

POLICY ISSUE NOTATION VOTE

June 1, 2012

SECY-12-0079

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: PARTIAL CLOSURE OF PETITION FOR RULEMAKING (PRM-72-6) C-10
RESEARCH AND EDUCATION FOUNDATION, INC.

PURPOSE:

To obtain Commission approval for partial closure of the petition for rulemaking from the C-10 Research and Education Foundation (C-10 or the petitioner) by accepting one request for consideration in the rulemaking process, denying nine of the petitioner's requests, and reserving two requests for consideration in a future rulemaking determination. This paper does not address any new commitments or resource implications.

SUMMARY:

Based on a thorough and thoughtful review of the petitioner's requests and technical basis for proposing the changes, the staff proposes accepting one request for consideration in the rulemaking process, denying nine of the petitioner's requests, and reserving two requests for consideration in a future rulemaking.

BACKGROUND:

On November 24, 2008, the petitioner requested that the U.S. Nuclear Regulatory Commission (NRC or the Commission) revise its regulations for interim storage of spent fuel in a petition for rulemaking (Docket No. PRM-72-6) (Enclosure 1). A notice of receipt of the petition was published in the *Federal Register* on March 3, 2009 (74 FR 9178), with the comment period ending May 18, 2009. Specifically, the petitioner requested 12 rule changes concerning dry

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SECY NOTE: THIS SECY PAPER TO BE RELEASED TO THE PUBLIC 5 WORKING DAYS
AFTER DISPATCH OF THE LETTER TO THE PETITIONER.

cask safety, security, transferability, and longevity. The requested rule changes would address concerns about failure of cask materials over long periods of time, the ability to detect these failures and assess storage cask construction materials with respect to long-term storage; the need for dose rate and temperature monitoring on storage casks at Independent Spent Fuel Storage Installation (ISFSIs); and storage cask vulnerability to weather-related deterioration and sabotage.

The petitioner asserted that by proposing to revise the Waste Confidence Decision (73 FR 59551, October 9, 2008), the NRC in effect will establish that there is no deadline for the Federal Government to take title to spent fuel and remove it from its point of origin at nuclear power facilities. The petitioner states that the NRC is allowing spent fuel storage to continue for an indefinite, prolonged period of time, and therefore, storage casks should be designed and constructed for a minimum of 100 years, as opposed to the 20 years permitted by licenses and certificates of compliance (CoCs). Subsequent to submission of PRM-72-6, the NRC extended the 20-year duration for licenses and CoCs to 40 years in the final rulemaking "License and Certificate of Compliance Terms" (76 FR 8872, February 16, 2011) and issued its Waste Confidence Decision Update (74 FR 81037, December 23, 2010).

The NRC received over nine thousand comment letters from industry, the American Society of Mechanical Engineers (ASME), non-governmental organizations, and members of the public. The majority of the comments were identical (form) emails. The Nuclear Energy Institute and the Strategic Team and Resource Sharing organization opposed the petition, while all form email comments, ASME, and the Berkeley Fellowship of Unitarian Universalists (BFUU) Social Justice Committee supported the petition. The draft *Federal Register* notice (Enclosure 2) summarizes the comments received on the petition.

While the NRC was considering the petition for rulemaking from C-10, it issued a draft technical basis for a future security rulemaking for ISFSIs and a final rule on terms and conditions for both ISFSI licenses and certificates of compliance. As described below, some aspects of both of these actions are pertinent to the petitioner's requests.

On December 16, 2009 (74 FR 66589), the NRC issued Draft Technical Basis for Rulemaking Revising Security Requirements for Facilities Storing Spent Nuclear Fuel and High-Level Waste. In this draft technical basis, the NRC describes the objectives, conceptual approaches, and potential solutions for the future rulemaking on ISFSI security. The NRC staff expects that the rulemaking, when completed, will result in risk-informed, performance-based regulations, with both site-specific and generally licensed ISFSIs having consistent regulations. The NRC staff received comments on the draft technical basis from several stakeholders who were opposed, for different reasons, to the draft technical basis. For this reason, the NRC staff in SECY-10-0114 NRC's (Agencywide Documents Access and Management System (ADAMS) Accession No. ML101880013) recommended that the schedule for the rulemaking effort be extended to allow the NRC staff to further evaluate these comments and their implications. The Commission approved the NRC staff's recommendation in its staff requirements memorandum, (SRM), SRM-SECY-10-0114 (ADAMS Accession No. ML103210025), and reaffirmed direction for the ISFSI security rulemaking in SRM-SECY-07-0148 (ADAMS Accession No. ML073530119). This rulemaking extended the duration of ISFSI licenses and storage cask CoCs to 40 years, clarified the difference between "renewal" versus "reapproval" terminology in

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72 and codified the requirements for an aging management plan for both general and specific licensees.

DISCUSSION:

The petitioner requested NRC to make 12 revisions to NRC regulations. The NRC staff proposes denying Requests 1, 2, 3, 5 through 8, 10, and 12, considering request 11 in the rulemaking process, and deferring action on requests 4 and 9.

Requests which Staff Proposes Denying

Request 1 – Prohibit non-conforming pre-built full-scale casks, specifically built for NRC certification testing, from being put into production under industry pressure to ‘accept-as-is’.

Response to Request 1 – The NRC staff determined that the petitioner did not provide any new or significant information indicating that any storage casks have been loaded and placed on a storage pad that do not conform to the design approved by the NRC. The NRC’s regulations provide that only those casks that have been approved under the procedures of 10 CFR Part 72, Subpart L and subsequently listed in 10 CFR 72.214, “List of Approved Spent Fuel Storage Casks,” may be used under a 10 CFR Part 72 general license. Pursuant to 10 CFR 72.48, “Changes, Tests and Experiments,” the applicant must evaluate any part or material that does not conform to its specification in the Final Safety Analysis Report to ensure that its use will not affect the ability of the storage cask to safely store spent fuel and to determine if an amendment request and revision to the storage cask certificate of compliance is needed.

Request 2 – Require that NRC certification of casks be based on upgraded code requirements, which include design criteria and technical specifications for a 100-year-minimum age-related degradation timeframe, upgraded from the current inadequate 20-year design specification. The NRC must also require an NRC regulatory and public review of an in-depth technical evaluation of the casks done at the 20-year certificate of compliance reapproval interval to effectively catch and address cask deterioration.

Request 5 – Require the most current ASME Codes and Standards be adopted for all spent fuel storage containers without exception.

Request 6 – Require ASME Code stamping for fabrication.

Request 7 – Require that all materials for fabrication be supplied by ASME-approved material suppliers who are certificate holders.

Request 8 – Require that current ASME Codes and Standards for conservative heat treatment and leak tightness are adopted and enforced.

Response to Requests 2 and 5 through 8 – The NRC staff determined that amending the regulations to incorporate the most recent version of the ASME Boiler and Pressure Vessel Code (ASME Code) is not necessary to ensure that adequate codes and standards are applied for the material selection, fabrication, design, examination, and testing of dry cask storage systems. The industry has adopted, and the NRC has accepted, ASME Code Section III, Division 1, “Rules for Construction of Nuclear Facility Components,” as an acceptable standard

for the design and fabrication of dry storage casks within the requirements of 10 CFR Part 72. However, dry storage casks are not active pressure vessels and, as such, ASME Code Section III, Division 1 cannot be implemented without allowing some exceptions to its requirements. Therefore, the NRC allows specific exceptions, with appropriate safety bases, to the ASME Code for those requirements that are not applicable or practical to implement for dry cask storage systems. The NRC staff is reviewing ASME Code Section III, Division 3, "Containments for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Waste," and, if endorsed, the NRC staff intends to develop guidance for use of this code in future fabrication of dry storage casks.

Additionally, the NRC staff notes that aging issues beyond 100 years will be considered in the context of SECY-11-0029, "Plan for the Long Term Update to the Waste Confidence Rule and Integration with the Extended Storage and Transportation Initiative" (ADAMS Accession No. ML110330445).

With respect to the petitioner's second proposal in Request 2 regarding an evaluation of the casks at the CoC reapproval interval, the NRC addressed some of the petitioner's concerns in the February 2011 Final Rulemaking, "License and Certificate of Compliance Terms" (76 FR 8872). This rulemaking clarified the difference between "renewal" versus "reapproval" terminology and codified the requirements for an aging management plan for both general and specific licensees. As discussed in the February 2011 final rulemaking, the NRC did not intend to use the term reapproval to mean that all the initial design bases were reviewed and reapproved prior to extending a CoC expiration date, as stated in the July 18, 1990, Final Rulemaking, "Storage of Spent Fuel in NRC-Approved Storage Casks at Power Reactor Sites" (55 FR 29181), which added the general license option to 10 CFR Part 72.

Request 3 – Require that the NRC approve, as part of the original ISFSI certification process and construction license, a method for dry cask transfer capacity that will allow for immediate and safe maintenance on a faulty or failing cask.

