unacceptable. The material may be used provided the condition is corrected in accordance with the requirements of NB-2500

ASME Section III NB-2538, "Elimination of Surface Defects" requires that defects are required to be examined by either magnetic particle or liquid penetrant method to ensure that the defect has been removed or reduced to an imperfection of acceptable size."

Instead of doing that (which I understand is impossible) which would maintain code compliance, the 72.48 deviates using a calculational method to bound the defect. The only "method" that should be used to disposition these defects is some method allowed or described in the BPVC code or the licensee would need an alternative to the code to maintain compliance with the regulatory licensing basis.

NRC Review Question Response Form

Requested Clarification (If needed): None

SONGS / Holtec Response:

NOTE: For clarity, the NRC question (comment) is separated by paragraph and a response to each is provided.

NRC Comment 1

Appendix B Technical Specification 3.3 requires, that the AMSE BPVC, 2007, is the governing Code for the MPC. Additionally, Appendix B Table 3-1 tie the canister and FSAR to the requirements of ASME Section III in many areas.

Response to Comment 1

It is agreed that the ASME BPVC, 2007 is the governing code for the MPC and that Technical Specification Appendix B Table 3-1 ties the canister and FSAR to the requirements of Section III in many areas. However, other sections of the code apply as well and the relationship is described below.

Section III is the design code portion of the ASME B&PV Code. It assumes that the other parts of the Code are also involved as appropriate. ASME Code materials are selected in accordance with Section II. NDE is generally performed in accordance with Section V. Welding is performed in accordance with Section IX. Preservice examinations required by the component specifications to be done by the manufacturer are often performed in accordance with Section XI. The primary jurisdiction of the Section III design code ends when the MPC component is complete and leaves the manufacturer. The ASME Code Section XI then has jurisdiction, as selected by Holtec, after the MPC leaves the manufacturer (this is consistent with the ASME BPVC, 2007, as referenced in the FSAR).

If a scratch during installation occurs, it can, under Section XI jurisdiction, either be dispositioned as a scratch (i.e., since it not a planar flaw) by reverting back to the Construction Code, which would be Section III, or if desired be dispositioned by Section XI, Table IWB-3514-1, as if it were a planar flaw (which is more conservative than Section III). The information supplied by SCE and Holtec to date is not intended to disposition any indication; but, provide assurance that any actual indications will remain well with ASME Code Allowables.

NRC Comment 2

The original FSAR statement for no scratches mirrored the CoC/TS design basis that no scratches would ensure the code adherence to ASME Section III.

Response to Comment 2

There is no indication in the CoC, its Appendices (Technical Specifications or Approved Contents and Design Features), or NRC SER that the statement in Chapter 9 of the FSAR related to no risk of scratching was considered in the NRC's evaluation of the ASME Code compliance of the MPC.

NRC Review Question Response Form

There is no violation of ASME Section III requirements, nor any cause for repair activities, stemming from minor scratches or wear marks that result from incidental contact between the MPC and the CEC internal features during download operations at site.

HI-STORM UMAX FSAR Rev. 4: 9.5.vii states

Because the MPC insertion (and withdrawal) occurs in the vertical configuration with ample lateral clearances, there is no risk of scratching or gouging of the MPC's external surface (Confinement Boundary). Thus the ASME Section III Class 1 prohibition against damage to the pressure retaining boundary is maintained.

The Section III requirements for pressure containing plate materials is that surface defects will be removed (NB-2538). In NCA-9000, *defective material* is defined as material that does not meet specified requirements. Similarly a defect is defined in general as a rejectable flaw and a flaw is defined as an imperfection or unintentional discontinuity that is detectable by visual, surface or volumetric methods (Section XI Glossary, IWA-9000 (1992)).

A scratch, if it occurred during installation, would not be a rejectable flaw due to potential effects on peak stresses as explained in HI-2188437. This is because localized scratches or wear marks are only capable of producing peak stresses, which are only objectionable from a fatigue or brittle fracture standpoint. The HI-STORM UMAX and FW FSARs (Table 3.1.10 of both address fatigue and HI-STORM FW FSAR Section 3.4.5 for brittle fracture) explain why neither fatigue nor brittle fracture ~~such conditions do not~~ present any risk to a the MPC.

A scratch would not be rejectable due to interference with material testing in NB-2000 since all of these tests would be completed prior to canister delivery.

Therefore, the only remaining cause (without further analysis) of rejection of a scratch located on the exterior of the canister wall generated during installation would be a condition where the amount of localized wall thinning was below an allowable wall thickness based on Section III. This means that the 0.625 inch nominal wall for a SONGS canister could be reduced without further analysis by 0.175 inches to 0.450 inches, which is allowable based on the licensed 0.500 inch baseline UMAX MPC as discussed in HI-2188437.

