

REQUEST FOR SUPPLEMENTAL INFORMATION

NEI-22-02- GUIDELINES FOR WEATHER-RELATED ADMINISTRATIVE CONTROLS FOR SHORT DURATION DRY CASK STORAGE OPERATIONS

The following Requests for Supplemental Information (RSIs) and Observations describe information that the Nuclear Regulatory Commission (NRC) needs to start its technical review of the Nuclear Energy Institute (NEI) guidance document, NEI 22-02, "Guidelines for Weather-Related Administrative Controls for Short Duration Dry Cask Storage Operations." The format of the RSIs is to first request information on how the licensees and/or Certificate of Compliance (CoC) holders would establish instructions or procedures followed by how they would implement and incorporate the weather-related administrative controls into their licensing and design basis.

Following the RSIs are observations made by the NRC in conducting the acceptance review of NEI 22-02. The staff provided these observations for NEI's awareness. The observations may become Requests for Additional Information later during a detailed technical review if the staff accepts NEI 22-02 for NRC review.

RSI 1: Procedures

Provide additional guidance on how licensees and/or CoC holders should review, develop, or revise weather-related administrative controls. In general, NEI 22-02 should provide more specific guidance for the development of appropriate administrative controls that would be generally applicable to most sites. Specifically, NEI 22-02 should provide guidance to:

- a. Review the design bases and identify the design basis parameters of all structures, systems, and components (SSCs) that are part of the dry cask storages (DCSs) that could be exceeded by adverse weather conditions.
- b. Consider the design bases parameters in developing instructions or procedures so that they contain appropriate acceptance criteria for the weather-related administrative controls.
- c. Establish the timing, frequency, and forecast area of the forecast checks that are a part of the administrative controls.
- d. Identify the specific actions taken for different levels of severity of weather conditions as part of the administrative controls.
- e. Consider the bounding durations and compensatory measures for handling operations that may be exposed to weather conditions in developing the administrative controls.
- f. Establish the roles and responsibilities of personnel for executing the weather-related administrative controls.

The guidance for administrative controls should provide for a consistent approach that can be applied to most sites, such as the approach used for technical specifications. NEI 22-02 should provide detailed guidance that licensees and CoC holders can use in developing adequate weather-related administrative controls. The weather-related administrative controls should include criteria based on the limiting parameters/conditions for the relevant handling equipment. The administrative controls should include specific actions to be taken based on the forecasted

weather conditions to ensure the criteria are met. Among these actions, the administrative controls should include compensatory measures to place the DCS in an analyzed configuration when the DCS does not meet the established acceptance criteria. For this, the administrative controls should prescribe specific times that the weather forecast would be checked, the frequency of the forecast checks, and the area considered in the forecast checks. For these controls to preempt weather conditions, their development should consider the amount of time (i.e., duration) necessary for completing the actions. Finally, the administrative controls should clearly define the roles and responsibilities of the personnel needed for its execution.

In Section 3.3 of NEI 22-02, NEI states, in part, that “the procedures or instructions should require a check for active weather alerts before outdoor DCS activities commence. Such activities should be prohibited if one of the alerts listed above is in effect at any time over the expected duration of the outdoor activity.” Section 3.3 considers weather alerts but does not take into consideration the design basis parameters of the DCS. The purpose of the weather-related administrative controls should be to prevent the DCS from exceeding its design basis parameters due to weather conditions prior to or during handling operations. Furthermore, design basis parameters may be exceeded by weather conditions that do not result in a weather alert. NEI 22-02 should provide more detailed guidance on reviewing the design basis parameters that may be affected by adverse weather conditions (e.g., operating windspeed and temperatures for any handling equipment used) and consider these design basis parameters along with weather forecasts for decision making and implementation when establishing these weather-related administrative controls.

