

SCE Position Paper High Burnup Fuel Storage and Transportation

I. Summary

San Onofre Nuclear Generating Station has 1,115 high burnup fuel (HBF) assemblies, all of which are undamaged, currently stored in spent fuel pools. There has been some discussion on the purpose and requirements for “canning” undamaged, high burnup, spent fuel assemblies. SCE’s position is when these HBF assemblies are moved to dry storage, they do not need to be placed in “damaged fuel” cans. The NRC has determined “there is no safety basis to require canning of all high burnup fuel.”

SCE has concluded that canning undamaged HBF does not provide additional safety benefits, has no technical advantages, no regulatory requirements, and is unnecessary.

II. Scope

The purpose of this paper is to provide the background and basis for SCE’s decision related to canning undamaged HBF assemblies at the San Onofre Nuclear Generation Station (SONGS).

III. Analysis

Background

During the Community Engagement Panel (CEP) workshop on spent fuel, there was discussion on the storage of HBF assemblies and the CEP requested SCE to clarify its position on canning HBF.

SCE’s rationale for not canning its undamaged HBF assemblies is threefold:

- Canning does not provide an additional safety benefit
- There are technical drawbacks in canning undamaged fuel, such as diminished heat transfer capability, increased structural loading, complexity in fuel handling, and increased radiation exposure to workers
- It is not a regulatory requirement to can undamaged fuel

In the past, regulatory uncertainty led two sites to “can” their undamaged HBF for dry storage and transportation. Since that time, the NRC has clarified there is no safety basis for canning undamaged HBF, and they should be stored in accordance with the same regulatory requirements as other fuel types.

Regulatory Requirements

The governing NRC requirements for spent nuclear fuel are contained in 10 CFR Part 72 for storage and 10 CFR Part 71 for transportation. To meet these requirements the NRC provided additional definitions and guidance in Nuclear Regulations (NUREG) with definitions of when spent fuel assemblies are required to be canned.

NUREG-1536 defines:

“C. Canning Damaged Fuel

Spent fuel that has been classified as damaged for storage must be placed in a can designed for damaged fuel, or in an acceptable alternative. The purpose of a can designed for damaged fuel is to (1) confine gross fuel particles, debris, or damaged assemblies to a known volume within the cask; (2) to demonstrate that compliance with the criticality, shielding, thermal, and

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structural requirements are met; and (3) permit normal handling and retrieval from the cask.....”

The purpose of canning is to confine damaged fuel to a known volume during storage and to facilitate future handling and ready retrieval of content, not just because it is a HBF assembly.

Contrary to some public opinions that canning would add additional protection, the dry cask storage industry experts have stated unnecessary canning of HBF has technical drawbacks, such as diminished heat transfer capability, and increased structural loading. Furthermore, the cans are actually not fully sealed; there are small holes at the top and bottom to allow water in the containers to be removed during drying operations. Canning also adds additional complexity and time to the cask loading evolution, resulting in workers receiving unnecessary radiation exposure.

To confirm safe storage of HBF for an extended period, the US Department of Energy sponsored a full-scale study by Electric Power Research Institute (EPRI) in 2013. The study will monitor conditions, long-term characteristics and behaviors of HBF assemblies in dry storage for the next 10 years. This study is similar to the mid-1980s demonstration at Idaho National Laboratory, where dry storage of low burnup fuel was studied and no degradation was found.

Undamaged HBF is currently being loaded into dry storage at multiple U.S. nuclear sites without being canned. Maine Yankee and Zion remain the only two plants to can their undamaged HBF. In the past, Maine Yankee and Zion placed their undamaged HBF in failed fuel cans due to regulatory uncertainty about requirements to transport HBF. With an approved license to transport HBF, there is no such uncertainty for SCE's HBF.

IV. Conclusion

There are no technical advantages and no regulatory requirements for canning HBF, however there are consequences in more fuel handling operations needed for canning and radiation exposure to workers. SCE's conclusion is that canning undamaged HBF is not necessary, and does not provide additional safety benefits.