

February 17, 2022

NRC Public Meeting

Approaches to Addressing  
Tornado Hazards during ISFSI  
Operations

NMSS/DFM



# AGENDA

- Introduction
- Background on Oversight of ISFSI Operations
- Review of VLSSIR Screening Process
- Regulatory Requirements and Licensing Basis
- Safety Significance Considerations
- Proposed Next Steps

# INTRODUCTION

- Purpose:

- To provide a summary of the staff's review of this issue to date and discuss the regulatory requirements associated with tornado hazards.
- Continue to engage the industry on the process used by general licensee for reviewing and evaluating the CoC holder differences in various spent fuel storage systems such as new lifting equipment or the addition of administrative controls.
- Discuss the staff recommended path forward.

- Desired Outcome:

- Establish a common understanding on a pathway to resolve this issue in the most resource effective manner for both NRC and industry that ensures continued safety during ISFSI operations.

# Background on Oversight of ISFSI Operations

- During oversight of ISFSI Operations, inspectors observed occurrences when general licensees were outside the bounds of the final safety analysis reports (FSARs) listed in the vendor's Certificate of Compliance for the Dry Cask Storage System. These occurred when the general licensees included the use of different components and configurations as those described in FSAR.
- The inspection staff documented these issues in several inspection reports. For example, a general licensee used a different ancillary piece of equipment to move the canister to the ISFSI pad than the piece of equipment described in the FSAR without performing an evaluation.

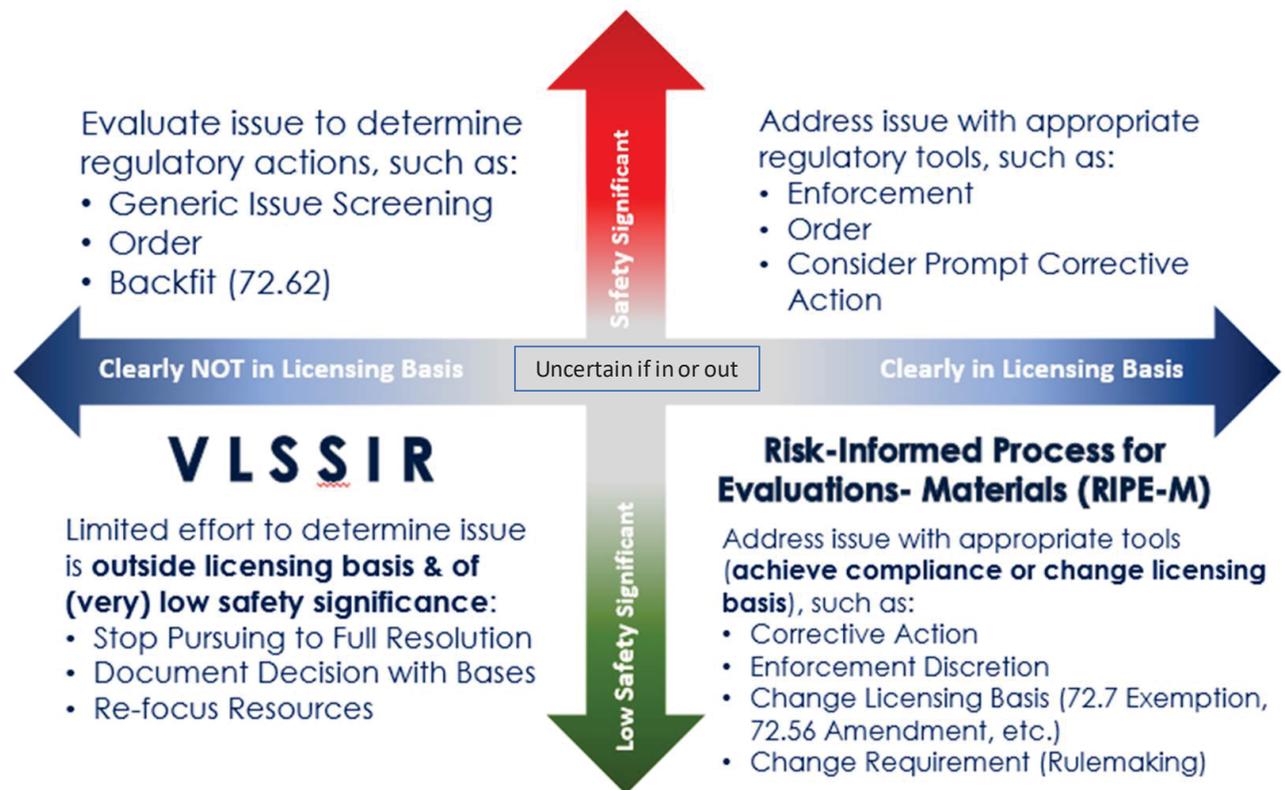
## Background on Oversight of ISFSI Operations (cont.)

