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U.S. Nuclear Regulatory Commission
Mail Stop: TWB-05-B01M
Washington, DC 20555-0001

Attn: Cindy Bladey

Subject: Submission of NAC's Comments to the NRC's Request for Comments for Potential Rulemaking, "Retrievability, Cladding Integrity and Safe Handling of Spent Fuel at an Independent Spent Fuel Storage Installation and During Transportation"

Docket ID: NRC-2013-0004

References: 1. 78 FR 3853, "Retrievability, Cladding Integrity and Safe Handling of Spent Fuel at an Independent Spent Fuel Storage Installation and During Transportation", January 17, 2013

NAC International (NAC) hereby submits comments to Reference 1. Reference 1 requested external stakeholder and public feedback on potential rulemaking for the following subject:

1. Evaluation of integration and compatibility of storage and transportation requirements

Reference 1 indicated the key subject areas are:

1. Retrievability
2. Cladding integrity
3. Safe handling of spent fuel

The following attachment to this letter covers the Reference 1 subject and provides comments related to each one of the indicated Reference 1 key subject areas.

If you have any comments or questions, please contact me on my direct line at 678-328-1274.

Sincerely,

Anthony L. Patko
Director, Licensing
Engineering

Attachment 1

Subject 1: Integration and Compatibility of Storage and Transportation Requirements

Reference 1 states the NRC issued a request for public comment under ADAMS Accession No. ML12293A434, Section VI "Request for Public Comment". Sections VI.A, .B, .C and .D outline several questions the NRC would like external stakeholders and the public to provide responses to. With regards to this attachment, those questions posed in ML12293A434 are addressed relative to the key subject areas described in Reference 1.

Key Area 1: Retrievability

Spent Fuel Retrievability During Storage

Question 1: [Should] ready-retrieval of individual spent fuel assemblies during storage be maintained, or [should] retrievability be canister-based.

Answer 1:

A new performance based and risked informed NRC policy on 10 CFR 72.122(l) for retrievability is needed, as described below. Consistent with this, the current regulations are appropriate and do not require rulemaking to change.

The new performance based risk informed interpretation of retrievability should be focused on the ability to remove fuel from the reactor site for receipt at a DOE facility. Changes to 10 CFR Part 72 would not be required. The following definition of ready retrieval is proposed and would meet the requirements of 10 CFR 72.122(l) and 10 CFR 72.236(m).

> *"Ready Retrieval: The ability to move used fuel/canisters from the storage location and to transport that fuel to a final destination (e.g., a repository or recycling facility)."*

The above definition meets the stated requirement in 10 CFR 72.122(l) since it maintains the capability to "allow ready retrieval of spent fuel...for further processing or disposal." The above definition also meets the stated requirement in 10 CFR 72.236(m)

> *"consideration should be given to compatibility with removal of the stored spent fuel from a reactor site, transportation, and ultimate disposition" since it ensures that fuel can be transported to a repository."*

Transportation Retrievability

Question 1: The NRC would like external stakeholders to comment on (a) whether retrievability should be extended to transportation packages after normal conditions of transportation (similar to the storage requirements), or (b) is it acceptable for high burnup spent fuel to degrade such that damaged fuel may have to be handled when the package is opened? Extending retrievability to transportation may be important if the U.S. were to move to consolidated interim storage, and if the NRC were to maintain its current definition of assembly-based retrievability during storage.

Answer 1:

No, retrievability should not be extended to transportation packages after normal conditions of transportation. Clad integrity and safe handling would minimize all risks, not only in storage but also in transportation. Transportation packages should continue to ensure that the safety requirements of subcriticality, containment and shielding during transport are met. Normal transport conditions may impart slightly higher or different forces on the fuel cladding, but they are not expected to cause a significant loss of spent fuel geometry. In this case, the framework for protecting against gross cladding rupture during storage is expected to ensure compliance with the equivalent requirement for transportation, 10 CFR 71.55(d)(2):

> *"The geometric form of the package contents would not be substantially altered."*

Additionally, credible fuel reconfiguration should be highlighted to eliminate the need to postulate the fuel assembly hardware is removed and the UO_2 floating in moderator.

