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General Comment

See attached file(s)

Attachments

MC&A Comments, R1

March 10, 2014

ATTN: Secretary, US Nuclear Regulatory Commission

SUBJECT: Comments on NRC NPRM regarding "Amendments to Material Control and Accounting [MC&A] Regulations" (Docket No. NRC-2009-0096)

In accordance with the *Administrative Procedures Act*, I am providing the following comments to the Commission's NPRM on "Amendments to Material Control and Accounting [MC&A] Regulations," published in the *Federal Register* (78 FR 67225; November 8, 2013). I am providing the following comments to assist the NRC staff in developing a final rule for the Commission's consideration.

Overview:

The MC&A requirements are a very important component of the NRC's regulations to ensure the safeguarding of special nuclear material. I am very supportive of this NPRM. However, I believe there are a number of issues that warrant further consideration by the NRC staff in developing a final rule to ensure a risk informed and performance-based regulation, which effectively manages the balance between potential SNM safeguards risk across all of the classes of facilities possessing SNM, allows for effective implementation by licensees, and considers appropriate cost implications for both licensees and the NRC.

Major Comments:

1. First, I support the NPRM's consolidation of MC&A regulations for independent spent fuel storage installations (ISFSIs) under 10 CFR Part 74. However, I note that 10 CFR Part 72 currently authorizes the storage of SNF at classes of facilities that include both an ISFSI and a Monitored Retrievable Storage Installation (MRS). However, the NPRM's language in Part 74 (multiple locations) only makes reference to ISFSIs. Currently, there are no NRC-licensed MRS facilities, nor are any license applications for an MRS pending before the NRC.

The NRC's proposed approach of only referring to ISFSIs in the new/revised language for Part 74 creates a regulatory gap for any future potential applicants for a Part 72 license for an MRS. In SRM-SECY-08-0059 the Commission directed the NRC staff to execute Option 4 to revise and consolidate the current MC&A regulations in Part 74. While SECY-08-0059, Option 4 only mentioned ISFSIs, neither the SRM, nor the SECY paper specifically excludes MRSes from the scope of this rulemaking. Consequently, the NPRM's preamble has not articulated a rationale for excluding potential MRS licensees from the scope of this rulemaking.

Accordingly, I suggest that the NRC staff should consider revising this final rule to include both ISFSI and MRS licensees and to treat them equivalently in Part 74.

2. Similar to my comment 1 above, I note that the surface facility of a potential Geological Repository Operations Area (GROA) can also, for a substantial period of time, temporarily store SNF containing SNM and potentially also store undiluted SNM encapsulated in vitrified high-level radioactive waste (HLW) (i.e., DOE's can-in-canister concept). The NRC's current repository regulations are contained in10 CFR Parts 60 and 63; and the MC&A safeguards requirements in Parts 60 and 63 both cross-reference into Part 72's ISFSI MC&A requirements – which are being relocated to Part 74 under this proposed rule. As with ISFSIs, the

consolidation of MC&A requirements for GROA licensees into Part 74 (also multiple locations) has the same regulatory consistency and effectiveness arguments. Also similar to my Comment 1 above, neither the SRM nor the SECY paper has specifically excluded GROA licensees from the scope of this rulemaking. Consequently, the NPRM's preamble has not articulated a rationale for excluding potential GROA licensees from the scope of this rulemaking.

However, I also note that a national consensus and workable framework for licensing of a potential GROA are not present today; and may be many years off from fruition. Consequently, while it would improve regulatory consistency to now include GROA licensees within the scope of a final Part 74 rule – because there do not appear to be any immediate licensing prospects for a GROA – the NRC may find it more prudent to defer incorporation of GROAs into Part 74 to a separate future rulemaking.

Accordingly, I suggest that the NRC staff should consider revising this final rule to also include GROA licensees in Part 74 and to treat them equivalently to ISFSI licensees in Part 74. Alternatively, the NRC staff could articulate support for MC&A consistency while also deferring incorporation of GROAs into Part 74 in a separate future rulemaking. (See also Comment A below.)