In Section 3.3 of NEI 22-02, NEI states, in part, that “depending on the expected duration of the DCS activity, the procedures or instructions should include additional checks of the forecast one or more times during the activity. Licensees should decide if, and how frequently, additional forecast checks should be performed and include the frequency in procedures or instructions. These formal forecast checks should be recorded and maintained with the documentation for the DCS campaign.” Weather forecasting is essential to the function of the weather-related administrative controls as NEI discusses in Section 2.2. However, Section 3 does not provide guidance on the timing, frequency, and forecast area of the forecast checks. NEI 22-02 should provide additional guidance on how licensees would consider the timing, frequency, and area of the forecast checks as well as maintaining records of forecast checks within the established procedures.

In Section 3.3 of NEI 22-02, NEI states, in part, that “the responsible personnel should also decide if a severe weather advisory (as opposed to one of the watches or warnings listed above) or other contemporaneous weather forecast information (e.g., temperature, wind, etc.) should prohibit such operations based on the particular circumstances of that advisory or other forecast information.” The decision making described in Section 3.3 is fundamental to the weather-related administrative controls. NEI 22-02 should provide guidance for developing such administrative controls, including the specific actions taken based on the weather forecast information. Specifically, NEI 22-02 should provide guidance on identifying specific weather conditions that may impact the DCS handling operations. This guidance should address

weather conditions for normal and off-normal conditions, not just accident conditions. Additionally, the established procedures should describe actions to be taken if a weather hazard is predicted or issued for the area, including actions to cease handling operations, and the actions necessary to place important to safety SSCs in a protected configuration or analyzed condition.

In Section 3.2 of NEI 22-02, NEI states that “actions should reflect the specific circumstances and timing of the potential change to the weather forecast as well as the current status of the short duration outdoor DCS operation. Response actions may involve any of the following, depending on the severity and timing of the pending weather situation [...]” NEI 22-02 should provide substantive details for associating specific actions (e.g., increasing the frequency of weather monitoring, taking compensatory measures, continuing handling operations) with the severity and timing of the weather conditions. This should include guidance that is actionable and valuable to licensees in developing weather-related administrative controls.

This information is needed to ensure the guidance document provides defense in depth to address the requirements of 10 CFR 72.236 and 10 CFR 72.122(b).

RSI 2: Weather Resources

Provide additional guidance on how licensees and/or CoC holders would use additional resources that could be used in the decision making for weather-related administrative controls. For example, the guidance should consider the following:

- a. Local meteorological data at the site, if applicable.
- b. The responsible personnel to obtain the information (e.g., control room operator).

In Section 3.1 of NEI 22-02, NEI states, in part, that “licensees can also use one of several mobile phone and internet-based applications (e.g., the Weather Channel) to receive severe weather notifications in real time for the area of interest. However, mobile phone applications should be considered defense in depth and not a replacement for written procedures or instructions.” NEI 22-02 should provide additional guidance on how the licensee would obtain the forecast information from sources, the responsible personnel, and how it would be captured in the procedure or instructions.

This information is needed to ensure the guidance document provides defense in depth to address the requirements of 10 CFR 72.236 and 10 CFR 72.122(b).

RSI 3: Duration

Provide guidance on how licensees and/or CoC holders should estimate a bounding duration of handling operations that may be exposed to weather conditions and associated compensatory measures. This guidance should consider at a minimum the following:

- a. The type of activity, configuration, and equipment being used in handling operations that may be exposed to weather conditions.

- b. Site-specific characteristics that could affect the duration of handling operations that may be exposed to weather conditions.
- c. The use of operating experience from previous handling operations.
- d. Malfunctions and delays.
- e. The level of staffing required to complete the operation.

In Section 2.1 of NEI 22-02, NEI states, in part, that “the specific types of these activities and ancillary equipment involved vary by Dry Storage Systems (DSS) design and site facility infrastructure. For these reasons, neither a complete list of all activities and equipment nor a single bounding duration for these activities can be defined.” The NRC recognizes the site-specific nature of the handling operations that may be exposed to weather conditions. In lieu of compiling a complete list of all activities and equipment or a single bounding duration for these handling operations, NEI 22-02 should provide guidance for licensees and CoC holders to use in developing a list of such activities and equipment and estimating bounding durations.