Response to Request 3 – The NRC staff determined that the petitioner did not provide any new or significant technical information to indicate how spent fuel assemblies would be damaged if placed back into the spent fuel pool. Additionally, pursuant to 10 CFR 72.236(h), "Specific Requirements for Spent Fuel Storage Cask Approval and Fabrication," the applicant must ensure that the spent fuel storage cask is compatible with wet or dry spent fuel loading and unloading facilities. As described in NUREG-1536 "Standard Review Plan (SRP) for Dry Cask Storage Systems" (ADAMS Accession No. ML010040237), a reflood analysis can be used to show that the thermally induced stresses on fuel rods are not sufficient to damage the rods.

Request 10 – Require real-time heat and radiation monitoring at ISFSIs at all nuclear power plant sites and away-from-reactor storage sites maintained by the utilities and that the monitoring data be transmitted in real-time to affected State health, safety, and environmental regulators.

Response to Request 10 – The NRC staff determined that the petitioner did not provide any new or significant technical information to justify a change in NRC regulations. The NRC's regulations in §§ 72.122(h)(4) and (i) require continuous monitoring for storage designs that utilize active systems. The NRC revised its regulations in June 1999 (64 FR 33178) to allow

periodic monitoring and instrumentation systems consistent with the storage design requirements for designs that rely on passive design features to ensure safety.

Regular monitoring for radiation at and near ISFSIs is required by § 72.44(d)(2), "License Conditions," with reporting required at 12-month intervals as specified in § 72.44(d)(3), and similarly for general licensees as specified in 10 CFR 50.36a(a)(2), "Technical Specifications on Effluents from Nuclear Power Reactors." The technical specifications for concrete storage casks with vents for natural convection to provide cooling to the canister can include temperature-monitoring devices or periodic visual monitoring to ensure that the inlet and outlet vents are free of blockage that would inhibit convective airflow. Either of these methods is acceptable to confirm that dry cask heat removal systems are performing as designed and to help ensure that cask system component temperature limits are not being exceeded.

In addition, an applicant must demonstrate the performance of the thermal design and thermal limits in analyses submitted with the certification or license application. Licensees also periodically survey the cask systems to verify there are no adverse conditions that would impede thermal performance. Given the surveillance, monitoring, and inspection programs, the risk of immediate failure or emergency is remote. Accordingly, the NRC staff has determined that the current regulatory requirements provide adequate protection of public health and safety and the environment.

Request 12 – Establish funding to conduct on-going studies to provide the data required to accurately define and monitor for age-related material degradation, assess the structural integrity of the casks and fuel cladding in „interim’ waste storage.

Response to Request 12 – Rulemaking is not the appropriate mechanism to establish funding to conduct research. The NRC staff addressed age-related material degradation for both the storage cask and spent fuel in the final rulemaking that extended the duration of storage licenses and CoCs to 40 years. Additionally, the NRC staff intends to address age-related degradation in the context of the plan for extended storage in SECY-11-0029.

Request which Staff Proposes to Consider in the Rulemaking Process

Request 11 – Require Hardened On-Site Storage (HOSS) at all nuclear power plants as well as away-from-reactor dry cask storage sites; and that all nuclear industry interim on-site or off-site dry cask storage installations or ISFSIs be fortified against terrorist attack. In addition, all sites should be safeguarded against accident and age-related leakage.

Response to Request 11 – The NRC is already considering the petitioner’s Request 11 as part of the ongoing ISFSI security rulemaking effort. The rulemaking effort is described in the December 16, 2009 (74 FR 66589), Spent Nuclear Fuel and High-Level Waste Security Requirements Revisions Draft Technical Basis.

Requests Which NRC Staff Proposes to Reserve for Future Rulemaking Determination

Request 4 – Require that dry casks are qualified for transport at the time of onsite storage approval certification.

Response to Request 4 – The NRC staff is evaluating Request 4, whether storage casks should be certified for both storage and transportation simultaneously, as part of COMSECY-10-0007, “Project Plan for the Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel” (ML101390413). The NRC staff identified storage and transportation compatibility as a potential policy issue in COMSECY-10-0007, Enclosure 1, Appendix A (ADAMS Accession No. ML101390426).

Request 9 – Require a safe and secure hot cell transfer station coupled with an auxiliary pool to be built as part of an upgraded ISFSI design certification and licensing process.

Response to Request 9 – The NRC staff is evaluating Request 9 to determine whether additional rulemaking or guidance for existing regulations is appropriate for ISFSIs at decommissioned reactors, which have no spent fuel pool for use in the event a storage cask would need to be unloaded. Additionally, as discussed in Section 3.1 of Enclosure 1 to COMSECY-10-0007, research needs to be performed to develop the safety basis for the behavior of high burnup fuel during extended storage periods. Whether the fuel retains sufficient structural integrity for extended storage and eventual transportation may affect whether the NRC would require dry transfer capability at decommissioned reactors storing high burnup fuel.

After NRC staff completes its evaluation of the issues related to the petitioner’s Requests 4 and 9, the petitioner’s requests will either be accepted into the rulemaking process or will be denied. The docket for PRM-72-6 will remain open and consist of the petitioner’s Requests 4 and 9 pending a final disposition by the Commission, at which time the NRC will publish another document in the *Federal Register* to notice the Commission’s decision.

RECOMMENDATIONS:

The NRC staff recommends that the Commission:

1. Approve partial closure of the petition by considering one request in the rulemaking process (Request 11), denying nine requests (Requests 1, 2, 3, 5 through 8, 10, and 12), and reserving two requests for future rulemaking determination (Requests 4 and 9);
2. Approve for publication the partial closure of the petition for rulemaking in the *Federal Register*;
3. Note:
 - a) The appropriate Congressional committees will be informed;
 - b) A letter is enclosed for the Secretary’s signature (Enclosure 3), informing the petitioner of the Commission’s decision on the petition; and
 - c) Office of Public Affairs does not plan to issue a press release.

The Commissioners

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COORDINATION:

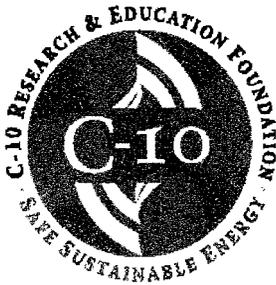
The Office of the General Counsel has reviewed this paper and has no legal objection to the partial denial of this petition.

/RA/

R. W. Borchardt
Executive Director
for Operations

Enclosures:

1. [Letter from Petitioner](#)
2. [Federal Register notice](#)
3. [Letter to Petitioner](#)



C-10 Envisions A Clean, Safe, Sustainable,
Non-nuclear Energy Future

November 24, 2008

**Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555-001
Attn: Rulemakings and Adjudications Staff**

The C-10 Research and Education Foundation Inc. Petition for NRC Rulemaking to Upgrade Interim Dry Cask Storage Code Requirements

For over fifty years, the federal government has failed to resolve the long-term need to contain and shield the public from exposure to irradiated nuclear fuel by creating a permanent high-level radioactive waste repository. Therefore, States will inherit the responsibility of high-level on-site nuclear waste storage for an indefinite prolonged period of time. The Nuclear Regulatory Commission (NRC) is currently proposing to change the Nuclear Waste Confidence Rule so that there is no deadline. In the Federal Register/Vol.73, No. 197/Oct. 9, 2008, p. 59549, the NRC stated “the NRC did not define a period when a repository will be needed for safety or environmental reasons in 1990 and is not doing so now; it is only explaining its view of when repository capacity may be reasonably expected to be available”.

The NRC’s current regulatory requirements for and enforcement of “interim” on-site dry cask storage of highly irradiated fuel are woefully inadequate because the NRC does not provide sufficient regulatory requirements nor does it enforce the existing regulatory requirements in the NRC’s general licensing process in 10 Code of Federal Regulations (CFR) 72, 10 CFR 72 Subpart K, 10 CFR 72.212, 10 CFR 72.48, 10 CFR 72.104, or in 10 CFR 50.59.

ASME Code Compliance Essential

The NRC allows licensees to use alternatives to the American Society of Mechanical Engineers (ASME) Code and standards with “justifications and compensatory measures” in lieu of building casks to ASME Code as written. Design criteria in material dedication can not absolutely meet the quality assurance requirements in

10 CFR Part 50, Appendix B without full adherence to ASME Code and NCA 3800 of the ASME Code which includes ASME code stamping. The NRC has not adopted ASME Code Subsection WC Class SC Storage Containments as written. Casks are designed to meet criteria and technical specifications for certification for a twenty year interval while on-site storage has been determined to be extended for an indeterminable timeframe. The NRC has not upgraded required design specifications to the current 2007-2008 ASME Code or conducted an adequate careful review of current cask degradation, as no current complete studies exist.¹

Unclear Renewal Process

NRC regulations 10 CFR 72.42(a) clearly specify that the initial license term for a site-specific Independent Spent Fuel Storage Installation (ISFSI) must be for a fixed term not to exceed 20 years from the date of issuance. In 10 CFR Part 72, it is unclear what the specific NRC requirements are to “renew” or “reapprove” irradiated nuclear fuel storage casks. The application for a “reapproval” implies that the NRC would reevaluate the design basis of the original cask design with the current standards and code requirements for the 20 year Certificate of Compliance (CoC) storage cask license. However, under Section 72.42 the use of the word “renewal” implies that the design requirements remain the same as the original, and simply replaces the original license. The NRC has no rulemaking on the clarification of “renewal” versus “reapproval” terminology. The NRC has yet to address what the license requirements are for multiple cask designs under different expiration dates at the same ISFSI.²

Arbitrary Extension of Container Licenses

There exists a serious lack of NRC regulatory requirements to address the reality that the twenty year CoC for irradiated nuclear fuel containers are being extended to 60 years without the technical data, regulatory evaluation, or scrutiny to adequately protect public health and safety and the environment beyond their initial license certification. In reviewing the performance of casks to date, there exist serious concerns.

