From:	Layton, Michael
To:	tgurdziel@twcny.rr.com
Cc:	Regan, Christopher; Markley, Christopher; Dunn, Darrell
Subject:	Response to REG CON 2018 (and other) Comments
Date:	Thursday, March 21, 2019 1:56:10 PM
Attachments:	Response to T. Gurdziel email questions.docx

Dear Mr. Gurdziel,

I am responding to your emails dated December 22, 2018, (ML18360A222); January 2, 2019, (ML19004A251); January 10, 2019 (ML19010A239); and January 16, 2019, (ML19016A403). Your emails were addressed to, among others, the NRC's "CHAIRMAN Resource" email address.

In your letters, you provide some comments and raise questions related to aspects of our work with spent nuclear fuel storage and transportation. I have attempted to answer the questions in the attached Microsoft Word document and also in the email message below.

I appreciate your interest in our regulatory program and thank you for your comments. Please let me know if I can be of further assistance.

Sincerely,

MCL

Michael C. Layton, Director
Division of Spent Fuel Management
Office of Nuclear Material Safety and Safeguards

U.S. Nuclear Regulatory Commission
301-415-9956

Responses to T, Gurdziel Questions in Emails
December 22, 2018, (ML18360A222)
January 2, 2019, (ML19004A251)
January 10, 2019, (ML19010A239)
January 16, 2019, (ML19016A403)

1. **On the first day of the NRC Regulatory Conference on spent fuel, there was a discussion on allowing fuel cladding temperatures to go above 400 °C (752 °F). Why are we spending money exploring a higher temperature limit on cladding than 400 °C (752 °F) and why is this needed?**

   Response: For clarity, the NRC is not exploring whether higher temperature limits for approved nuclear fuel cladding materials cladding are appropriate. The methods that are currently used to calculate cladding temperatures during fuel drying are conservative and assume higher than actual heat loads which over-predicts cladding temperatures. The current NRC guidance is based on test data obtained

from these cladding materials. At this time, the NRC has not received a request to increase cladding temperature limits for the storage of spent nuclear fuel.

There are efforts in the nuclear industry to develop more accurate methods to predict cladding temperatures during spent fuel loading and drying operations. The NRC staff is currently examining whether maximum temperature of 400 °C (752 °F) should continue to be treated as a conservative limit or can a tolerance be assigned to the peak clad temperature limit while maintaining safety by not compromising the cladding integrity under steady state dry storage conditions.

2. **A request for information from another caller was not, in my opinion, handled well. Why not have some NRC-paid person do an ADAMS search for the requestor, or at least make the offer to do so?**

   Response:

   The NRCs public records including publicly available information from licensees and applicants are available to everyone to view and search in the NRC's Agencywide Documents Access and Management System (ADAMS) (https://www.nrc.gov/reading-rm/adams.html). The NRC makes every practical effort to answer questions from the public. This includes routinely answering questions from the public as part of public meetings. The NRC also provides written responses to questions received during established public comment periods during formulation of agency guidance documents such as updated regulatory guidance and standard review plans.

   The NRC strives to make as much information as possible publicly available on our website, and searchable through the ADAMS database. Additionally, information can also be requested through a Freedom of Information Act (FOIA) request. The NRC, as with other agencies within the federal government, provides instructions for requesting information in accordance with FOIA. NRC's instructions are contained in Subpart A of Chapter 10 of the *Code of Federal Regulations* (CFR) Part 9 (https://www.nrc.gov/reading-rm/doc-collections/cfr/part009/). Absent a FOIA request, the NRC does not routinely embark on extensive search requests verbally made at public meetings.

3. **I noted comments asking for less requirements. That seems to make sense to me. What do you think?**

   Response: The NRC requirements for dry cask storage systems provide reasonable assurance of adequate protection for the safe storage of spent nuclear fuel. Before approving any dry cask storage system for use, the NRC first determines that it meets all applicable regulatory requirements through a robust engineering review of the design. After a system is approved, the NRC conducts inspections of independent spent fuel storage installation operations and the manufacturing of the dry cask storage systems to ensure continued compliance with all applicable regulatory requirements.

   All dry cask storage systems approved by the NRC for use at independent spent fuel storage installations must be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lightning, hurricanes, floods, tsunami, and seiches*, without compromising the system's ability to perform the safety functions. The materials used in the construction of dry cask storage systems are

evaluated to ensure they will not degrade when exposed to the range of operating environments encountered in fuel loading, transfer and storage.

*A seiche is temporary disturbance or oscillation in the water level of a lake or partially enclosed body of water such as a bay. Seiches are caused by changes in atmospheric pressure, storms, or sustained winds. Seiches are known to occur on all of the Great Lakes.

4. **There was a comment from another caller that welded casks don't allow interior inspection. Is this true? What about using a cutting torch on carbon steel or maybe air arc or a grinder? And, I think there is a new electro static discharge method in use now, too. If the claim is actually true, shouldn't somebody (in the NRC) start requiring the use of bolted casks?**

   Response: Most of the welded stainless steel canisters are designed to be transportable inside a specially designed transportation overpack. This allows the fuel to be stored and transported without the need for additional fuel handling. The welded stainless steel canisters are leak tested prior to being put into service. This assures that the inert helium environment will be maintain inside the canister. The inert environment prevents degradation of the stored spent fuel and eliminates the need to inspect the fuel or the interior of the canister. However, if there is a safety need to open a welded canister, there is a procedure in the licensee's or certificate holder's Safety Analysis Report which has been reviewed and approved by the NRC.