In Section 2.2 of NEI 22-02, NEI states, in part, that “portable lifting devices such as boom cranes and cask transport vehicles (whether classified as important to safety or not) may not be designed or analyzed for high winds and/or tornado missiles because they are used intermittently and for short periods of time to lift and move the loaded cask and these devices are not operated during times when severe weather is forecast.” Conclusions like this from Section 2.2 rely on the duration of the handling operations exposed to weather conditions. However, NEI 22-02 does not provide any discussion of the duration of these handling operations or any guidance that licensees and CoC holders could use to determine these durations for an ISFSI site.

In Section 2.2 of NEI 22-02, NEI states, in part, that “accurate weather forecasting enables ISFSI licensees to reliably determine with high confidence whether severe weather will occur in the windows of time required to conduct the various required short duration outdoor DCS activities at their sites.” As discussed in Section 2.2, the reliability of the weather-related administrative controls depends on the window of time required to conduct the handling operations that may be exposed to weather conditions. NEI 22-02 should provide guidance on estimating these windows of time or durations of the weather-related administrative controls accounting for site-specific characteristics, operating experience, characteristics of the handling operations, potential delays and malfunctions, and level of staffing.

This information is needed to ensure the guidance document provides defense in depth to address the requirements of 10 CFR 72.236 and 10 CFR 72.122(b).

RSI 4: Compensatory Measures

Provide guidance for identifying compensatory measures (referred to as “response actions” in NEI 22-02), meaning appropriate actions that will be used to place the DCS in an analyzed configuration when the DCS does not meet the established acceptance criteria of the weather-related administrative controls. This guidance should consider at a minimum the following:

- a. Quantitative acceptance criteria for the weather-related administrative control.
- b. The type of activity, configuration, and equipment being used in handling operations that may be exposed to weather conditions.
- c. Site-specific characteristics that could affect the duration of handling operations that may be exposed to weather conditions.
- d. The duration of handling operations that may be exposed to weather conditions and the duration of compensatory measures.
- e. The level of staffing required to complete the compensatory measure.
- f. Subsequently occurring incidents (e.g., the malfunction of a lifting device followed by a tornado) and the potential for being in an unanalyzed condition.

In Section 3.2 of NEI 22-02, NEI states, “whether a severe weather alert is in effect before or during short duration outdoor DCS activities, the intent of ISFSI licensee response actions is fundamentally the same – to ensure the cask is placed in an analyzed configuration. Such actions should reflect the specific circumstances and timing of the potential change to the weather forecast as well as the current status of the short duration outdoor DCS operation.” As discussed in Section 3, compensatory measures (i.e., actions to place important to safety SSCs in an analyzed condition or provide physical protection as necessary to maintain confinement of radioactive material during ISFSI handling operations) are essential to the function of weather-related administrative controls. As such, NEI 22-02 should provide specific guidance on developing appropriate compensatory measures to ensure the weather-related administrative controls are reliable.

This information is needed to ensure the guidance document provides defense in depth to address the requirements of 10 CFR 72.236 and 10 CFR 72.122(b).

RSI 5: Licensing and Inspection

Provide additional guidance on how licensees and/or CoC holders can add weather-related administrative controls to the technical specifications, final safety analysis report (format and content), and/or 72.212 report, as applicable for licensing and inspection activities.

NEI 22-02 states, in part, that “the topic of severe weather during short duration outdoor DCS operations is typically not addressed in the ISFSI or DSS FSAR, or the NRC’s Safety Evaluation Report. Instead, licensees rely on administrative controls to assure that these operations do not occur during times that severe weather is forecast. The multitude of equipment types and configurations that could be possible across the dozens of ISFSI sites in the United States make it infeasible to address every conceivable circumstance at every site.”