Our chief concerns are:

- NRC code requirements have not been updated;
- casks are not consistently manufactured with American Society of Mechanical Engineers (ASME) consensus code conformance;³
- Independent Spent Fuel Storage Installations (ISFSI) are not designed or required to incorporate the robust fortifications needed to withstand a terrorist attack (as they are not currently required); nor
- casks are not safeguarded against accidents, adverse weather related events, and leakage driven by age-related degradation.⁴

Insufficient Scientific and Technical Research Field Data

The NRC has declared that a cask shares the same class of importance to safety (Class 1 in ASME Sec III terminology) as a reactor vessel.⁵ Conversely, the NRC has chosen to modify 10 CFR Part 72 (RIN 3150-AF80) to make distinctions between “wet” and “dry” storage requirements. For example, Section 72.122 (i) requires that instrumentation and control systems be provided to monitor systems important to safety, and specifically, to monitor and control heat removal systems.

The NRC has chosen in their ruling, however, to not require control systems for dry cask storage systems at ISFSIs.

As another example, Section 72.124 (b) requires specific methods for criticality control, including the requirement that wherever solid neutron absorbing materials are used, the design must provide for positive means to verify their continued efficacy. The NRC concluded that the potentially corrosive environment under wet storage conditions is not present in dry storage systems.

In their license renewal scope, the NRC has determined that as the storage environment is evacuated of air and moisture and then back-fitted with helium, the irradiated nuclear spent fuel is inert, and therefore, there is no reasonable basis to assume degradation will occur.⁶ The Point Beach incident in May of 1996, the evidence provided from the Surry reactor's inner seal failures, and NRC reports of salt water air corrosiveness at seacoast reactors are proof that this assumption is invalid.

The NRC ruling states that as the dry casks are sealed, it is not practical to penetrate the integrity of the cask to make measurements for verifying the efficacy of neutron absorbing materials, and therefore, has ruled that a positive means for verifying the continued efficacy of solid neutron absorbing materials are not required for dry cask storage.⁷ Vital adequate technical radiation and heat monitoring data as regulatory criteria for license approval and extensions needed to protect nuclear workers, assure public safety, and provide the criteria for future cask fabrication, material specification, and performance analysis has not been required in NRC regulations.

Lack of Vendor Compliance

Federal code for irradiated nuclear fuel storage systems in 10 CFR 72.122(a) and in 10 CFR 72.234(b), clearly requires that structures, systems and components important to safety must be designed, fabricated, and tested to quality standards commensurate with the importance of the function performed. However, the NRC has not updated their aforementioned code and grants the utilities and their vendors numerous exemptions. While the NRC has allowed exemptions to vendors by justifying vendor compliance to merely "the maximum extent possible",⁸ they simultaneously cite vendors and manufacturers with numerous violations and then approve repeated corrective actions. As a result, the dry cask design, fabrication and performance issues remain unresolved.

Inadequate Long-Term Research Study Requirement

There is limited data to determine the extent of the long-term degradation of NRC certified irradiated nuclear fuel storage casks or the fuel cladding within the casks. The NRC has inadequate technical research data available on the long-term material degradation issues for the 20 year Certificate of Compliance license time-frame for any existing dry cask storage container. The NRC did support a research program "The Dry Cask Storage Characterization Project" conducted at the Idaho National Engineering and Environmental Laboratory however it was canceled after 15 years instead of the original 20 year study time-line. In that study a single cask from the Surry plant was opened. Subsequently, Surry was forced to open up several casks after a much shorter period of time because of inner seal failures.

Although the NRC reported that the condition of the fuel was found acceptable in those cases, there were signs of degradation. The casks studied were also repositioned between 1985 and 2001. The dose rate on the pad was 40-50% higher in the 2001 study results as compared to previous data results and was attributed to the repositioning of the casks. These inconsistencies in study design did not provide conclusive data either for the integrity of the casks or the condition of the irradiated nuclear fuel.⁹

Enclosed in our petition is a videotape (Point Beach Cask Event) showing a hydrogen burn incident at Point Beach in May 1996 with supportive documentation for your careful review.¹⁰ The videotape, provided by Union of Concerned Scientists, Nuclear Safety Project Director, David Lochbaum, and obtained from the NRC in response to a Freedom of Information Act request, demonstrates the critical need to require lab research to document dry cask aging. The build-up of the “white gobs” we witnessed in the videotape, produced from chemical reactions within the casks, will cause metal degradation at unknown rates and/or cause a blanket, preventing heat decay from flowing away from the enclosed irradiated fuel rods and causing a heat build-up inside the casks.¹⁰ A sampling of NRC-certified casks should be opened periodically and carefully studied for at least 60 years, as the NRC has permitted extensions of the 20 year dry cask licenses to 60 years. This sampling process is analogous to the metal specimens placed within reactor pressure vessels which are removed periodically and analyzed to compare to predicted material performance over time.

Unfortunately, the only known NRC study on dry casks, “The Dry Cask Storage Characterization Project” conducted at the Idaho National Engineering and Environmental Laboratory was discontinued after 2001 before the cask’s 20 year license expired. Funding was not prioritized for this study to continue. Therefore, there exists no comprehensive data on the performance of these casks for their entire 20 year license. The NRC has given extensions up to 60 years for these casks.¹¹

With regard to the storage casks themselves our main technical concerns are:

- failure of cask materials over long periods of time;
- the ability to observe and detect those failures as there is no active maintenance in place;
- difficulty assessing some materials of construction with respect to their long-term integrity in storage service;
- lack of formal aging-management program;
- lack of dose rate and heat monitoring for increased heat and radiation levels on the Independent Spent Fuel Storage Installations (ISFSI) or even for individual casks;
- vulnerability to weather-related deterioration and sabotage. Unlike the reactor vessel, as well as the spent fuel pool, irradiated nuclear fuel casks are outdoors in plain sight and not designed to withstand various terrorist attack scenarios. The casks are the only barrier between the highly-radioactive nuclear fuel, the public and the environment. In contrast, reactor vessels are within a containment building in a controlled

environment with a trained team of operators, inspectors and maintenance staff. ¹²As ISFSIs are clearly exposed and vulnerable, they must be hardened, not only against terrorist attacks but against environmental elements.

Therefore, the NRC must be required through a Petition for Rulemaking:

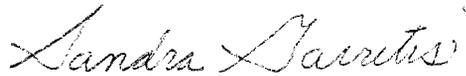
- 1) To require the NRC to prohibit non-conforming pre-built full scale casks specifically built for NRC certification testing from being put into production under industry pressure to “accept-as-is”.
- 2) To require that NRC certification of casks be based on upgraded code requirements which include design criteria and technical specifications for a 100 year minimum age related degradation timeframe, upgraded from the current inadequate 20 year design specification minimum. The NRC must also require an NRC regulatory and public review of an in-depth technical evaluation of the casks done at the 20 year CoC reapproval interval to effectively catch and address cask deterioration.
- 3) To require that the NRC approve as part of the original ISFSI certification process and construction license, a method for dry cask transfer capacity that will allow for immediate and safe maintenance on a faulty or failing cask. Dry cask stored irradiated fuel climbs to approximately 400 degrees Fahrenheit, while irradiated waste storage pool water is kept at 100 degrees Fahrenheit. Therefore, the reinsertion of dry casks in the wet pool and resultant steam flash is not only a risk to workers; it also thermally shocks the irradiated nuclear fuel rods themselves. The ability to do maintenance safely on deteriorating casks while protecting workers and avoiding a radioactive steam flash in the pool should be a regulatory priority. The ability and procedures to act promptly in an emergency situation and safely transfer spent fuel must be in NRC regulations.
- 4) To require that dry casks are qualified for transport at the time of on-site storage approval certification. Transport capacity for shipment off-site must be required in the event of a future environmental emergency or for matters of security to an alternative storage location or repository and must be part of the approval criteria. NRC Chapter 1 of the Standard Review Plan (NUREG-1567) should clearly define Part 72.122(i); 72.236(h); and in 72.236(m).
- 5) To require the most current ASME codes and standards be adopted for all containers without exception. The NRC should no longer issue “justifications and compensatory measures” for ASME codes or allow the industry to design or manufacture casks conforming to safety regulations merely to “the maximum extent practical” in lieu of the actual ASME Codes. These ASME codes should be enforced unconditionally, and without exceptions or exemptions.
- 6) To require ASME code stamping for fabrication. Code stamping would require the presence of an ASME certified Nuclear Inspector on-site at

the fabrication plant. These inspectors who would be independent of the vendor, fabricator and the NRC would be authorized to inspect at will.