3. In the preamble to the NPRM, the NRC has provided a basis for treating the SNM in SNF stored in ISFSIs as a lesser category of safeguards risk; and therefore, permits an ISFSI to be excluded from the more stringent MC&A requirements of the proposed revisions to Subparts C, D, and E of Part 74. For example, in the NPRM's discussion of "tamper-safing" (at 67228), the NPRM indicated that "[c]ontainers for spent fuel at ISFSIs are welded shut and are sufficiently difficult to open that tamper-safing is not required." This information in the NPRM is only partially correct. Many of the SNF canisters (i.e., cask designs) at current ISFSI are welded shut; however, for some ISFSIs, the casks' have bolted lids – which would imply an appropriate need for a greater degree of tamper monitoring for mechanically closed SNF containers.

Secondly, the NPRM does not address the MC&A risk implications of the presence of a dry transfer system (DTS) at an ISFSI. Currently, no ISFSIs have a DTS capability. However, the Commission in its recent proposed waste confidence rule and generic EIS (78 FR 56776; September 13, 2013) indicated that a DTS would be necessary during extended storage conditions – where the useful life of a dry storage canister/cask would be exceeded, but the SNF needed to remain onsite (i.e., onsite transfer of SNF from one sealed storage cask to another sealed storage cask, or to dual-purpose storage cask & transportation package). Furthermore, while the GEIS indicated the use of a DTS for such transfers was expected to occur a substantial period of time in the future (i.e., 80 to 100 years from now), the need for a DTS to transfer SNF from storage only casks to dual purpose storage casks & transportation packages may occur much sooner (e.g., in support of a transportation campaign to a central interim storage ISIFS – especially at ISFSIs where the power reactor, and its spent fuel pool, have been decommissioned and removed. Given the increased MC&A theft and diversion risk from unsealed SNF containers; it is not clear in the NPRM how licensees would address this transitory, increased risk condition.

Accordingly, I suggest that the NRC staff should consider revising this final rule to 1) clarify that SNF storage casks can be welded or mechanically sealed; and 2) indicate whether the operation of a DTS at an ISFSI falls within the general MC&A performance objectives of proposed § 74.3 [for an ISFSI], or if more rigorous MC&A requirements are necessary during DTS operations.

However, if the NRC staff concludes that appropriately addressing DTS MC&A considerations would significantly impact issuance of final rule (e.g., creating the need for a supplemental proposed rule or significantly impacting the schedule for issuance of a final rule), I would suggest deferring resolution of DTS MC&A considerations to a separate future rulemaking.

4. With respect to ISFSIs, the NPRM appears to contemplate that the SNF stored in an ISFSI only consists of light water reactor (LWR) SNF. LWR SNF produces only certain fissile isotopes. However, some current NRC-licensed ISFSIs store non-LWR SNF, which can have significantly different isotopic compositions; and thus may warrant different MC&A risk considerations. However, from an overall safeguards perspective, I do not believe the risk from the SNM contained in an irradiated fuel matrix is the same as is presented by unirradiated SNM, even if the quantity of SNM is identical (e.g., more than 2000 grams). Therefore, even if a facility possessed a substantial quantity of SNM, the MC&A requirements of Subpart E (for a Category I facility) would appear to be excessive; and thus not commensurate with the actual safeguards risk presented by the SNM in the SNF matrix.

Accordingly, I suggest the NRC staff should consider revising the final to clarify whether these MC&A provisions applicable to ISFSIs apply to both LWR and non-LWR SNF, stored in an ISFSI or MRS.

5. In proposed Appendix A to Part 74, Note 2 (at 67251), the NPRM would propose for irradiated SNF, "which by virtue of its **original fissile material content** as included as Category I or II [SNM] before irradiation" (emphasis added) permit reducing the SNM by one category level if the fuel exceeds 1 Gray (Gy) per hour at 1 meter (m), unshielded. However, the proposed Appendix A, Notes rule text does not address the situation where a Category I or II quantity of SNM was not present before irradiation (i.e., was not part of the original fissile material content), but is now present in the fuel matrix due to neutron absorption during the fuel's irradiation in a reactor. This SNM could consist of principally of isotopes of Pu or of U-233. However, SNF that used high-enriched U-235, is addressed by proposed rule.

