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

PRM-72-6

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.

<u>ASME Code Compliance Essential</u>
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

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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.

<u>Lack of Vendor Compliance</u>
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.

<u>Inadequate Long-Term Research Study Requirement</u>
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. [12]As 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.**

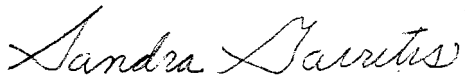
10) **To require real-time heat and radiation monitoring at ISFSIs at all nuclear power plant sites and away-from-reactor storage sites maintained by the utilities and the data transmitted in real-time to affected state health, safety and environmental regulators.** [13]

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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Cited Sources

[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, dated12/27/07. *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.**