- 7) To require that all materials for fabrication be supplied by ASME approved material suppliers who are certificate holders. If a non-certified supplier is used, material certification under NG/NF-2130 is not possible, which means that material traceability can not be achieved.
- 8) To require that current ASME Codes and standards for conservative heat treatment and leak tightness are adopted and enforced.
- 9) To require a safe and secure hot cell transfer station coupled with an auxiliary pool to be built as part of an upgraded ISFSI design certification and licensing process. The utility must have dry cask transfer capability for maintenance as well as emergency situations after decommissioning for as long as the spent fuel remains on-site. The NRC has to date not approved a dry cask transfer system.
- 10) To require real-time heat and radiation monitoring at ISFSIs at all nuclear power plant sites and away-from-reactor storage sites maintained by the utilities and the data transmitted in real-time to affected state health, safety and environmental regulators.¹³
- 11) To require Hardened On-Site Storage (HOSS) at all nuclear power plants as well as away-from-reactor dry cask storage sites: that all nuclear industry interim on-site or off-site dry cask storage installations or ISFSIs be fortified against attack. In addition all sites should be safeguarded against accident and age-related leakage. According to the National Academy of Sciences study “Safety and Security of Commercial Spent Nuclear Fuel Storage”, supported by grant number NRC-04-04-067 between the National Academies and the NRC, the NRC should upgrade the requirements in 10 CFR 72 for dry casks, specifically to improve their resistance to terrorist attacks. Also, Institute for Resource and Security Studies Director, Gordon Thompson stated; “the dry cask storage modules used at ISFSIs are not designed to resist attack. At all recently established ISFSIs in the USA, spent fuel is contained in metal canisters with a wall thickness of about 1.6 cm. Each canister is surrounded by a concrete overpack, but this over pack is penetrated by channels that allow cooling of the canister by convective flow of air. Attackers gaining access to an ISFSI could employ readily-available skills and explosives to penetrate a canister in a manner that allows free flow to spent fuel, and could use incendiary devices to initiate burning of fuel cladding, leading to a release of radioactive material to the atmosphere.”¹⁴
- 12) To establish funding to conduct on-going studies to provide the data required to accurately define and monitor for age-related material degradation, assess the structural integrity of the casks and fuel cladding in “interim” waste storage. It is vital to create the data for proactive assessment for the management of future damage and determine the design specifications for future irradiated nuclear waste storage.

Please give this Petition for Rulemaking your serious consideration.

Sincerely,



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- ¹ ASME- Code – Section III Division 3 (2007- addenda 2008) subsection WA-WC Class SC Storage Containments
- ² NRC SECY-06-0152 July 7, 2006 Rulemaking Issue, Luis A. Reyes.
- ³ Transnuclear Letter E-25967 to USNRC, ASME Code Alternative Request, Docket 72-1030, dated 12/27/07. *TN in coordination with Dominion submitted a request for exemption to the ASME Code requirement for the subject loaded DSC's dry storage casks, as well as five others not yet loaded.*
- ⁴ Thompson, Gordon, *Robust Storage of Spent Nuclear Fuel: A Neglected Issue of Homeland Security* (Cambridge, Massachusetts: Institute for Resource and Security Studies, January 2003).
- ⁵ Turula, P. Nupak, *New ASME Code for Radioactive Material Transportation Packaging Containments*, p.2
- ⁶ Federal Register: June 9 1998 (Vol. 63, Number 110) *Miscellaneous Changes to Licensing Requirements for the Independent Storage of Spent nuclear Fuel and High-Level Radioactive Waste*. Page 4.
- ⁷ Federal Register: June 9 1998 (Vol. 63, Number 110) *Miscellaneous Changes to Licensing Requirements for the Independent Storage of Spent nuclear Fuel and High-Level Radioactive Waste*. Page 4.
- ⁸ Nuhoms HD System Generic Technical Specifications, Ascension number ML 070160083, 2007-01-10, Section 4-3.
- ⁹ Dry Cask Storage Characterization Project – *Phase 1: CASTOR V/21 Cask Opening and Examination (Idaho National Engineering and Environmental Laboratory)*, NUREG/CR-6745, INEEL/EXT-01-00183, 1985, 1999, 2001.
- ¹⁰ NRC Information Notice 96-34: Hydrogen Gas Ignition During Closure Welding of a VSC-24 Multi-Assembly Sealed Basket, May 31, 1996: NEI Dry Cask Storage Workshop Held August 14, 1996 (workshop to provide utilities with lessons-learned relative to hydrogen ignition event of May 28th, 1996, at Point Beach Nuclear Plant). NRC Press Release “*NRC Staff Proposes \$325,000 Fine Against Wisconsin Electric Co For Violations of NRC Requirements At Point Beach Nuclear Plant*”, Dec. 4, 1996: Attachment to New Announcement RIII-96-72.
- ¹¹ NRC SECY-04-0175 Sept.28, 2004 *Options for Addressing the Surry Independent Spent Fuel Storage Installations License Renewal Period Exemption Request p.2-4.*

VR-SECY-04-0175 - Options for Addressing the Surry Independent Spent Fuel Storage Installation License-Renewal Period Exemption Request. Nov. 29, 2004, Chairman Diaz disapproves the staff's recommended option.

¹² Turula, P. Nupak *New ASME Code for Radioactive Material Transportation Packaging Containments* p.1-8. Paris Patram Conference, 2002

¹³ Federal Register: June 9 1998 (Vol.63, Number 110) *Miscellaneous Changes to Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste.* Page 4.

¹⁴ Gordon Thompson, *Assessing Risks of Potential Malicious Actions at Commercial Nuclear Facilities: A Case of a Proposed ISFSI at Diablo Canyon Site*, June 27, 2007 p. 34-40.

NUCLEAR REGULATORY COMMISSION

10 CFR Part 72

[Docket No. PRM-72-6; NRC-2008-0649]

Petition for Rulemaking Submitted by C-10 Research and Education Foundation, Inc.

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for Rulemaking; partial consideration in the rulemaking process.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC or the Commission) received a petition for rulemaking (PRM) dated November 24, 2008, filed by Ms. Sandra Gavutis, Executive Director for C-10 Research and Education Foundation Inc. (the petitioner). The petition was docketed by the NRC and assigned Docket No. PRM-72-6. The petitioner requests that the NRC amend its regulations concerning dry cask safety, security, transferability, and longevity. The petitioner made 12 requests. The NRC is denying nine of the petitioner's requests, but will consider one request in the rulemaking process. Action on two requests is being reserved for future rulemaking determinations, as these requests are currently under consideration by the NRC. The NRC will publish another *Federal Register* notice to inform the public of the

Commission's decision for these two requests. The docket for this PRM will remain open until action is taken on the two remaining requests.

ADDRESSES: Further NRC action on the issues raised by this petition can be found on the Federal rulemaking Web site at <http://www.regulations.gov> by searching on Docket ID NRC-2009-0558, which is the identification for the future rulemaking.

You can access publicly available documents related to the petition, which the NRC possesses and is publicly available, using the following methods:

- **Federal Rulemaking Web site.** Public comments and supporting materials related to this petition can be found at <http://www.regulations.gov> by searching on the petition Docket ID NRC-2008-0649 or the future rulemaking Docket ID NRC-2009-0558. Address questions about NRC dockets to Carol Gallagher; telephone: 301-492-3668; e-mail: Carol.Gallagher@nrc.gov.

- **NRC's Agencywide Documents Access and Management System (ADAMS):**
You may access publicly available documents online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced.

NRC's PDR: You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Jeffery Lynch, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-5041, e-mail: Jeffery.Lynch@nrc.gov.

SUPPLEMENTARY INFORMATION:

Background

On November 24, 2008, C-10 Research and Education Foundation Inc. filed a petition for rulemaking. The petition was docketed by the NRC and assigned Docket No. PRM-72-6. On March 3, 2009 (74 FR 9178), the NRC published a notice of receipt and request for comment for PRM-72-6.

The petitioner requested that the NRC amend Title 10 of the *Code of Federal Regulations* (10 CFR) Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste," to revise the NRC requirements for interim dry cask storage of spent fuel. Specifically, the petitioner requested that the NRC's regulations be amended to:

1) Require that the NRC prohibit non-conforming pre-built full-scale casks, specifically built for NRC certification testing, from being put into production under industry pressure to "accept-as-is."