A scratch that might be formed during incidental contact of an MPC wall with the divider shell inside the cavity enclosure container during downloading would not result in a rejectable flaw condition, considering the large allowable margin for such localized thinning. This is based on engineering judgment and operational experience. Knowledge of basic wear principles with two soft materials having incidental contact under light lateral loads and many years of operating experience with acceptable canister loading of horizontal canisters inform this judgment. Scratches of a light nature, though somewhat likely, present no risk since the impact is negligible.

NRC Review Question Response Form

NRC Comment 3

Now under 72.48, a design change is needed to deviate to allow scratches. But instead of using ASME BPVC code criteria to inspect the canister and properly disposition the defects which would maintain conformance to the code, the calculation utilizes Archard's wear equation to bound the condition. I just don't see how that meets CoC.

Response to Comment 3

ECO-5021-042 is not a design change. It is a proposed change to clarify the HI-STORM UMAX FSAR. The ECO and supporting 72.48 are explicit in this regard. They further note that they are evaluated as if they were a design change to assure a more comprehensive documented review.

A change is not required to allow scratches since the FSAR statement that there is no risk of damage to the ASME Section III Class 1 pressure retaining boundary that might result from scratching remains valid.

It is not necessary to conclude that the intent of the FSAR was to state that no scratches would occur since incidental contact could occur. More likely the intent was to note that, compared to other designs with much higher contact loads and no clearance, there was negligible risk that shallow scratches in the vertical designs would be rejectable. When SCE and Holtec were asked (after the August 3, 2018 event) to justify this engineering judgment, accepted engineering practices were used for the estimation of scratches as well as laboratory tests and canister inspections. This was not a required calculation for design purposes, but the use of standard engineering explanations, all of which substantiated the initial judgment.

NRC Comment 4

Now I understand, how SCE has argued, it is not a methodology. I think it is more of CoC and Appendix B change, myself. Essentially, the change is adding an alternative to the code to not have to do inspections and repair these new defects. Alternatives to the code can only be done via license amendment. Or maybe per TS Appendix B 3.3.2.

Response to Comment 4

It is not correct to call these slight scratches "defects". By the definition of the ASME code, a defect is a flaw that is rejectable. None of these scratches approach criteria that require removal or repair. That judgment has been substantiated by accepted wear laws, first principles, laboratory tests, operating experience, and examination of installed loaded canisters that this judgment was and still is valid.

As noted in the Response to Comment 4, questions regarding the judgment arose from various stakeholders following the hang-up of the MPC on August 3, 2018. It was apparently presumed that the lateral loads during passage of the MPC into the cavity enclosure container must be higher than previously considered. After assessing the actual loads and their effect on the surfaces of the canister, the original judgment was validated.

NRC Review Question Response Form

NRC Comment 5

NB-4131 "Material originally accepted on delivery in which defects exceeding limits of NB-2500 are known or discovered during the process of fabrication or installation is unacceptable. The material may be used provided the condition is corrected in accordance with the requirements of NB-2500.

Response to Comment 5

SCE and Holtec agree with this ASME Code requirement. It is appropriately implemented by the fabricator as an attribute of the manufacturing process and its controls. Appropriate documentation is provided to Holtec and SCE certifying compliance with FSAR invoked requirements of the ASME Code.

As previously noted, no defects (i.e., rejectable flaws) were discovered or are anticipated during the process of installation. Therefore no corrections are required per NB-2500.

NRC Comment 6

ASME Section III NB-2538, "Elimination of Surface Defects" requires that defects are required to be examined by either magnetic particle or liquid penetrant method to ensure that the defect has been removed or reduced to an imperfection of acceptable size."

Response to Comment 6

No defects (rejectable flaws) have been identified that have resulted from scratches or are expected to result from scratches due to incidental contact during down-loading. The bounding scratches estimated in response to the various inquiries are theoretical projections not identified flaws.

This is consistent with the judgment in the FSAR, and validated by the means explained above. The requirement of NB-2538 might have removed a scratch during construction if it interfered with the ability to complete the surface or volumetric material examinations of the pressure boundary material.

Once this had been completed and the canister delivered, a similar surface defect occurring during installation would not need to be removed because these material examinations had already been completed.

NRC Review Question Response Form

NRC Comment 7

Instead of doing that (which I understand is impossible) which would maintain code compliance, the 72.48 deviates using a calculational method to bound the defect. The only "method" that should be used to disposition these defects is some method allowed or described in the BPVC code or the licensee would need an alternative to the code to maintain compliance with the regulatory licensing basis.

Response to Comment 7

As previously noted no "defects" due to incidental contact are anticipated. The calculational methods are tools to estimate potential scratch depth and are in no way a means to disposition any defect; real or projected.

Neither the identification nor removal of shallow scratches, wear or rub marks due to installation is required to maintain compliance with ASME Section III or the ASME B&PV Code generally.

Assigned Response Team Member: David Rackiewicz

Assigned Independent / Peer Review Team Member: Bob Yale/Ken Wilson

NRC Inspector: Lee Brookhart

Response provided date / time: 3/23/19