



NYSERDA

KATHY HOCHUL
Governor

RICHARD L. KAUFFMAN
Chair

DOREEN M. HARRIS
President and CEO

August 1, 2022

Shana Helton, Director
Division of Fuel Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Rockville, MD 20852

Subject: Indian Point Energy Center Exemption Request for the HI-STORM 100S Version E Cask Allowable Contents

Dear Ms. Helton,

The State of New York has reviewed the Holtec Decommissioning International (Holtec) March 24, 2022 request seeking NRC approval of an exemption from an allowable contents requirement contained in the Certificate of Compliance (CoC) No. 1014 for the HI-STORM 100S Version E Cask. Specifically, CoC No. 1014, Appendix D, Table 2.1-1, Section V, "MPC MODEL: MPC-32M," Item C only permits a single Neutron Source Assembly (NSA) to be loaded into the Multipurpose Canister (MPC). Additionally, Section 2 of the Final Safety Analysis Report (FSAR) specifies that the neutron source is to be placed in the center of the canister¹.

Holtec has requested to increase the allowable number of primary Plutonium-Beryllium (Pu-Be) NSAs in any single MPC-32M canister from one (1) to five (5) and up to 32 secondary NSAs. Holtec states that the proposed exemption will allow loading of fuel assemblies from which the NSA cannot be removed and that under such conditions, the current CoC requirements prevent some fuel assemblies from being loaded into dry storage systems, therefore preventing the full removal of all assemblies from the Indian Point Unit 2 (IP2) and Unit 3 (IP3) spent fuel pools.

Holtec's request includes information that has been deemed proprietary by the Company, withheld from public disclosure, and is unavailable to the host State and its officials and subject matter experts. Absent access to the full criticality, thermal, and dose calculations used to support the request, the State is unable to

¹ HI-STORM FSAR partial Revision No. 15 <https://www.nrc.gov/docs/ML1813/ML18130A139.pdf>

New York State Energy Research and Development Authority

Albany
17 Columbia Circle, Albany, NY 12203-6399
(P) 1-866-NYSERDA | (F) 518-862-1091
nyserda.ny.gov | info@nyserda.ny.gov

Buffalo
726 Exchange Street
Suite 821
Buffalo, NY
14210-1484
(P) 716-842-1522
(F) 716-842-0156

New York City
1359 Broadway
19th Floor
New York, NY
10018-7842
(P) 212-971-5342
(F) 518-862-1091

**West Valley Site
Management Program**
9030-B Route 219
West Valley, NY
14171-9500
(P) 716-942-9960
(F) 716-942-9961

perform a complete review. We have identified a number of concerns and outline them herein. We request that the NRC ensure all calculations, evaluations, and analyses are performed in a detailed, thorough, and comprehensive manner.

The publicly-available version of Holtec's request provides limited factual information on the fuel assemblies and NSAs due to the assertion that much of the information is proprietary. As stated previously, proprietary information is not available to the State or the general public. In the absence of the proprietary information, NYSERDA together with the Department of Public Service and the Department of Health participated in two telephone calls with the NRC and one with Holtec to informally discuss specific, targeted State questions.

The State's due diligence review was therefore limited to the non-proprietary version of the exemption request, public literature, and telephone discussions with NRC and Holtec. The State offers the following observations with affiliated recommendations for further NRC inquiry:

Increase in Neutron Dose May Negate Rationale Presented in Final Safety Analysis Report

The latest available revision to the HI-STORM Final Safety Analysis Report (FSAR) in NRC's ADAMS document access system is a partial Revision No. 15², which states that neutron dose evaluations of neutron source assemblies (NSAs) have not been performed because only a single NSA is permitted in a canister and the single NSA neutron dose is small compared to the assemblies to be stored.³ A single NSA is likely a few percent of the total neutron population, so this rationale to forgo dose evaluations might be deemed acceptable within those particular parameters and assumptions. However, increasing the licensed canister contents to include five NSAs, as proposed by Holtec, could increase the neutron-only dose rate by as much as 15 percent. As such, Holtec's FSAR rationale appears to be no longer true, accurate, or applicable.

Dose rates for the HI-STORM system licensing are shown for bounding configurations and can be as high as 3,828 mrem/hour at location 2.⁴ This theoretical bounding configuration, however, will not exist at Indian Point. Due to the use of the MPC-32M canisters, the 125-ton HI-TRAC, and fuel with significantly less burnup than used in the licensing calculations, actual dose rates may be much less.

The current configuration allows one NSA to be loaded in the center of each cask, which has the effect of maximizing the shielding provided by the cask. Additional NSAs loaded into the same cask will be placed in slots closer to the exterior of the cask, thus reducing the level of shielding. Loading up to five Plutonium-Beryllium NSAs in a single cask, as proposed by Holtec, could result in actual surface dose rates increasing

² HI-STORM FSAR partial Revision No. 15 <https://www.nrc.gov/docs/ML1813/ML18130A139.pdf>

³ See section 5.2.7.1 on pages 5-58 and 5-59.

⁴ See table 5.1.7 on page 5-20.

significantly, due to both the additional dose contribution of the NSAs themselves and their placement closer to the cask exterior wall than currently allowed.