The requirement for geometric form not to be substantially altered is in the context of maintaining subcriticality, and can be seen as important when applied to the larger number of materials licensed under 10 CFR Part 71, which include gases and liquids. However, in the context of used fuel, limitations on the geometric form are not the only means to control criticality. Used fuel contains much less fissile material than fresh fuel, and the package can be designed to preclude moderator. Thus, a revision to the interpretation of 10 CFR 71.55(d)(2), or a rulemaking to exempt used fuel from the geometric form of contents to not be substantially altered should be pursued as a means to reduce unnecessary requirements for used fuel transportation. These regulatory actions can rely upon recent NRC actions to improve reliance on burnup credit in ISG-8, Rev 3, application of ISG-19, and may wish to consider revisions to 10 CFR 71.55(d)(3) and 71.55(e)(2).

Even if the NRC maintains its current definition of retrievability and interpretations for clad integrity, a requirement for assembly based retrievability in transportation is not necessary to ensure safety, and would result in significant impacts in the form of costs and overall risks, and would have an exceedingly small safety benefit to worker dose. Further, for consolidated storage, resolution of challenges in applying requirements for storage subsequent to transportation would be manageable and would not benefit from a retrievability requirement for transportation.

Additionally, if any experimental data program were to be accomplished, such as bringing a loaded cask back into the pool to be reopened and examined, thermal cycling from pool unloading should be evaluated as a variable that may impact cladding life prior to accepting this as an acceptable method to collect material property data.

Question 2: If it is acceptable for the fuel to degrade, should the package application for a certificate of compliance provide a description of the design and operations of any facilities and methods necessary to handle the damaged fuel (at the facility that will open the package)?

Answer 2:

It is not appropriate for the transportation certificate to describe the design and operations of facilities that might receive the package. A transportation certificate should be limited to describing its own design (packaging and contents) and operations (10 CFR 71.89).

The design and operation of a facility receiving the package should be described in that facility's license. There is a large risk that facility design and operations defined in a transportation certificate (where they can only speculate to the overall design and operations of that facility) would result in burdensome and unnecessary requirements for the facility. Further, it would place the NRC, and its licensees, in an odd situation where the NRC enforces facility design and operational requirements on the transportation certificate holder. It would, however, be appropriate for the transportation certificate to describe an opening and unloading method for the cask after normal transportation.

Key Area 2: Cladding Integrity

Cladding Integrity

Question 1: Should the spent fuel cladding continue to be protected from degradation that leads to gross rupture, or otherwise confine the spent fuel, during storage such that it will not pose operational safety problems with respect to its removal from storage? In particular, provide any explanatory information discussing the additional cost, dose, and effort required to repackage potentially damaged fuel over canned spent fuel, if the prohibition against gross deformation to the cladding were removed and the spent fuel required repackaging (whether by DOE or storage licensees).

Answer 1:

The regulation, 10 CFR 72.122(h)(1), that provides this requirement should remain; however, the interpretation of this requirement should be modified to be more risk informed and to exercise the provision of "otherwise confine." The proposal would be to continue to protect cladding from gross rupture, in a risk informed manner, during the initial license term for storage. The risk informed manner pertains to situations where complete data is not available to reach reasonable assurance, but that there is some data that suggests that the cladding will be protected. This approach provides the majority of the protection of cladding against gross rupture.

If data suggests that fuel cannot be protected against gross rupture in the initial license term, then use of individual fuel cans to meet the option to "otherwise confine" should be exercised. Additionally, alternative means to meet the option to "otherwise confine" should be permissible if, during the storage license renewal period, protection against gross rupture cannot continue to be fully demonstrated. The latter would avoid risks associated with repackaging and placing assemblies into individual fuel cans.

A new interpretation is needed for the portion of 10 CFR 72.122(h)(1):

> *"otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. This may be accomplished by canning of consolidated fuel rods or unconsolidated assemblies or other means as appropriate."*

Although historically, this has been strictly limited to individual fuel assembly cans, per ISG-02, these limitations were primarily attributed to meeting the interpretation of retrievability. An individual fuel can is not needed to meet the retrievability definition, and therefore alternative means to confinement should be permissible (e.g. screens on both ends of the basket fuel cells to provide defense-in-depth confinement to the canister,

or increased reliance on the canister confinement through an augmented aging management program). We believe that applicants should be free to propose solutions, but highlight that if there is potential gross rupture during a storage renewal term, and subsequent loss of defense-in-depth that the cladding provides, this should be compensated for by increasing assurance of confinement through other means.