2) Require that the NRC's certification of casks be based on upgraded code requirements, which include design criteria and technical specifications for a 100-year-minimum age-related degradation timeframe, upgraded from the current inadequate 20-year design specification. The NRC must also require an NRC regulatory and public review of an in-depth technical evaluation of the casks done at the 20-year certificate of compliance (CoC) reapproval interval to effectively catch and address cask deterioration.

3) Require that the NRC approve, as part of the original independent spent fuel storage installation (ISFSI) certification process and construction license, a method for dry cask transfer capacity that will allow for immediate and safe maintenance on a faulty or failing cask.

4) Require that dry casks are qualified for transport at the time of onsite storage approval certification.

5) Require the most current American Society of Mechanical Engineers (ASME) Codes and Standards be adopted for all spent fuel storage containers without exception.

6) Require ASME Code stamping for fabrication.

7) Require that all materials for fabrication be supplied by ASME-approved material suppliers who are certificate holders.

8) Require that current ASME Codes and Standards for conservative heat treatment and leak tightness are adopted and enforced.

9) Require a safe and secure hot cell transfer station coupled with an auxiliary pool to be built as part of an upgraded ISFSI design certification and licensing process.

10) Require real-time heat and radiation monitoring at ISFSIs at all nuclear power plant sites and away-from-reactor storage sites maintained by the utilities and that the monitoring data be transmitted in real-time to affected State health, safety, and environmental regulators.

11) Require "Hardened On-Site Storage" (HOSS) at all nuclear power plants as well as away-from-reactor dry cask storage sites, and that all nuclear industry interim on-site or off-site dry cask storage installations or ISFSIs be fortified against terrorist attack. In addition, all sites should be safeguarded against accident and age-related leakage.

12) Establish funding to conduct on-going studies to provide the data required to accurately define and monitor for age-related material degradation, assess the structural integrity of the casks and fuel cladding in "interim" waste storage.

While the NRC was considering the C-10 petition for rulemaking, it issued a draft technical basis for a future security rulemaking for ISFSIs and a final rule on terms and conditions for both ISFSI licenses and certificates of compliance. As described in the following paragraphs, some aspects of both of these actions are pertinent to the petitioner's requests.

On December 16, 2009 (74 FR 66589), the NRC published a notice of availability and solicitation of public comments for Draft Technical Basis for Rulemaking Revising Security Requirements for Facilities Storing Spent Nuclear Fuel and High-Level Waste. In this draft technical basis, the NRC describes the objectives, conceptual approaches, and potential solutions. The NRC staff expects that the rulemaking, when completed, will result in risk-informed, performance-based regulations, with both site-specific and generally licensed ISFSIs having consistent regulations. The NRC staff received comments on the draft regulatory basis from several stakeholders who were opposed, for different reasons, to the draft technical basis. For this reason, the NRC staff, in SECY-10-0114 (ADAMS Accession No. ML101880013) recommended that the schedule for the rulemaking effort be extended to allow the staff to further evaluate these comments and their implications. The Commission approved the NRC staff's recommendation in its staff requirements memorandum, SRM-SECY-10-0114 (ADAMS Accession No. ML103210025), and reaffirmed the direction for the ISFSI security rulemaking in SRM-SECY-07-0148 (ADAMS Accession No. ML073530119).

On February 16, 2011 (76 FR 8872), the NRC issued the Final Rulemaking "License and Certificate of Compliance (CoC) Terms." This rulemaking extended the duration of ISFSI licenses and storage cask CoCs to 40 years, clarified the difference between "renewal" versus "reapproval" terminology in 10 CFR Part 72, and codified the requirements for an aging management plan for both general and specific licensees.

Public Comments on the Petition

The notice of receipt for PRM-72-6 invited interested persons to submit comments. The comment period closed on May 18, 2009. The NRC received over nine thousand comments. Comments were received from industry, various non-governmental organizations, and members

of the public. The majority of the comments were identical (form) emails. The Nuclear Energy Institute (NEI) and the Strategic Teaming and Resource Sharing (STARS) organization opposed the petition. All other commenters, including the ASME and Berkeley Fellowship of Unitarian Universalists Social Justice Committee, supported the petition.

NEI Comments:

In its letter dated May 18, 2009 (ADAMS Accession No. ML091400073), the NEI stated that the current NRC regulations contained in 10 CFR Part 72 are sufficient to provide for the safe storage of spent nuclear fuel and that the NRC should deny the petition. The NEI made the following assertions:

1) Industry has safely maintained spent fuel storage pools for over 40 years and has successfully loaded and emplaced at ISFSIs over 1,000 dry cask storage systems at 47 locations over the past 25 years.

2) The additional requirements requested by the petitioner “go far beyond” the necessary regulation of existing dry-cask design technology and extend to dictating design changes that go beyond the NRC’s purview. The petitioner’s request that the NRC require a hot cell transfer station coupled with an auxiliary pool requirement is unnecessary for safety and costly for both the NRC and its regulated entities.

3) The petitioner’s request that the NRC specify design criteria and technical specifications for a 100-year minimum age-related degradation timeframe for dry cask storage certification is not appropriate, given that any renewals by the NRC would be based upon conditions that would require licensees to undertake an aging management program subject to NRC inspection.

4) There is no need for rulemaking regarding ASME Code requirements, because the NRC acknowledges in its “*Standard Review Plan for Dry Cask Storage Systems*”,

NUREG-1536 (ADAMS Accession No. ML010040237), that ASME Boiler and Pressure Vessel (B&PV) Code, Section III is an acceptable standard for the design and fabrication of spent fuel dry-storage casks. The NRC recognized in Spent Fuel Storage and Transportation Interim Staff Guidance 10, "Alternatives to the ASME Code," Revision 1 (ADAMS Accession No. ML003770459), that dry storage casks are not pressure vessels, and as such, ASME Code Section III cannot be implemented without allowing some exceptions to its requirements. The NRC, in NUREG-1567 (ADAMS Accession No. ML003686776), "Standard Review Plan for Spent Fuel Dry Storage Facilities," Section 16.4.1, has provisions for ISFSI licensees and applicants for a CoC to request exceptions from the ASME Code.

5) The petitioner's request that the NRC require real-time heat and radiation monitoring should be denied, because the current NRC regulations (i.e., 10 CFR 72.44) already contain requirements for the technical specifications to include monitoring instruments, surveillance requirements, and administrative controls.

6) There is no need for rulemaking with regard to security issues. The NRC relies on security assessments to ensure that the industry meets the relevant regulations (e.g., 10 CFR 72.212 and 10 CFR 73.55). Compliance with these existing regulations ensures that dry cask storage modules will be appropriately designed to resist terrorist attack.

7) There is no need for rulemaking to include funding to conduct effectiveness studies of age-related material degradation because the ISFSI license renewal contains license conditions addressing an aging management review program.

NRC Response:

As described in the response to Request 9, the NRC is still considering the request to require a hot cell transfer station for decommissioned reactor facilities. Therefore, at this time, the NRC does not agree with NEI that this request should be denied. Also as discussed in the

response to Requests 5 through 8, the NRC agrees with NEI that there is no need for rulemaking regarding ASME Code requirements and to include funding to conduct effectiveness studies of age-related material degradation.

The NRC also agrees that including design criteria and technical specifications for a 100-year minimum age-related degradation timeframe is not warranted. The updated ASME Code requirements do not include design criteria and technical specifications for a 100-year minimum age-related degradation timeframe. Furthermore, as discussed in response to petitioner Request 2, the NRC is evaluating material degradation and other issues for extended storage and transportation that might last beyond 100 years. The NRC is evaluating this in the context of SECY-11-0029, "Plan for the Long Term Update to the Waste Confidence Rule and Integration with the Extended Storage and Transportation Initiative" (ADAMS Accession Number ML110330445).

The NRC disagrees with NEI that the security assessments, by themselves, are sufficient to preclude the need for any rulemaking to enhance security at ISFSIs. As such, the NRC is considering Request 11, as part of the ongoing ISFSI security rulemaking effort.

STARS Comments:

In its letter dated May 18, 2009 (ADAMS Accession No. ML091410360), the STARS organization opposed the petition. It made the following assertions:

1) The proposed changes would impose significant additional costs on the NRC and the industry with no safety benefit.

2) The NRC should continue to allow exceptions to the ASME Code requirements for dry storage casks. This is consistent with other similar existing regulations that recognize the need for exceptions and alternatives to the ASME Code. Because dry storage casks are not pressure

vessels, it is virtually impossible to implement the ASME Code without allowing exceptions to some of the requirements.

3) There is no need for rulemaking to include funding to conduct effectiveness studies of age-related material degradation. As part of an NRC research program, a dry storage cask from the ISFSI at the Surry Power Station was opened at the Idaho National Engineering Laboratory after the fuel had been stored approximately 15 years. The findings confirmed the condition of the fuel to be acceptable during the 15-year storage period (SECY-09-0069, Proposed Rule: 10 CFR Part 72 License and Certificate of Compliance Terms (RIN 3150-AI09), ADAMS Package Accession No. ML090610154).

