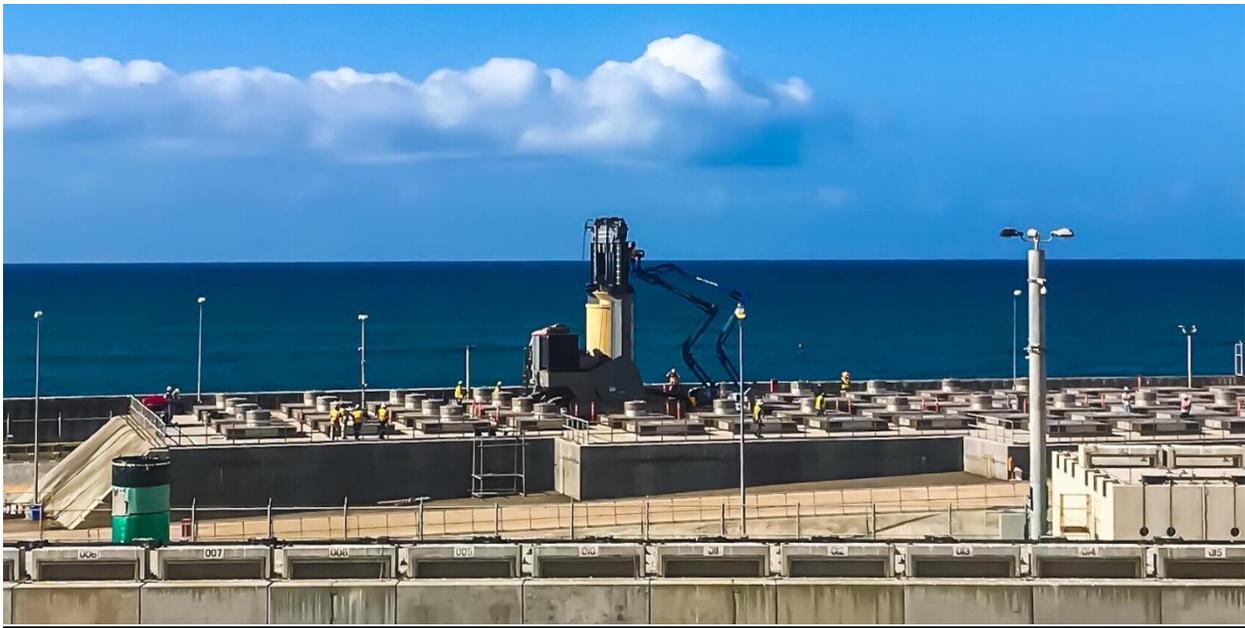


A Discussion of Retrievability Requirements for Dry Fuel Storage Systems at San Onofre Nuclear Generating Station



Al Bates, NRC Regulatory Affairs Manager
San Onofre Nuclear Generating Station
BS Nuclear Engineering, Purdue University

Introduction

The Retrievability issue is one generally raised by activists as a criticism of spent nuclear fuel storage at San Onofre Nuclear Generating Station (SONGS). The activists, some of whom prefer bolted-lid casks to welded-lid canisters, falsely claim that without the ability to open a sealed canister, [“you have no idea what’s going on in there.”](#) In fact, there are multiple methods to determine the spent fuel storage canisters are performing satisfactorily without cutting them open. Even bolted-lid casks are not opened up merely to learn “what’s going on in there.” External temperature and dose readings are two very reliable methods to understand the integrity of spent fuel canisters.

The difference between a “canister unloading training exercise” and “retrievability”

There is a Nuclear Regulatory Commission (NRC) requirement in the Holtec Certificate of Compliance (CoC) to perform a dry run training exercise to demonstrate, prior to starting a spent fuel dry loading campaign, the procedures and tooling needed to return a canister to the spent fuel pool and open it up. This is known as the “Canister Unloading Training Exercise” and is discussed in Section A, below. It is important to note that this demonstration is not an enduring requirement; rather it is a one-time training exercise to be demonstrated prior to the start of a campaign to move spent fuel from wet to dry storage. Once the spent fuel is safely in the dry storage facility, there is another requirement, contained in 10CFR72, which takes over, called “retrievability,” which is discussed below in Section B. The retrievability requirement has three options for how it can be satisfied, one of which is to return the canister to the spent fuel pool and unload it of spent fuel assemblies. However any one of the three retrievability options is an acceptable means of achieving compliance.

Therefore, for long-term dry storage operations, the retrievability option of unloading a canister in the spent fuel pool is not a requirement as long as one of the other options is met. At San Onofre, Southern California Edison (SCE) has chosen to comply with the long-term retrievability requirement by having the ability to remove a canister from the overpack (i.e. the storage location), and has already demonstrated the ability to perform this option. As such, SCE is in full compliance with the retrievability requirement.

Section A – Canister Unloading Training Exercise

This Canister Unloading Training Exercise requirement is to demonstrate, as a one-time training exercise, that prior to starting the process of moving used fuel from wet to dry storage, the ability to return a loaded canister to the spent fuel pool and reverse the process, i.e. unload the canister. This requirement to perform a one-time training exercise in no way conveys an enduring requirement to maintain this ability.