5. **During the 1-9-2019 Holtec Pre-decisional Enforcement Conference question and answer period, I found each question was answered with appropriate respect and adequate information. I was also happy to hear information on the allegation process. Another caller made a comment that the Holtec "MPC" means multi-purpose cask and that includes transportation, which was not addressed during the meeting.**

   Response: The Pre-decisional Enforcement Conference was focused on the apparent violations identified during an NRC inspection of change control procedures and the impact to the storage function of the MPC. The certificate of compliance (CoC) for this system was issued under NRC regulations in Chapter 10 of the Code of Federal Regulations (10 CFR) Part 72, Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater Than Class C Waste." The NRC inspection report is publicly available in the NRC's Agencywide Documents Access and Management System (ADAMS) under Accession Number ML18306A853.

   Transportation and package certification are covered under the regulations in 10 CFR Part 71. The NRC has certified multiple systems for the transportation of nuclear materials including spent nuclear fuel from commercial power reactors. The NRC established safety requirements for transportation of radioactive material in 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" (http://www.nrc.gov/reading-rm/doc-collections/cfr/part071/), and related information may be found at http://www.nrc.gov/waste/spent-fuel-transp.html.

   Prior to transportation, a transportable spent fuel dry storage system canister and its contents must be evaluated to verify that the contents meet the description in the transportation certificate of compliance.

6. **I notice that I did not receive a reply that we either do have, or do not have Holtec MPC casks. The potential problem that I see is that with the changed MPC shims, the MPCs could not be used to transport spent fuel, even though that is what they were purchased for.**

   Response: The Holtec system discussed in the Pre-decisional Enforcement Conference is the UMAX dry storage system which used the Holtec MPC that is designed for both storage and transportation. The concern identified during the NRC inspection focused on the function of the bottom supports for the shims and the impact to the helium circulation and heat dissipation during storage.

   For transportation the shims, not just the bottom supports are designed to support the fuel basket along the full length of the canister, as the canister is transported in the horizontal orientation. The bottom supports for the shims do not have an impact on thermal performance of the MPC during transport because helium circulation is not relied on for heat dissipation; however, prior to transportation, a transportable spent fuel dry storage system canister and its contents must be evaluated to verify that the contents meet the description in the transportation certificate of compliance.

   Information on dry storage systems used by NRC licensees can be found in the NRC Information Digest, 2018–2019 (NUREG-1350, Volume 30) Appendices N and O (https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/).

7. **How can the interior and contents be inspected if the dry storage system for spent fuel uses a welded canister? Earlier designs used bolted casks with seals which allow the cask to be reopened is necessary. This question was asked by another caller but no response was provided by the NRC staff.**

   As discussed in the previous responses to Questions 3 and 4, inspection of the interior of welded spent fuel storage canisters can be accomplished, if there is an indication that such an inspection is warranted. It should be noted that opening a welded canister and presumably resealing the canister would presents a significant potential radiation exposure risk to workers, and also would compromise the inert atmosphere within the canister. Performing such an inspection activity should not be undertaken unless there is a specific need, based on indications that the canister is not performing adequately and only after an evaluating other measures to remedy the circumstance with the canister along with the potential risks such activities, including opening the canister, could present.
   Before approving any dry cask storage system for use, the NRC first determines that it meets all applicable regulatory requirements through a robust engineering review of the design. The NRC's engineering evaluation of each dry cask storage system is documented in a Safety Evaluation Report (SER), which describes the basis for the NRC's approval. The NRC's SERs are available for public review in ADAMS.

   A licensee selects the dry cask storage system to be used at its facility. Selection of a dry cask storage system is based on the operational needs of the ISFSI. Every licensee using an NRC approved dry cask storage system listed in Chapter 10 of the *Code of Federal Regulations* (CFR) 72.214 is required to perform an evaluation to show that for the conditions at the ISFSI location, the dry cask storage system(s) selected will meet all of the applicable requirements. This evaluation, described in 10 CFR 72.212, "Conditions of general license issued under 10 CFR 72.210," requires the licensee to consider, among other things, the range of natural hazards

for the ISFSI location. The NRC inspects the 10 CFR 72.212 evaluation as part of ISFSI inspection activities.

There are several dry cask storage systems that were reviewed and approved by NRC more than 10 years ago that use bolted lids with seals. These systems are in use at ISFSIs in the U.S. These systems include:

(i) TN Americas TN-32 for pressurized water reactor (PWR) fuel (Certificate of Compliance [CoC] 1021) and the TN Americas TN-68 for boiling water reactor (BWR) fuel (CoC 1027).

(ii) TN Americas TN-40 and TN-40HT metal storage casks with bolted lids. This system is similar to the TN-32 (CoC 1021) metal cask with the capacity for storing up to 40 PWR fuel assemblies. This system is used at the Prairie Island ISFSI which was approved in 1993.

(iii) GNB CASTOR systems are in use at the specifically licensed ISFSI at Surry. The GNB CASTOR V/21 and X/33 were manufactured using nodular cast iron sections for radiation shielding and physical protection. The Surry ISFSI was approved in 1986.

(iv) Holtec HI-STAR 100 systems (CoC 1008) are in use for dry storage of BWR fuel assemblies and greater than class C waste at the Humboldt Bay, Dresden, and Hatch ISFSIs. The HI-STAR 100 systems use a welded stainless steel multipurpose canister inside of a carbon steel overpack for radiation shielding and physical protection. The carbon steel overpack has a bolted lid and seals and the interior of the carbon steel overpack can be inerted with helium and leak tested. The Holtec HI-STAR 100 system was approved in 1999.