From: Robert Lewis, NMSS
To: E. William Brach; Larry Camper
Date: 5/1/03 10:28AM
Subject: Fwd: Note on Holtec violation decision

Bill, Larry,

We have an IOU to Margaret to debrief her on the Holtec inspection. Due to the evaporation of the high-profile/precedential 72.48 violation, perhaps you could forward Paul's attached WP file to her by e-mail in lieu of a brief.

We are ready to brief if she still wants too.

Rob

CC: Frank Jacobs; Paul Narbut

F-45
BM

From: Robert Lewis /NMSS
To: Margaret Federline
Date: 5/2/03 7:33AM
Subject: Holtec inspection results

Margaret:

Following up on your request for a debrief on the Holtec inspection. As described below, the potentially significant violation that related to improper changes is not being pursued in lieu of a violation for design control. We can still brief at your convenience (let us know), but I suggest the following can bring you up to speed. Attached is some more detailed info as well.

On April 29, 2003, the SFPO inspectors (Paul Narbut, Frank Jacobs) debriefed SFPO management on the two violations that were proposed pursuant to the unexpected generation of hydrogen gas from Holtec spent fuel casks in the spent fuel pool at Columbia Generating Station in Richland, WA in July 2002. The violations were discussed with Holtec during an SFPO inspection at the Holtec offices in Marlton, NJ on April 22-24, 2003.

One proposed violation was for a failure to obtain NRC approval prior to revising the FSAR to add hydrogen sampling and mitigation. Prior to the inspection, there was much internal dialogue and questions as to whether this violation could stick. The second violation was for inadequate design control measures for incompatible material control. Holtec had acknowledged the violation for material incompatibility, but did not agree with the violation for failure to obtain prior NRC approval for an FSAR change.

After deliberation, SFPO management determined that the violation for failure to obtain NRC approval prior to changing the FSAR was not warranted. The violation was written against 10CFR 72.48(c)(2)(v) for implementing a change that would create the possibility of an accident of a different type than previously evaluated in the FSAR. Since an 'accident' is defined in endorsed guidance as affecting public health and safety, and a hydrogen burn would not result in a radioactive release, public heath and safety would not be affected and the violation was not warranted. Holtec was informed by telephone on April 29, 2003.

The inspectors are documenting the results of the inspection.

CC: E. William Brach; Elizabeth Perch; Frank Jacobs; John Monninger; Joseph Olencz; Larry Camper; Paul Narbut

April 29, 2003

Holtec Inspection April 22-24, 2003

Background:

Region IV led a dry run team inspection at Columbia Generating Station (CGS) in July 2002. Hydrogen was observed in the spent fuel pool emanating from the Holtec cannister. The Holtec **FSAR stated that hydrogen was not credible**. Holtec revised the FSAR to recognize hydrogen using 72.48. The Region IV inspection report treated the issue as an unresolved item and remanded it to SFPO by a TAR. TAR response by SFPO stated that NRC approval was required.

Issue:

Some SFPO staff believes that NRC approval was required to make that change because they catagorize the possibility of a **hydrogen burn as a new accident**. Other staff do not believe that a hydrogen burn is an accident, since an **accident is defined as affecting the public health and safety**. Prior to the inspection, the decision was made to present two violations to Holtec, one against 72.48 and one against 72.146 design control.

Holtec Reaction:

The inspection exit was held last week on 4/24. Holtec VP Mike McNamara requested a telephonic follow-up exit, which was held yesterday 4/28. Holtec does not agree the violation against 72.48 is warranted. They agree with the violation against design control 72.146.

If NRC approval was required, Holtec questioned why Columbia was allowed to proceed with fuel loading without coming in to NRC for approval.

Violations

A 10 CFR 72.48, "Changes, tests, and experiments," states that a licensee may make changes in the spent fuel storage design as described in the Final safety Analysis Report (FSAR) without obtaining a Certificate of Compliance (CoC) amendment, providing the change does not meet any of the criteria in 10 CFR 72.48(c)(2). 10 CFR 72.48(c)(2)(v) states that a CoC holder shall request a CoC amendment prior to implementing a proposed change if the change would create a possibility for an accident of a different type than any previously evaluated in the FSAR.