It is appropriate that industry maintain operations that support prudent controls to maintain fuel cladding integrity. However, since maintaining cladding integrity is not needed to maintain public health and safety there should not be a regulatory requirement for fuel assembly retrievability. Regulatory requirements for retrievability should be limited to the welded canister.

Question 2: Should each high burnup spent fuel assembly be canned to ensure individual fuel assembly retrievability? Additionally, should spent fuel assemblies classified as damaged prior to loading continue to be individually canned prior to placement in a storage cask? In particular, NRC is interested in gathering input on the additional cost, dose, and effort required to place individual fuel assemblies in a damaged fuel can during storage cask loading. Comparison of the upfront cost, dose, and effort to can all high burnup fuel assemblies against the cost, dose, and effort to repackage potentially damaged fuel at a repository or prior to transport to a repository, may factor into NRC's retrievability policy decision making process.

Answer 2:

No, each high burnup spent fuel assembly should not be canned to ensure retrievability. Currently there is no substantial evidence that shows high burnup fuel will degrade over time. Just because an assembly may have high burnup does not mean it is damaged as long as it can be shown that it can meet regulatory requirements at initial loading. If an assembly is indeed damaged (e.g. cracked cladding) then the applicant must provide a means of safely storing and transporting the fuel assembly.

Requiring canning of high burnup fuel will undoubtly increase the overall cost of a storage system. It will also increase the amount of time required to load and vacuum dry a storage system, which leads to increased personnel dose that is unnecessary. A comparison to repackaging depends on the repackaging method. If retrievability is considered to be canister based, then no fuel will need to be handled because the canister itself could be placed in a new canister, thus eliminating the need to open an existing canister, move fuel and seal a new canister, etc.

Key Area 3: Safe Handling of Spent Fuel

Acceptance of Spent Fuel by a Future Disposal or Reprocessing Facility

Question 1: Should an enhanced regulatory framework assume the licensee receiving spent fuel for disposal will be able to site and design a repository for direct disposal of these high capacity canisters without repackaging?

Answer 1:

Yes, the regulatory framework should assume that the licensee receiving spent fuel for disposal will be able to siting and design of a repository for direct disposal of high capacity casks without repackaging or be prepared to repackage upon receipt.

Question 2: Should an enhanced regulatory framework assume the repository licensee will be able to handle and repackage potentially degraded/damaged fuel on large production scales?

Answer 2:

Yes, the regulatory framework should assume that the repository licensee will be able to safely handle and repackage potentially degraded/damaged fuel on large production scales.

Question 3: What effects, if any, would a canister-based retrievability policy have on a future reprocessing facility?

Answer 3:

A canister-based retrievability policy would not have any effects on a future recycling facility.

Question 4: What other factors, such as cost, dose or time, should be considered?

Answer 4:

The primary factor for consideration is the adequate protection of public health and safety. Additional considerations will be to worker safety. While a framework is not necessary for adequate protection, but would result in safety benefits, these should be cost justified.

Further Comments:

Retrievability and clad integrity are not necessary to ensure safety in any of the activities related to storage, transportation, handling, disposal or recycling/reprocessing. Retrievability and clad integrity are primarily an assurance for ease of operation and handling. While there is only a limited experience handling damaged fuel, this experience has shown that the increased time, cost and dose are relatively minor. In fact, it is reasonable to project that the DOE will be required to have damaged fuel handling capabilities even if the NRC requires that all fuel remain undamaged during storage and transportation. This is due to the fact that DOE cannot be certain as to the condition of the fuel when it arrives, and will likely handle the opening of each cask as if it contains damaged fuel. Thus, the DOE is expected to integrate routine handling operations for damaged fuel into its receipt of transportation casks to further minimize cost, time and worker dose. Finally, DOE recently stated that it does not have any programmatic requirement for fuel to be "Undamaged", which is further supported by the Standard Contract with utilities that DOE will accept all fuel no matter what its condition is.

There would not be any negative impact on a potential recycling facility due to a change in the regulatory framework. The amount of used fuel generated and forecasted greatly exceeds the amount of used fuel

Further Comments (Cont'd):

that could be recycled, even in the most aggressive scenarios. In fact, DOE in the recent used fuel strategy report stated that over 98% of the current used fuel would not be destined for a recycling facility if one is developed. Since there is more used fuel than would be destined for a potential recycling facility, DOE would be selective. Even for selection criteria, most fuel would remain undamaged in the proposed framework, and DOE could further select recently discharged fuel if handling of damaged fuel became a limiting condition (an unlikely scenario).