NRC Response:

Regarding the STARS comments, the NRC agrees that ASME Code exceptions should continue to be allowed as discussed in the NRC response to Requests 5 through 8. As stated in the response to the petitioner's Request 12, rulemaking is not the appropriate mechanism for establishing funding for conducting research. With regard to materials aging studies, the NRC has cooperated with other interested agencies and is participating in the Electric Power Research Institute Extended Storage Collaboration Program.

ASME Comments:

In its letter dated May 5, 2009 (ADAMS Accession No. ML091260362), the ASME supported the NRC's full endorsement of the ASME B&PV Code, Section III, Division 3, "Containments for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Waste." The ASME stated that all five of the petitioner's requests that make specific reference to the ASME Codes and Standards would be resolved by the NRC's full

endorsement of the ASME Code because it includes the latest edition and addenda of the Code, code stamping, materials and fabrication and testing.

NRC Response:

The NRC staff is reviewing the ASME B&PV Code, Section III, Division 3 for endorsement. If endorsed, the staff intends to develop guidance for licensees and vendors to use in future design and fabrication of dry storage casks.

Other Comments:

In a comment dated on May 4, 2009 (ADAMS Accession No. ML091250353), the Berkeley Fellowship of Unitarian Universalists Social Justice Committee supported rulemaking to strengthen the NRC quality assurance rules on the design and manufacture of dry casks. All other comments were submitted in a standard form letter. These comments requested: 1) HOSS requirements at all nuclear power plants, as well as away-from-reactor dry cask storage sites; and 2) that nuclear power facilities be required to promptly transfer spent fuel from the pools to dry casks. Approximately 100 comments included additional information that fell outside the scope of rulemaking, and were not considered in this PRM.

NRC Response:

Regarding comments about HOSS requirements at all nuclear power plants, as well as away-from-reactor dry cask storage sites, as discussed in the response to petitioner's Request 11, the NRC agrees that HOSS requirements at nuclear power plants should be considered in a future rulemaking. With regard to comments regarding a requirement that nuclear power facilities promptly transfer spent fuel from the pools to dry casks, as discussed in the response

to petitioner's Request 3 the NRC disagrees, because storage in both spent fuel pools and dry casks are safe and secure modes of storing spent fuel.

Petition Resolution

For the reasons discussed in this section, the NRC is considering this petition in part, denying it in part, and reserving it in part for a future rulemaking determination. The NRC is denying the petitioner's Requests 1, 2, 3, 5 through 8, 10, and 12, as listed in the Background section of this document, because the petitioner has not provided new and significant information that would warrant the NRC revising its regulations. Request 11 will be considered, as part of the ongoing ISFSI security rulemaking effort (Docket ID NRC-2009-0558). In this section, the description of each request being denied, reserved for future rulemaking determination, and considered in future rulemaking is summarized immediately before the NRC response.

Action on Requests 4 and 9 are reserved for future rulemaking determinations. Request 4, which requested that the NRC require that dry casks are qualified for transport at the time of onsite storage approval certification, is being evaluated as part of COMSECY-10-0007, "Project Plan for the Regulatory Program Review to Support Extended Storage and Transportation of Spent Nuclear Fuel" (ADAMS Accession No. ML101390413). The staff identified storage and transportation compatibility as a potential policy issue in COMSECY-10-0007, Enclosure 1, Appendix A, "Project Plan for the Extended Storage and Transportation Regulatory Program Review," (ADAMS Accession No. ML101390426).

Request 9, which requested that the NRC require a safe and secure hot cell transfer station coupled with an auxiliary pool as part of an upgraded ISFSI design certification and licensing process, is still being evaluated by staff. Additionally, as discussed in Section 3.1 of

Enclosure 1 of COMSECY-10-0007, research is needed to develop the safety basis for the behavior of high burnup fuel during extended storage periods. Whether the fuel retains sufficient structural integrity for extended storage and eventual transportation may affect whether the NRC would require dry transfer capability at decommissioned reactors storing high burnup fuel.

The docket for PRM-72-6 will remain open and consist of the petitioner's Requests 4 and 9. Once the Commission takes action on the two remaining requests, the NRC will publish another document in the *Federal Register* to give notice of the Commission's decision.

Petitioner Request 1: Prohibit non-conforming pre-built full-scale casks, specifically built for NRC certification testing, from being put into production under industry pressure to "accept-as-is."

NRC Response: The NRC is denying the petitioner's Request 1. The NRC's regulations provide that only those casks that have been approved under the procedures of Subpart L, 10 CFR Part 72 and subsequently listed in § 72.214, "List of Approved Spent Fuel Storage Casks," may be used under a 10 CFR Part 72 general license.¹ The NRC is not aware of, nor did the petition state where any non-conforming, pre-built, full-scale casks were placed into service.

The NRC requires in 10 CFR 72.170, "Nonconforming materials, parts, or components", that storage cask vendors/fabricators establish measures to control materials, parts, or components that do not conform to their requirements in order to prevent their inadvertent use or installation, that includes procedures for identification, documentation, segregation, disposition, and notification to affected organizations. Non-conforming items must be reviewed and accepted, rejected or reworked in accordance with documented procedures. Prior to

¹ The CoC holder or its contractor fabricates dry storage casks in accordance with the CoC and sells them to 10 CFR Part 72 general licensees, who are nuclear power plant operators.

nonconforming parts being used in a storage cask that is placed into service, the certificate holder/fabricator must perform a review under 10 CFR 72.48 to ensure that its use will not affect the ability of the storage cask to safely store spent fuel. The NRC will perform a safety review of any non-conformances in response to requests for a certificate or license amendment. In addition, 10 CFR 72.122 requires both general and specific licensees to design, fabricate, test and erect structures, systems and components that are important to safety to quality standards that are commensurate with its importance to safety.

Also, the NRC inspection program confirms that non-conforming casks and materials are not placed into service. This inspection program is designed to confirm that fabrication activities are performed in accordance with the requirements in 10 CFR Part 72, the applicable CoC, the Safety Analysis Report, and the CoC holder's NRC-approved Quality Assurance program. Both CoC holders and general licensees are periodically inspected in accordance with the NRC's inspection program. The petitioner did not provide any new or significant information indicating that any storage casks have been loaded and placed on a storage pad that does not conform to the design approved by the NRC. Accordingly, for the reasons previously discussed, the NRC is denying this request.

Petitioner Request 2 – Require that NRC certification of casks be based on upgraded code requirements, which include design criteria and technical specifications for a 100-year-minimum age-related degradation timeframe, upgraded from the current inadequate 20-year design specification. Also, require an NRC regulatory and public review of an in-depth technical evaluation of the casks done at the 20-year CoC reapproval interval to effectively catch and address cask deterioration.

The petitioner asserted that the federal government has not created a permanent high-level radioactive waste repository and States will inherit the responsibility of high-level, on-site nuclear waste storage for an indefinite period of time. In addition, the petitioner asserted that in

proposing to revise the Waste Confidence Decision (73 FR 59551, November 9, 2008), the NRC has effectively stated that there is no deadline for the Federal Government to take title to the spent fuel and remove it from its point of origin at the nuclear power facilities. The petitioner stated that casks are designed to meet criteria and technical specifications for certification for a 20-year interval while onsite storage is for an indeterminable timeframe.

The petitioner noted that the NRC has not upgraded design specifications to the current ASME Code. The petitioner requested that NRC require all storage casks be designed and built to the latest version of the ASME B&PV Code which, according to the petitioner, includes a requirement that storage cask designs be designed for a minimum of 100-years, as opposed to the 20-year interval for licenses and CoCs. Note that since the petitioner submitted its request, the NRC extended the 20-year duration for licenses and CoCs to 40 years in the Final Rulemaking entitled "License and Certificate of Compliance Terms" (76 FR 8872, February 16, 2011) and issued a Waste Confidence Decision Update (75 FR 81037, December 23, 2010).

Additionally, the petitioner stated that the regulations for storage of spent fuel are unclear on the specific NRC requirements to "renew" or "reapprove" storage CoCs. The petitioner stated that an application for "reapproval," as used in 10 CFR 72.240, "Conditions for Spent Fuel Storage Cask Reapproval," implies that the NRC would reevaluate the original cask design basis using current review standards and regulatory requirements prior to extending the 20-year CoC expiration date. The petitioner also asserted that under Section 72.42, "Duration of License; Renewal," use of the word "renewal" implies that the design requirements remain the same as the original cask design basis, and the expiration date is extended. Additionally, the petitioner contends that the NRC has not addressed the regulatory requirements needed to extend a license for multiple cask designs with different expiration dates at the same ISFSI.

The petitioner asserted that the NRC must require an in-depth technical review of the cask design basis at the 20-year reapproval period to catch and address cask deterioration.

