

Response to Public Comments on Draft ISG-2, Rev 1 “Fuel Retrievability”

Comment 1, General – The revised ISG establishes that a facility meets the requirements of 10 CFR 72.122(l) if the facility is “2) designed to allow retrieval and repackaging of the fuel rods and fuel assemblies, if necessary, into a transport package...”

How would shut-down reactor sites with ISFSIs meet this facility requirement? They have no means to open and remove a fuel assembly potentially damaged due to a storage accident condition that could have changed the fuel cladding integrity. As defined in this ISG, this appears to be requiring ISFSIs, especially at shutdown sites, to have a fuel repackaging facility/capability in order to satisfy Part 72 requirements.

Lines 77-95 – This paragraph states that fuel must be retrievable on an assembly basis and the reasons why. However, lines 26-29 state that assembly retrievability is only necessary if the condition of the fuel is not suitable for transport, which would imply that fuel may not have to be retrievable on an assembly basis. These two sections appear to be in conflict. Please clarify.

1-5, Line 99 – The ISG Clearly states, “AND maintaining the ability to handle individual assemblies.” This statement contradicts current decommissioning principles and contradicts the Line 26 statement that would allow an alternative action. Currently decommissioned sites with fuel in dry storage would not be in compliance with this guidance. Plants planning to decommission would be required to retain this ability (e.g., Zion).

NRC Response – The guidance provides two acceptable means for package designs to satisfy regulatory requirements for transferring of the fuel to another overpack should the necessity arise. It does not mandate that the owner of the fuel at a dry storage facility located at a closed-down reactor site be able to handle the fuel by both methods.

Until such time a decommissioned reactor site is able to demonstrate that it can repackage without the availability of a pool, if necessary, the ability to transfer the canister to another overpack must be maintained. Once again, packaging the fuel with the ability to retrieve by two methods is preparing for an unknown site condition and allows the site to respond to a potential issue by the most expedient means.

Change to ISG – no change

Comment 2, Lines 11-14 – The guidance should be clarified that it pertains only to licensing under 10 CFR 72.10. CFR 71 does not include specific requirements for retrievability of either the canister or the fuel.

NRC Response – The statement below will be added for clarity

Change to ISG – The sentence will be changed to “This Interim Staff Guidance (ISG) provides guidance to the staff for determining if interim storage systems licensed under 10 CFR Part 72 allow ready retrieval of spent fuel.”

Comment 3, Line 25 – seems to imply that the canister can only be unloaded in a spent fuel pool

NRC Response – It is not the intent of the ISG to specify a canister can only be unloaded in a spent fuel pool.

Change to ISG – “or other facility” was added after “spent fuel pool”.

Comment 4, Lines 26-28 – Line 26 states “2) if it is not possible to demonstrate that the spent fuel condition is suitable for transportation then there must be the ability to unload a storage cask and either repackage the fuel”
Line 29 “Both conditions must be met”

This would imply if a transport license was available at the time of storage, item “2.)” would be met as the transport license would provide the demonstration that the spent fuel is suitable for transportation. [Note that this interpretation would be a severe drawback to vendors without a transport license for the contents placed into storage]

Please clarify what is meant by “...if it is not possible to demonstrate that the spent fuel condition is suitable for transportation...” Is there an expectation that more than demonstration of compliance with the Part 71 CoC is required?

NRC Response – Granting a storage license under 10 CFR Part 72 does not imply that the package meets all the requirements for a 10 CFR Part 71 license. The ability to meet Part 71 requirements will be determined at the time that the application for a Part 71 license is made. An example of a concern might be the ability of the fuel rod cladding to have adequate ductility to maintain a suitable configuration to meet all the Part 71 regulations and be acceptable for transport. The NRC has made no specific recommendation on how a demonstration that the package contents will meet transportation regulations after a period in storage will be made.

Change to ISG – No change.

Comment 5, Line 55 – Remove 2nd period.

NRC Response – Agree.

Change to ISG – Second period was removed.

Comment 6, Line 64 – Line 64 mentions intact fuel. This should be expanded to include undamaged fuel as well.

NRC Response – Agreed.

Change to ISG – Text was changed to substitute “intact” for “undamaged” since intact fuel is a subset of undamaged fuel.

Comment 7, Lines 67-68 – The last sentence, pertaining to “additional fixtures” being included with the package for transport, should be deleted or revised to address only retrieval from storage. This is currently a transportation-related statement that is not appropriate for storage-related guidance. Moreover, it is unnecessary to include the additional fixtures or other required tools with the package when transported. It is acceptable to ship the tools separately or for the package recipient to otherwise arrange to have the necessary fixtures and tools at the site where the fuel would be removed from the transport package.

NRC Response – This statement will be removed.

Change to ISG – The sentence starting “Any additional fixtures ...” was removed.

Comment 8, Line 79 – Editorial: The statement in quotation marks appears to be intended to quote the rule verbatim and is not consistent with the rule language. Please revise to be consistent with the regulations.

NRC Response – Agreed.

Change to ISG – Changed the sentence to: “During storage, 10 CFR 72.122(h)(1) requires, for the basis of confinement, that “the spent fuel must be protected against degradation that leads to gross rupture or the fuel must otherwise be confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage.”