- A Public workshop held on November 9, 2021 (ML21342A221), so that the staff could hear the industry's perspective on the potential issues associated with tornado hazards on dry fuel storage systems during handling operations.
- NEI suggested to the staff that the NRC adopt the application of the Very Low Safety Significance Issue Resolution (VLSSIR) process to reach a documented resolution on this issue.

# Overview of VLSSIR Screening Process

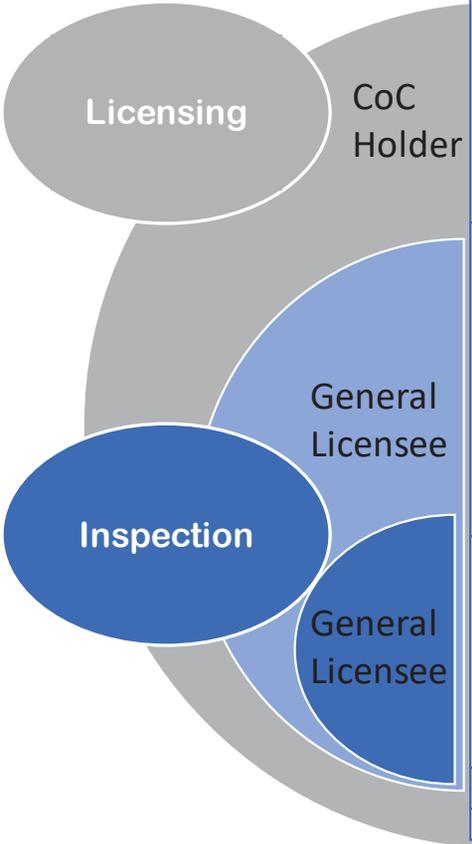
- **Licensing Basis**

- **Safety Significance**



# Regulatory Requirements and Licensing Basis

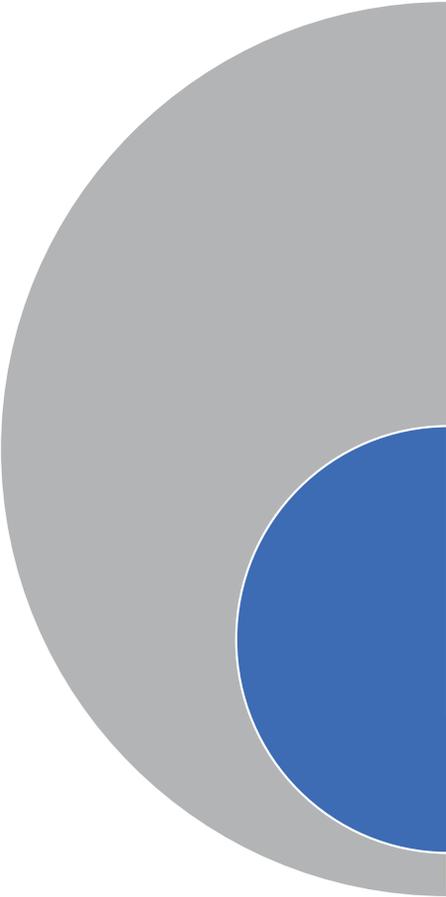
10 CFR 72.13, "Applicability"