The petitioner stated that there is a lack of regulatory requirements to address the extension of CoCs from 20 years to 60 years and that CoCs are being extended without the technical data, regulatory evaluation, or scrutiny to protect the public health and safety. Specifically, there is limited data to determine the extent of degradation of storage casks and the spent fuel it contains. The petitioner cited “The Dry Cask Storage Characterization Project,” a study jointly funded by the NRC, the Electric Power Research Institute, and the U.S. Department of Energy that is detailed in NUREG/CR-6831 (ADAMS Accession No. ML032731021), “Examination of Spent PWR Fuel Rods after 15 Years in Dry Storage” and NUREG/CR-6745, “Dry Cask Storage Characterization Project—Phase 1: Castor V/21 Cask Examination and Opening” (ADAMS Accession No. ML013020363). The petitioner also refers to the opening of, subsequent to this study, several storage casks at the Surry ISFSI due to inner seal failures. These casks were opened after a shorter storage duration than the cask opened in the study. The petitioner stated that although the spent fuel in these cases was found acceptable, there were signs of degradation, and therefore, there is no conclusive data for integrity of casks or the condition of the nuclear fuel.

NRC Response: The NRC is denying the petitioner’s Request 2. With respect to the request that the NRC incorporate the latest version of the ASME B&PV Code in its regulations, the NRC has determined that amending its regulations to incorporate the latest versions of the AMSE B&PV Code is not necessary to ensure that adequate codes and standards are applied for the material selection, fabrication, design, examination, and testing of dry cask storage systems. As stated in the NRC’s standard review plans for spent fuel storage, NUREG-1536 and NUREG-1567, the NRC staff reviews ISFSI and storage cask designs to verify that they incorporate appropriate national codes and standards, in order to comply with NRC regulations. Storage casks approved by the NRC are designed and fabricated to the ASME B&PV Code, Section III, Division 1 for steel confinements and Division 2 for concrete containments. While

Section III, Division 3 of the ASME B&PV Code has been specifically written by ASME for containment systems for spent fuel transportation packages and storage casks, it has not been endorsed by the NRC. The NRC staff is reviewing ASME Code Section III, Division 3 and if endorsed, the NRC staff intends to develop guidance for its use in future fabrication of dry storage casks. In addition, with regard to the ASME Code, the petitioner stated that the code includes a requirement that storage cask designs be designed for a minimum of 100-years. A 100-year minimum age-related degradation requirement, however, is not in the ASME B&PV Code.

With respect to the petitioner's request that the NRC perform a complete review of the design basis for a storage cask prior to extending the expiration date of a storage cask's certificate of compliance, the NRC addressed some of the petitioners concerns regarding aging management in the February 2011 Final Rulemaking, "License and Certificate of Compliance Terms" (76 FR 8872).

With respect to the petitioner's assertions regarding "reapproval" and "renewal," the NRC determined in the February 2011 Final Rulemaking (76 FR 8872) that the 40-year duration, with renewals that include aging management plans, is the appropriate duration for licenses and CoCs for spent fuel storage casks. In addition, the NRC clarified the difference between "renewal" versus "reapproval" terminology and codified the requirements for an aging management plan for both general and specific licensees. Additionally, the NRC stated in the July 18, 1999, Final Rulemaking, "Storage of Spent Fuel in NRC-Approved Storage Casks at Power Reactor Sites" (55 FR 29184), that it did not intend to use the term reapproval to mean that all the initial design bases were reviewed and reapproved prior to extending a CoC expiration date. Additionally, this rulemaking included requirements for an aging management plan for both general and specific licensees. Along with the rulemaking, the NRC issued NUREG-1927, "Standard Review Plan for Renewal of Spent Fuel Dry Cask Storage System

Licenses and Certificates of Compliance” (ADAMS Accession No. ML100350309), to provide staff guidance on reviewing renewal requests for ISFSI licenses and spent fuel storage cask certificates of compliance.

With respect to the petitioner’s assertions regarding degradation of the storage cask and fuel, the NRC addressed aging and potential degradation mechanisms of spent fuel in storage casks in the February 2011 rulemaking (76 FR 8872). In that rulemaking, the NRC stated that, based on the research performed at Idaho National Laboratory and described in NUREG/CR-6381, the NRC expects very little, to no, degradation of the spent fuel or cask internals at the end of an extended storage period up to 60 years. Finally, in SECY-11-0029, “Plan for the Long Term Update to the Waste Confidence Rule and Integration with the Extended Storage and Transportation Initiative [EST]” (ADAMS Package Accession No. ML110330445), the NRC staff described the work that will be done to identify and resolve any regulatory and/or technical gaps that may exist for application of current regulations to longer periods of extended storage. The NRC staff will provide the public with an opportunity to comment on the draft gap assessment report, and will treat the current petition request as a public comment on this activity. As described in SECY-11-0029, the NRC staff will evaluate the need for rulemaking to address any gaps that are identified for extended storage and transportation.

Petitioner Request 3: Require that the NRC approve, as part of the original ISFSI certification process and construction license, a method for dry cask transfer capacity that will allow for immediate and safe maintenance on a faulty or failing cask. The temperature of the fuel inside a dry storage cask may reach 400 degrees Fahrenheit, while irradiated waste storage pool water is kept at 100 degrees Fahrenheit. Reinsertion of the canister into the pool and resultant steam flash is a risk to workers, and would thermally shock the fuel rods, potentially damaging the fuel assemblies.

NRC Response: The NRC is denying the petitioner's Request 3. Dry cask storage systems are designed to be robust, and operating experience indicates that they have been safely used to store fuel for over 20 years. Additionally, pursuant to 10 CFR 72.236(h), "Specific Requirements for Spent Fuel Storage Cask Approval and Fabrication," the applicant must ensure that the spent fuel storage cask is compatible with wet or dry spent fuel loading and unloading facilities. As described in NUREG-1536, a reflood analysis can be used to show that the thermally induced stresses on fuel rods are not sufficient to damage the rods. The typical operating procedure introduces water into the canister at a very low flow rate. This flow rate allows the steam that forms at the bottom of the canister, well below the active fuel length, to cool the fuel as a vapor to reduce the thermal-induced stresses on the fuel. When the bottom portion of the canister is sufficiently cool for the water level to rise to the active fuel, the rate at which the water level rises is sufficient to cool the fuel rods without causing thermal stresses that would damage the fuel. These operating procedures allow maintenance to be performed safely without undue risk to workers or the public. The petitioner did not provide any new or significant information to indicate that spent fuel assemblies would be damaged if placed back into the spent fuel pool or that existing requirements do not adequately address worker safety.

Petitioner Requests 5 through 8: Require the most current ASME Codes and Standards be adopted for all spent fuel storage containers without exception; require ASME Code stamping for fabrication; require that all fabrication materials be supplied by ASME-approved material suppliers who are certificate holders; and require that the current ASME Codes and Standards for conservative heat treatment and leak tightness be adopted and enforced.

The petitioner asserted that design criteria in material dedication cannot meet the quality assurance requirements in 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," without full adherence to ASME B&PV Code and NCA 3800 of the ASME Code, which includes ASME Code stamping.

Additionally the petitioner stated that 10 CFR 72.122(a) and 10 CFR 72.234(b) require that structures, systems and components important to safety be designed, fabricated, and tested to quality standards commensurate with the importance of the function performed. However, the petitioner asserted that the NRC has not updated its use of the ASME B&PV Code and grants the utilities and their vendors numerous exemptions. The petitioner stated that while the NRC allows exemptions to vendors by justifying vendor compliance to “merely the maximum extent possible,” the NRC simultaneously cites vendors and manufacturers with numerous violations and then approves repeated corrective actions, which has resulted in dry cask design, fabrication and performance issues remaining unresolved. The petitioner stated that the NRC should not issue “justifications and compensatory measures” for ASME codes or allow conformance with safety regulations “to the extent practical.” The petitioner asserted that the ASME codes should be enforced unconditionally, without exception or exemption.

The petitioner cited an example request from a dry cask storage vendor seeking exemptions to certain portions of the ASME Code and a set of technical specifications that the NRC issued for a storage cask that states “The 32PTH DSC is designed, fabricated and inspected to the maximum practical extent in accordance with ASME B&PV, Code Section III, Division 1, 1998 Edition with Addenda through 2000, Subsections NB, NF, and NG for Class 1 components and supports. Code alternatives are discussed in 4.4.4.” Although the petitioner referenced Section 4.3 of the technical specifications, the NRC believes the petitioner meant Section 4.4, which provides the codes and standards that apply to this particular storage cask.