The training exercise requirement is predicated upon a hypothetical need to do so, should something go wrong during the movement of used fuel from wet to dry storage. The process involves the following steps: up-load the canister from a storage location, return the canister to the spent fuel pool, cut open the canister, and unload the spent fuel from the canister.

This process has been adequately demonstrated using the same equipment and procedures that are available at San Onofre.

Shown below is the “Canister Unloading Training Exercise” requirement wording and how this requirement has been satisfied at San Onofre.

NRC Requirement

The dry storage system designed by Holtec and in use at San Onofre contains a Certificate of Compliance (CoC) number 1040, effective April 6, 2015, docket 72-1040. The CoC contains a requirement to demonstrate “Preoperational Testing and Training Exercise” in the various wet to dry storage processes, including “Canister unloading training exercise”, as follows:

Excerpted from CoC 1040

“A dry run training exercise of the loading, closure, handling, unloading, and transfer of the HI-STORM UMAX Canister Storage System shall be conducted by the licensee prior to the first use of the system to load spent fuel assemblies. The training exercise shall not be conducted with spent fuel in the CANISTER. The dry run may be performed in an alternate step sequence from the actual procedures, but all steps must be performed. The dry run shall include, but is not limited to the following [Note: a thru g omitted for clarity]

h. HI-STORM UMAX Canister Storage System unloading, including flooding CANISTER cavity and removing CANISTER lid welds. (A mockup may be used for this dry-run exercise.)”

How the Requirement is met:

This requirement to do a one-time performance of this dry-run training at SONGS was met, and accepted by the NRC as follows:

NRC Inspection report dated Aug. 24, 2018:

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“(h) HI-STORM UMAX Canister

Storage System unloading, including flooding CANISTER cavity and removing CANISTER lid welds (A mockup may be used for these dry-run exercises)....

The removal of the canister lid welds was demonstrated by providing the NRC with a videotape of a welded CANISTER-37 lid being removed. The Division of Spent Fuel Management (DSFM) has accepted that if the cutting evolution had been successfully completed on the same model of CANISTER at one site, another general licensee can take credit for the demonstration, as long as the same equipment and procedures would be utilized. The demonstration to remove the welds from a CANISTER-37 canister was performed July 16-18, 2015, at the Holtec Manufacturing Division located in Turtle Creek, PA. Inspectors from NRC’s DSFM observed the cutting dry run at the Holtec facility. The cutting activities included boring through the cover plate and the CANISTER vent/drain port covers. The lid cutting machine was then utilized to cut through the cover plate and the CANISTER lid-to-shell weld. During the cutting evolution, Holtec personnel purged the area under the lid with argon while monitoring for hydrogen as required by the Final Safety Data Report (FSAR). All cutting demonstrations were successful, and the CANISTER lid was removed from the shell. This inspection was documented in an NRC Inspection Report (ADAMS Accession No. ML15303A348). A direct link is provided [here](#). The procedures and arrangements to use the same cutting system had been adopted into the SONGS ISFSI program.”

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“The NRC inspectors observed the licensee successfully complete all the required preoperational tests specified by License Condition #8 of the CoC. This included fuel assembly selection, welding, nondestructive testing, drying, helium backfilling, and the unloading of a sealed canister.”

Section B – Retrievability

Once a wet-to-dry used fuel storage campaign is completed, all the canisters are safely stored in the robust concrete and steel, seismically rated structure. At that point the retrievability requirement takes over. The NRC allows for the requirement for retrievability to be satisfied in several ways.

NRC Retrievability Requirement

The dry storage systems must meet the requirements contained in 10CFR72.

10CFR72.122(l) Retrievability, requires that spent fuel storage systems must be designed to allow ready retrieval of spent fuel, high-level radioactive waste, and reactor-related GTCC waste for further processing or disposal.

The NRC has developed documents to provide guidance to staff in determining whether an applicant’s application for a CoC meets the applicable regulatory requirements. Interim Staff Guidance STSF-ISG-2, “Fuel Retrievability in Spent Fuel Storage Applications,” describes an acceptable method of meeting the regulatory requirement of 10CFR72.122(l) for retrievability.

Excerpt from ISG-2 Rev.2

*“ISG-2, Rev.2 defines ready retrieval as the ability to safely remove the spent fuel from storage for further processing or disposal. In order to demonstrate this ability, a licensee should demonstrate it has the ability to perform **any** of the three options below. **These options may be utilized individually or in any combination or sequence, as appropriate.** (emphasis added)*

- A. remove individual or canned spent fuel assemblies from wet or dry storage,*
- B. remove a canister loaded with spent fuel assemblies from a storage cask/overpack,*
- C. remove a cask loaded with spent fuel assemblies from the storage location.”*

As described in ISG-2, Revision 2, Appendix A, the staff also considered that for removing a spent fuel assembly from a canister or cask (i.e. canister unloading training exercise), disadvantages included labor intensity, radiation dose to workers, and the need to breach and then re-establish a confinement boundary (i.e. the canister boundary).

Therefore, ISG-2 Rev. 2 does not force San Onofre, or any other licensees to maintain the ability to remove individual spent fuel assemblies from a dry storage canister. This, in turn, means that there is no need to maintain a spent fuel pool (nor create a hot cell) in order to meet the NRC’s guidance on retrievability requirements.