CoC Holder	10 CFR 72.236 (l) The spent fuel storage cask and its systems important to safety must be evaluated, by appropriate tests or by other means acceptable to the NRC, to demonstrate that they will reasonably maintain confinement of radioactive material <b>under normal, off-normal, and credible accident conditions.</b>
General Licensee	10 CFR 72.122 (b) <i>Protection against environmental conditions and natural phenomena.</i> (1) Structures, systems, and components (SSCs) important to safety (ITS) must be designed to accommodate the effects of, and to be compatible with, site characteristics and environmental conditions associated with normal operation, maintenance, and testing of the ISFSI or MRS and to withstand postulated accidents. (2) SSCs ITS must be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, lighting, hurricanes, floods, tsunami, and seiches, without impairing their capability to perform safety functions.
General Licensee	10 CFR 72.212(b)(6) Review the Safety Analysis Report referenced in the CoC or amended CoC and the related NRC Safety Evaluation Report, prior to use of the general license, to determine whether or not the reactor site parameters, including analyses of earthquake intensity and tornado missiles, are enveloped by the cask design bases considered in these reports. The results of this review must be documented in the evaluation made in paragraph (b)(5) of this section.

10 CFR 72.48, "Changes, Tests, and Experiments"

# Regulatory Requirements - Statements of Considerations



**10 CFR 72.122 (b) Protection against environmental conditions and natural phenomena.** The explanation of the exemption for tornado missiles, set out in the preamble of the existing rule (45 FR 74693, November 12, 1980) states that radionuclide releases from spent fuel which has undergone at least a year of radioactive decay would not be significant in the event of tornado missile impact, citing an accident evaluation from NUREG-0575 "Generic Environmental Impact Statement on Handling and Storage of Spent Light Water Power Reactor Fuels" with gaseous radionuclide releases from water pool storage. With the continuing development of dry storage technologies, which include metal casks, concrete silos, dry wells, and air-cooled vaults, the Commission decided the designs should take into account tornado missile protection, unless it is shown that tornado missiles will not have any effect on structures, systems and components important to safety. While offsite gaseous release impacts from fuel rod rupture due to a tornado missile incident would remain insignificant, **it is important to assure that design criteria for dry storage designs continue to address maintaining confinement of particulate material. All safety reviews for storage licensed under Part 72, both water pool and dry storage, have evaluated designs with respect to tornado missile impact. Since safety considerations drive the concern with respect to the tornado missile phenomenon, it is not necessary to expand that concern beyond "structures, systems, and components important to safety."** [Final SOCs – 53 FR 31658, Aug 19, 1988]

# Safety Significance Considerations

- Addressing the issue requires an appropriate characterization of the risk. The staff's determination of the safety significance is ongoing due to unique circumstances at each site, the result of the risk will provide insights to the decision-making process regarding the appropriate regulatory pathway.
- The staff acknowledges that there are a variety of ways to address the safety significance of the issue (e.g., through a detailed qualitative or quantitative assessment by the NRC or industry).

# Safety Significance Considerations (cont.)

Risk Analysis

Defense-in-  
Depth

Safety  
Margins

Risk Insights  
from  
Operating  
Experience

## Proposed Next Steps – Current NRC Guidance and Processes

- Changes made to NEI 12-04 and endorsed in Regulatory Guide 3.72, “Guidance for Implementation of 10 CFR 72.48, Changes, Tests, and Experiments,” Rev. 1.
- Consider revision or supplement of Regulatory Issue Summary (RIS) 2015-06, “NRC Regulatory Issue Summary 2015-06 Tornado Missile Protection” to include more examples on ISFSI related findings and additional guidance on tornado hazards for ISFSI operations.
- Consider Enforcement Guidance Memorandum (EGM) to establish guidance for the inspection staff for generic type issues.

## Proposed Next Steps (cont.)

- As the staff disposition the issues, whether plant specific or generically, the staff will ensure coordination across all Regional and HQs staff.
- Review or complete a safety significance determination and document the basis of the decision.
- The staff will consider risk in its determination, including consideration of an EGM.
- Continue to use the VLSSIR screening process and consider the use of the VLSSIR to disposition the issue as applicable.

# Summary

- The staff reviewed the letters and white papers submitted by industry and general licensees and gathered valuable information from public meetings to assist in our assessment of a path forward.
- Complete the review and communicate a resolution on tornado hazards evaluations to facilitate a common understanding between industry and NRC (i.e., a RIS, possible EGM, etc.).
- The staff is currently reviewing amendments from two vendors for use of administrative controls which may provide a pathway for resolving this issue.