NRC Response: The NRC is denying the petitioner’s Requests 5 through 8, because the NRC has determined that revising the regulations is not the most effective or efficient method to adopt the ASME Code for the design and fabrication of spent fuel dry storage casks. As stated in NUREG-1567, the industry has adopted, and the NRC has accepted, ASME Code Section III, Division 1 and Division 2 as acceptable standards for the design and fabrication of

dry storage casks. It is expressly understood, by the NRC and industry, however, that dry storage casks are not pressure vessels and, as such, ASME Code Section III could not be implemented without allowing some exceptions to its requirements. Therefore, the NRC allows specific exceptions to the code for those requirements that are not applicable or practical to implement for spent fuel dry cask storage systems. Further, the petitioner asserted that adherence to ASME B&PV Code and NCA 3800 of the ASME Code is required to meet the quality assurance requirements in 10 CFR Part 50, Appendix B. Storage casks are not, however, required by the NRC's regulations to meet the requirements of 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

The NRC staff is reviewing ASME Section III, Division 3, "Containments for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Waste" for endorsement. If endorsed, the staff intends to develop guidance for use in future fabrication of dry storage casks.

Petitioner Request 10: Require real-time heat and radiation monitoring at ISFSIs at all nuclear power plant sites and away-from-reactor storage sites maintained by the utilities and that the monitoring data be transmitted in real-time to affected State health, safety, and environmental regulators.

The petitioner referenced a paper from PATRAM '98: 12th International Conference on the Packaging and Transportation of Radioactive Materials, written by a non-NRC employee asserting that the NRC has declared that a storage cask shares the same class of importance to safety (Class 1 in ASME Code Section III terminology) as a reactor vessel, yet an NRC proposed rule regarding miscellaneous changes to 10 CFR Part 72 (63 FR 31364, June 9, 1998), states that NRC distinguishes between wet and dry storage requirements. The petitioner stated in that rulemaking, the NRC chose not to require control systems for dry cask storage systems at ISFSIs.

The petitioner also stated that another example showing the differentiation between wet and dry storage is that the NRC does not require a method for licensees to provide positive means to verify that solid neutron absorbing materials have continued efficacy after being placed in an inert environment in dry storage. The petitioner stated that the NRC regulations in 10 CFR 72.124(b) provide that for dry storage, in lieu of a positive means to test for continued efficacy, a demonstration that solid neutron absorbing materials do not undergo significant degradation during storage is sufficient. The petitioner further asserted that the Point Beach incident in May 1996, the evidence provided from the Surry reactor's inner seal failures, and the NRC reports of salt-water air corrosiveness at seacoast reactors are proof that the assumption that the corrosive environment that is present in wet storage is not present during dry storage is invalid.

The petitioner also stated that the NRC has determined that it is not practical to penetrate the integrity of storage casks to measure the efficacy of neutron absorbing materials. Finally, the petitioner states that NRC regulations do not require adequate technical radiation and heat monitoring data to protect nuclear workers, assure public safety and provide for future cask fabrication, material specifications and performance analysis.

NRC Response: The NRC is denying the petitioner's Request 10, because regular monitoring for radiation at and near ISFSIs is currently required by § 72.44(d)(2) for specific licensees, with reporting required at 12-month intervals as specified in § 72.44(d)(3), and similarly for general licensees in 10 CFR 50.36(a)(2). There have not been any instances of measurable radiation doses from ISFSIs at the site boundaries. The storage cask technical specifications require that concrete storage casks with vents for natural convection provide cooling to the canister and have temperature-monitoring devices or periodic visual monitoring to ensure that the inlet and outlet vents are free of blockage that would inhibit convective airflow.

The applicant demonstrates performance of the thermal design and thermal limits through analyses during the certification and licensing process. The cask systems are also periodically examined by the licensee to verify there are no adverse conditions that would impede thermal performance. Given the surveillance, monitoring, and inspection programs, the risk of immediate failure or emergency is remote. The NRC staff has determined that the current regulatory requirements provide adequate protection of public health and safety and the environment.

While the petitioner referenced a proposed rule, the final rule (64 FR 33178, June 22, 1999), revised the regulations for continuous monitoring of the dry storage confinement system to allow periodic monitoring consistent with the storage cask design requirements and to require that instrumentation systems for dry storage casks be provided in accordance with cask design requirements. In the rulemaking, the NRC determined that continuous, uninterrupted control systems and monitoring are required for wet storage systems that have active heat removal and other active systems, whose safety depends on the continued operation of these systems. Dry storage casks, whose safety solely relies on passive heat removal, do not require continuous, uninterrupted control systems and monitoring as wet storage does. The NRC revised the rules in §§ 72.122(h)(4) and (i) to require monitoring and instrumentation systems that are consistent with the storage cask design basis.

Finally, the examples that the petitioner cited, the Point Beach hydrogen gas ignition event, Surry seal failure, and potential degradation due to salt water environment, all occurred where air was present and not in an inert environment like the inside of a canister. The NRC is unaware of any degradation mechanism that would occur inside of an inert, sealed canister after being placed on the storage pad that would require licensees to open a storage canister and positively verify the neutron poison's efficacy.

Petitioner Request 11: Require HOSS at all nuclear power plants as well as away-from-reactor dry cask storage sites; and that all nuclear industry interim on-site or off-site dry cask storage installations or ISFSIs be fortified against terrorist attack. In addition, all sites should be safeguarded against accident and age-related leakage.

NRC Response: The NRC concludes that the petitioner's Request 11 warrants consideration in rulemaking. It will be considered as part of the NRC's effort to revise the security requirements for ISFSIs and monitored retrievable storage (MRSs) installations. The Commission has directed the NRC staff to update the security requirements for ISFSIs and MRSs (SRM-SECY-10-0114 and SRM-SECY-07-0148 – ADAMS Accession No. ML103210025 and ML073530119 respectively). Further information regarding NRC action on petitioner Request 11 will be available at <http://www.regulations.gov> by searching on Docket ID NRC-2009-0558.

Petitioner Request 12: Establish funding to conduct on-going studies to provide the data required to accurately define and monitor for age-related material degradation, assess the structural integrity of the casks and fuel cladding in "interim" waste storage.

NRC Response: The NRC is denying the petitioner's Request 12 because rulemaking is not the appropriate mechanism for establishing funding for conducting research. The NRC has cooperated with other interested agencies to support materials aging studies, and is participating in an Electric Power Research Institute program that evaluates materials aging issues.

Conclusion

For the reasons previously discussed, the NRC is denying nine of the petitioner's requests (Requests 1, 2, 3, 5 through 8, 10, and 12), will consider one request in the rulemaking process (Request 11), and is deferring action on two requests (Requests 4 and 9). The docket for PRM-72-6 will remain open until the Commission acts, at which time the NRC will publish another document in the *Federal Register* to notice the Commission's decision.

Dated at Rockville, Maryland, this _____ day of _____, 2012

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

Ms. Sandra Gavutis
Executive Director, C-10 Research
and Education Foundation, Inc.
44 Merrimac Street
Newburyport, MA 01950

Dear Ms. Gavutis:

I am responding to your petition for rulemaking (PRM) submitted to the U.S. Nuclear Regulatory Commission (NRC) on behalf of the C-10 Research and Education Foundation, Inc., dated November 28, 2008. Your petition was docketed as PRM-72-6 and requested that the NRC amend its regulations to ensure dry cask safety, security, transferability, and longevity. The notice of receipt of the petition was published in the *Federal Register* on March 3, 2009 (74 FR 9178). The comment period closed on May 18, 2009. Over nine thousand comments were received.

The NRC has considered the petition, your supporting rationale, and the public comments received. For the reasons provided in the enclosed *Federal Register* notice, your petition for rulemaking will be considered in part, denied in part, and reserved in part for future determination.

The NRC will consider your request to require Hardened On-Site Storage at all nuclear power plants as well as away-from-reactor dry cask storage sites as part of a rulemaking effort to update security requirements for ISFSIs and Monitored Retrievable Storage. Further information on this rulemaking may be tracked by going to <http://www.regulations.gov> and searching under Docket ID NRC-2009-0558 (RIN 3150-AI78). As in all rulemakings, the NRC will solicit and consider public comments during the proposed rule phase of the rulemaking before determining the approach that will be the basis for the final rule.

The NRC is reserving for future rulemaking determinations the two requests described below:

1. To require that dry casks are qualified for transport at the time of onsite storage approval certification.
2. To require a safe and secure hot cell transfer station coupled with an auxiliary pool to be built as part of an upgraded independent spent fuel storage installation (ISFSI) design certification and licensing process.

After Commission consideration in the future, these two requests will either be considered for rulemaking or will be denied. The docket for PRM-72-6 will remain open until the NRC determines the appropriate action on these items. You will be informed of the NRC's decision on these two requests in a subsequent letter and *Federal Register* notice.

S. Gavutis

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The NRC is denying the remainder of your PRM requests. Please see the enclosed *Federal Register* notice for the basis of denial for each of the remaining requests. The *Federal Register* notice considering in part, denying in part, and reserving in part for future consideration your petition is being transmitted to the Office of the Federal Register for publication.

You may also find the most current information on Rules at <http://www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/rulemaking-dockets/index.html> and the most current information on PRMs at <http://www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/petitions-by-year.html>.

Sincerely,

Annette L. Vietti-Cook
Secretary of the Commission

Enclosure:
Federal Register notice