Contrary to the above, Holtec changed the HI-STORM FSAR without fully evaluating the possibility that an accident of a different type was created. In particular, Section 3.4.1 of HI-STORM FSAR, Revision 0, states that there is no credible mechanism for chemical or galvanic reactions in the HI-STORM system and, as such, no mechanism for flammable gas generation. However, during pre-operational loading tests at Columbia Generating Station in August 2002, test samples indicated that hydrogen gas was being generated at rates approaching the flammable concentration limits of 4 percent. In response to these observations, Holtec prepared "10 CFR 72.48 Screening/Evaluation No. 621," to change the HI-STORM FSAR to state that insignificant amounts of flammable gas were generated by the aluminum in the MPC and that monitoring for hydrogen be performed during welding and cutting operations. The generation of hydrogen gas with the possibility of an ignition event creates the potential for an accident of a different type than previously evaluated in the FSAR and must be submitted in a CoC amendment to NRC for review and approval prior to implementation.

B. 10 CFR 72.146, "Design control," states in part that the certificate holder shall establish measures for the selection and review of the suitability of materials. Where a test program is used to verify the adequacy of a specific design feature, the certificate holder shall include suitable qualification testing under the most adverse design conditions. The measures shall be applied to items such as the compatibility of materials.

The design bases for the HI STORM spent fuel cask storage system, The HI STORM FSAR, Revision 0, Holtec Report HI-200244, Section 3.4.1, "Chemical and Galvanic Reactions," stated that there was no credible mechanism for chemical or galvanic reactions. The FSAR stated, in part, that in order to eliminate the aluminum water reaction during fuel loading, all aluminum surfaces will be pre-passivated.

Contrary to the above, design measures were not adequate to ensure compatibility of materials. During dry runs and spent fuel cask loading Columbia Generating station, significant amounts of hydrogen were generated indicating significant aluminum water reaction. The pre-passivation of the Boral plates had been done at nominal water depth, whereas the casks were generating hydrogen while at substantial fuel pool depths. The passivation process had not been qualified under the most adverse conditions, i.e. significant water depth.

Inspection Purpose and Results

The purpose of the inspection is to resolve the issues identified in the Region IV TAR. Those issues are:

1. Determine if NRC approval was required to change the FSAR
   Result: COMPLETED. Violation A. Approval was required per SFLS and TRD staff (TSSI staff disagrees). Holtec disagrees.

2. Determine if a violation for inadequate design control was warranted.
   Result: COMPLETE: Violation B. Holtec agrees, doesn't believe two violations are warranted.

3. Determine if the pre-passivation process was qualified by Holtec. Were tests of passivation done under the QA program?
   Result: 1. Passivation not a special process. Passivation not formally qualified as a special process. Inspectors agree.
   2. Passivation, as a design control measure , should have been "qualified" (read performed) at the most severe conditions. Was not. See violation B.
   3. Passivation at UST&D was done under QA program.

   NOTE Holtec plans to drop passivation and substitute Controls on hydrogen.

4. Determine if there is evidence that aluminum is the problem. Holtec had suggested that impurities in the Boral may be the source of hydrogen. Were the purchase specifications for Boral adequate to preclude impuriities? Did Boral meet purchase specification?
   Result: Aluminum is the problem per Holtec. Inspectors agree. Specific Impurities controlled in the Boral PO and certs. Impurities can accelerate or retard H2. Columbia's impurities met spec.

5. Determine if swelling of the Boral will be a problem.
   Result: No history of swelling. Informational tests by Holtec show 8-12% porosity in Boral enhancing H2 escape. No swelling observed in oven tests. SFLS/TRD previously responded to Region IV in the TAR. Stated that swelling was not a problem, no reference document provided.

6. The TAR response states that the current (revised under 72.48) FSAR **recommends** purging if hydrogen is above a certain level. The TAR response states that purging should be a **requirement,** not a recommendation.
   Result: Holtec, intends to require purging. HUG licensee feedback to Holtec is negative. Licensees want the option to sample and decide. Holtec questions if NRC approval is required to change the FSAR. They don't think so but Violation A, for changing the FSAR without NRC approval, confounds them.

The inspectors added:

7. Review a sample of Holtec 72.48 screenings and evaluations to assess the adequacy of the 72.48 program implementation. Use 60857. Also assess the 72.48 procedure adequacy. Sample the 72.48 for the hydrogen FSAR change.

Results : Procedure good. Samples sat. Brought additional smart samples home for 72.48 task force evaluation. The 72.48 for H2 was sat if you conclude NRC approval was not required. **Unsat if NRC approval is required.**

The inspectors also added a look at root cause:

8. Assess root cause analysis for defective top lid forgings at Hatch, and precursor event, weldability problems at US Tool and Die

Result: Sat., good analysis, rationale, actions and extent of condition analysis.

OTHER

Saw **videos** of bubbles at Hatch July 2000 and Columbia August 2002 (initiating event). Hatch bubbles were similar in size, appearance, point of origin, but about ½ in quantity compared to.

I conclude Hatch had H2 but we have no proof positive through samples.