Moreover, previous NRC staff calculations using ORNL's ORIGIN code have concluded for LWR fuel that, even with typical standard fuel burnup (e.g. 35,000 MWD/MTU), Category I quantities of SNM (composed of the nuclides of Pu) can be present in a single power reactor spent fuel assembly (i.e., greater than 2000 grams). Accordingly, it is not clear how SNM created during irradiation that is currently stored in an ISFSI, or potential future MRS or GROA, and that exceeds the Category I and II SNM quantity limits is to be treated as time has passed and the fuel's (i.e., the SNM's) radiation level decreases below the 1 Gy at 1 m threshold value from any accessible surface without regard to any intervening shielding.

For example, proposed §§ 74.31(a)(2), 74.41(a)(2), and 74.51(a)(2) all specifically exclude ISFSIs from Subparts C, D, and E, notwithstanding the direction provided in Appendix A to Part 74 (i.e., the possessed SNM mass as modified by the radiation level) causes the material to be regulated at one category less than the physical SNM mass that is present. How should the direction of Appendix A be applied to SNF stored in an ISFSI?

Accordingly, I suggest the NRC staff should consider revising a final rule to apply the proposed Appendix A direction to the post-irradiation, total SNM content; rather than just considering the pre-irradiation SNM inventory of the fuel assemblies (when determining the appropriate MC&A requirements).

6. In proposed Appendix A I believe increased clarity is necessary on how to apply the direction of Appendix A to Part 74 to SNM contained in SNF stored in an ISFSI. Specifically, should the SNM be evaluated (regarding the application of Appendix A) on a facility wide basis (i.e., on an individual gram of SNM basis), on a SNF assembly basis, or on a storage canister (containing multiple SNF assemblies) basis? The NPRM is not clear on this issue.

Accordingly, I suggest the NRC staff should consider revising a final rule to provide increased clarity on how to apply the direction of Appendix A to Part 74 to SNM contained in SNF stored in an ISFSI.

Minor Comments:

A. Current MC&A regulations in both 10 CFR 60.78 and 63.78 that are applicable to GROAs include language which cross-references to §§ 72.76 and 72.78, regarding MC&A records and reports. However, item 9 of the NPRM's proposed rule text (at 67245) removes and reserves §§ 72.76 and 72.78, without also including any conforming changes to §§ 60.78 and 63.78 to reflect this proposed action in Part 72. Consequently, the proposed action in Part 72 would render invalid the current language in §§ 60.78 and 63.78.

Accordingly, I suggest the NRC staff should consider revising the final rule to expand the scope of the rulemaking to include conforming changes Parts 60 and 63 to prevent creating invalid cross references arising from the removal of §§ 72.76 and 72.78 in a final rule.

B. In proposed Appendix A to Part 74, Note 2 (at 67251), the NPRM would treat irradiated SNF as reduced by one SNM category level if the radiation level of the [spent nuclear] fuel exceeds 1 Sievert per hour (100 rads per hour) at 1 meter, unshielded. I agree with the concept of reducing the SNM category level in the presence of elevated radiation levels.

However, the correct SI unit for radiation level is the Gray (Gy), not the Sievert (Sv) (which applies to absorbed dose). The use of Gray as the appropriate SI unit is also consistent with the IAEA's INFCIRC/225/Rev. 4 and the Commission's recent final rule (78 FR 29250; May 20, 2013) revising 10 CFR 73.37 (see § 73.37(a) at 29550). However, § 73.37(a) also uses a more precise ending clause "... from any accessible surface without intervening shielding..."; rather than the NPRM's proposed use of "unshielded."

Additionally, the Commission's 1996 metrification policy (61 FR 31169; June 19, 1996) requires in rulemaking that dual units be expressed in the SI unit first and then the English unit parenthetically afterward. However, no distance using English units was specified after the "1 meter" language in the proposed rule text.

Accordingly, the NRC staff should consider revising the final text to "...the radiation level from the fuel exceeds 1 Gray (Gy) (100 rad) per hour at 1 meter (m) (3.3 ft), from any accessible surface without intervening shielding." This language will promote consistency within the NRC's Chapter 1 regulations that use the "1 Gy radiation level" threshold for both security and safeguards considerations.

Respectfully,

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