In a telephone call, NRC represented that approval of the Holtec exemption request to load up to five Plutonium-Beryllium NSAs in a single cask could increase total surface dose rates for casks at Indian Point by as much as 28% or about 1,100 mrem/hour for a total surface dose of 3,934 mrem/hour.⁵ This appears to be a very large increase, particularly when compared to the actual cask dose rates rather than the design basis calculated values, and brings the FSAR rationale for omitting dose evaluation into further question.

Recommendation 1: The NRC should require Holtec to perform an updated and conservative dose evaluation of a loaded HI-STORM cask with five Plutonium-Beryllium NSAs and 32 secondary NSAs.

“As Low As Reasonably Achievable” (ALARA) Concerns Have Not Been Evaluated

The ability to load up to five NSAs in an individual canister does not appear to be necessary for Holtec to complete the transfer of all spent fuel into dry cask storage. Rather, it appears that the relief required to complete the transfer is additional flexibility on the allowable NSA storage locations within the casks, in particular for those NSAs contained in damaged fuel assemblies. If approved, the proposed exemption will increase surface dose since the locations for damaged fuel are further from the cask center and will receive less self-shielding. Thus, the exemption would create a situation that unnecessarily increases potential worker exposure. Indeed, in a June 6th telephone call, NRC noted that radiation technicians may need to require workers to increase the distance at which they perform some of their work so as to reduce workers’ personal exposure.⁶ This would seem to be contrary to ALARA principles and, depending on the specific task involved, it may not be possible to increase distance. However, to our knowledge, no estimates of the increase in crew exposure have been provided to evaluate whether the proposed exemption does indeed comply with the principles of ALARA.

Recommendation 2: The NRC should require Holtec to provide an evaluation of the potential increase in worker exposure during loading operations for NRC review.

⁵ This information was provided during a teleconference between the NRC and NYSERDA on June 6th, 2022. We understand that this estimate by NRC was based on NRC’s evaluation of calculations provided by Holtec but to date we are unable to find a document reflecting this calculation on ADAMS.

⁶ Ibid.

Absence of Criticality Analyses and Considerations for Future Removal Offsite

For stored fuel to be removed from the site, it must be transportable. For it to be transportable, it must be in casks that meet transportation requirements. It is unclear whether the proposed loading of up to five NSAs, including NSAs in a damaged fuel assembly, into an individual cask would result in loaded onsite storage casks that will fail to meet transportation requirements.

No revised criticality analyses appear to have been performed for the proposed new configuration. Holtec asserts in the exemption request that there is no increase in the criticality factor, K_{eff} , so there is no criticality concern and, thus, no need for revised analyses. However, Holtec intends to remove the spent fuel pools at Indian Point and should comply with the NRC's fuel retrievability guidance. To ensure consistency with the NRC's Interim Staff Guidance⁷, the sealed canister should be compatible with a transportation cask. This seems to warrant analyzing the configuration of an NSA contained in a damaged assembly (together in a damaged fuel can) for transportation.

To address the State's concern, the NRC referred us to the HI-STORM Safety Evaluation Report, wherein Holtec determined the minimum required soluble boron during loading and unloading considering the most reactive configuration of damaged fuel and fuel debris in addition to non-fuel hardware or neutron source assemblies in guide tubes filled with borated water⁸. However, these analyses and conclusions do not address the criteria for transportation under conditions where structural integrity of a damaged assembly is not assured, and in particular the criticality of a damaged assembly together with an NSA. As a result, it is not clear to the State that retrievability has been satisfied.

As stated previously, if the loaded onsite storage casks fail to meet transportation requirements, the cask contents may have to be removed and repackaged prior to transport. These are activities which will be difficult and expensive without a spent fuel pool onsite, thus increasing potential worker dose, the risk of mishaps, and cost. Performance of revised criticality and thermal analyses now may allow the NRC to tailor the exemption to avoid problems in the future.

Recommendation 3: The NRC should require Holtec to provide revised criticality analyses to ensure that NRC's retrievability requirements for eventual offsite transportation of the spent fuel casks are met.

⁷ Division of Spent Fuel Storage and Transportation Interim Staff Guidance (ISG) – 2, Rev 2. April 2016:

<https://www.nrc.gov/docs/ML1611/ML16117A080.pdf>

⁸ Section 7.1.3 "Criticality Analysis", Hi-Storm 100 Amendment 15 Safety Evaluation Report (SER):

<https://www.nrc.gov/docs/ML2111/ML21118A871.pdf>

In summary, the State strongly supports the timely transfer of Indian Point spent fuel into dry cask storage. We also strongly support timely and efficient retrieval and removal offsite by the U.S. Department of Energy (DOE).

NRC's evaluation of changes to onsite storage container loading should include consideration of the eventual need to transport those containers and any NRC approvals should be made with an eye toward avoiding complications down the road.

If you have any questions or would like a more detailed technical explanation of these concerns, you may contact me at (518) 862-1090 x3274.

Sincerely,

A handwritten signature in cursive script that reads "Alyse Peterson".

Alyse Peterson, P.E.
Senior Advisor

cc: Doug Tifft, NRC