Comment 9, Line 83 – Editorial: a) Change “not” to “no.” b) Add “assemblies” after “fuel.” c) The term “gross degradation” is not defined. Please change this to read “degradation that leads to gross ruptures” consistent with the regulations. (d) Change “there would be not need to” to “there would be no need to.”

NRC Response – Agreed

Change to ISG –: Staff changed “not” to “no”, added “assemblies” after “fuel”, changed “gross degradation” to “degradation that leads to gross ruptures”, and changed “there would be not need to” to “there wouldn’t be a need to.”

Comment 10, Line 83 – The statement “there would be not [sic] need to protect the individual fuel against gross degradation” seems to imply that the sole reason to protect the fuel against degradation leading to gross rupture is to ensure retrievability. This is a misleading statement and needs to be clarified. Prevention of cladding rupture is primarily to ensure the fuel material stays in a configuration and geometry bounded by the criticality analysis

NRC Response – The issue of criticality was addressed later in the ISG. The staff does agree that ready retrieval of the fuel is only one of the reasons to protect the fuel against gross degradation.

Change to ISG – The editorial comment was accepted. No other change was made to the text.

Comment 11, 1-3, Lines 86 – Tubes cannot restrain fuel material into a known volume for criticality calculations unless the tubes are reconfigured into damaged fuel can tubes. NRC position is/has been that fuel may take on arbitrary form once degraded. Only a damaged fuel can is designed to retain material in region that can be shown to be subcritical at optimum moderation.

NRC Response – The staff is aware of vendors who are using the basket tubes with only screens on the top and bottom as approved damaged fuel cans. Due to the tight fit of the assemblies into the basket, and the filtering action of the bottom and top end fixtures of the assembly, the tubes retain the fuel to a known volume. This does not alter ready retrievability of the fuel since the basket is usually not retrievable as either a fuel tube or a complete basket from the canister. Unless shown otherwise, the fuel can take an arbitrary configuration within the basket tube.

Change to ISG – No change.

Comment 12, 1-4, Line 89 – “If the configuration of the spent fuel changed during storage to a point where ... Therefore, it is necessary for the fuel to remain in a retrievable condition even if the canister itself is retrievable.”

Storage cask licensing is based on the premise that fuel will not degrade during storage conditions (i.e., temperature limit on clad, inert gas backfill, and evaluation of system drops). Assuming that fuel will degrade in storage seems contrary to current storage licensing conditions. Extending the hypothetical degradation to affect transportability implies that the licensed storage configuration is being questioned.

NRC Response – A potential concern for high burnup fuel is that there will be hydride reorientation during drying that significantly reduces the ductility of the cladding. Under completely normal conditions this should not pose a problem for storage of the spent fuel. If there is a drop during the transfer of the cask, or a tip over, then the configuration of previously-intact fuel should be reanalyzed. If the fuel is shown to be damaged then either its configuration would have to be known to determine if it was transportable or it would have to be retrievable for repackaging.

Change to ISG – No change.

Comment 13, Lines 89-92 – The statement “If the configuration of the spent fuel changed during storage...” needs to be deleted or clarified. Absent an accident or environmental event that exceeds the design basis of the storage system, there is no credible scenario that could cause the configuration of the stored fuel to change, nor is there any way to truly confirm that it did or didn’t change, except for opening the canister and removing and inspecting the fuel. If the storage conditions have been within the design basis for the entire duration of storage, reasonable assurance exists that the fuel configuration has not changed and the fuel is retrievable and transportable (subject to compliance with the conditions of the Part 71 CoC).

The regulation cited (72.122(h)(1)) does not include a requirement, nor should one be implied, that the fuel needs to be in a condition where it can be “analyzed to determine if it was transportable.” This statement should be deleted because it implies that some additional analysis or evaluation may be required after storage to confirm that the fuel is transportable. Provided the fuel was loaded for storage in a manner that meets the transportation CoC and no beyond-design-basis events have occurred during the storage period, the fuel and canister are transportable and no further analysis or verification is necessary.

In summary, the discussion of retrievability under the Part 72 regulations in this ISG should be limited to storage and not transportation. It is incumbent upon licensees to validate that the fuel, other contents, the canister, and the packaging are in compliance with the Part 71 CoC prior to releasing the package for transportation.

NRC Response – See the response to Comment 12 regarding the concern in the first paragraph of this comment. The staff agrees with the comment that 10 CFR 72.122(h)(1) does not include any such requirement. The citations for this requirement in the ISG were 10 CFR 71.33(b)(3), and 10 CFR 71.55(b)(1). Regarding the third part of this comment, the operational requirement of retrievability (10 CFR 72.122(l)) must be considered.

Change to ISG – No change.

Comment 14, Lines 141-144 – This paragraph is interpretation of the regulation rather than the regulatory basis. Therefore, this paragraph should be removed from this section.

NRC Response – Agreed.

Change to ISG – Paragraph was removed.

Comment 15, Line 173 – the succinct definitions of “retrievability” (presented in Lines 97-100) and “normal means” (presented in lines 63-64) should be added directly to this section for clarity.

NRC Response – Agreed.

Change to ISG – Definitions were added to the Recommendation section for ‘ready retrieval’ and ‘normal means’. Section 10 CFR 72.122(l) states that retrievability, including the ready retrieval of spent fuel, is an overall requirement of spent fuel storage systems.