Additionally, NEI-22-02 states, in part, that “ISFSI licensees also recognize that routine DCS operations conducted outdoors sometimes involve DSS components in an unanalyzed configuration for short time segments and that for short-term duration outdoor DCS activities and components configurations where the licensing basis is silent, it is prudent for ISFSI licensees to have appropriate site-specific administrative controls in place to address the

potential for severe weather.” However, the staff notes that having administrative controls may not be sufficient or recommended to address unanalyzed configurations that could potentially place the DCS in a nonconforming or degraded condition. Therefore, the staff needs additional justification or information on how licensees and/or CoC holders can add weather-related administrative controls to the technical specification, final safety analysis report, and/or 72.212 report, as applicable, which could be generically implemented. This may include specific examples of unanalyzed configurations covered by these administrative controls.

This information is needed to ensure the guidance document provides defense in depth to address the requirements of 10 CFR 72.236 and 10 CFR 72.122(b).

Observations

- O-1. For clarity of the guidance, consider defining terms in NEI 22-02 or use definitions consistent with the current DCS systems or NUREG-2215.
- O-2. The NEI cover letter to NEI 22-02 states, in part, “since NRC questions about this issue have arisen in the context of recent inspections conducted with respect to 10 CFR 72.48, ‘Changes, Tests, and Experiments,’ industry considers NEI 22-02 to be a complimentary resource to NRC endorsed industry guidance document NEI 12-04, Revision 2, ‘Guidance for Implementation of 10 CFR 72.48, ‘Changes, Tests, and Experiments.’ It is our expectation that NRC endorsement of NEI 22-02 would provide a vehicle to achieve a documented resolution to NRC inspector questions raised about protection of DSS from natural phenomena during transient outdoor operations.” Describe how NEI 22-02 is a complimentary resource to NEI 12-04 as mentioned in the cover letter of NEI 22-02.
- O-3. NEI 22-02 should make clear that an alternative option to the use of administrative controls to implement the agency’s regulations could include physical design modifications and/or perform evaluations or analyses that demonstrates that important to safety SSCs of the DCS are designed to withstand the effects of normal, off-normal, and accident conditions.
- O-4. NEI 22-02 should make clear that the guidance is being implemented to establish appropriate controls to ensure that handling operations are only conducted during weather conditions that do not result in exceeding the design basis parameters of the DCS. These conditions are typically much less severe than design basis natural phenomena, including tornadoes and tornado-generated missiles. It should be recognized that the milder weather conditions used for the controls will occur at a higher frequency than design basis natural phenomena hazards and as such cannot be generically characterized as “low risk” to handling operations. The preventive and mitigative aspects of the controls are intended to minimize the risk of encountering the design basis natural phenomena hazards.
- O-5. Section 2 of NEI 22-02 provides a discussion of the risk associated with weather conditions during handling operations as background to this guidance on weather-related administrative controls. However, this risk discussion uses a variety of risk

terms that are not defined, and it includes several statements and conclusions about the risk of these activities that are not supported or justified. NEI 22-02 should supplement the discussion of risk to: (1) consider the effects of the duration of handling operations and compensatory measures; (2) consider existing risk studies for severe weather and handling operations; (3) clearly define risk terminology; and (4) provide justification for risk conclusions.

- O-6. In Section 2.2 of NEI 22-02, NEI states, “a forecast that predicts no severe weather for that window provides the basis for the licensee to consider tornadoes as non-credible events during that time.” 10 CFR Part 72 does not require evaluations or controls for non-credible conditions. An event could be defined as not credible if it is an external event with a frequency of occurrence that can conservatively be estimated as less than once in a million years. If an event is not credible, controls are not required to prevent or mitigate the event. The “not credible” nature of an event must not depend on any feature that could credibly fail to function or be rendered ineffective, such as this administrative control. NEI should correct the use of the term “non-credible” in Section 2.2.
- O-7. In Section 2.2 of NEI 22-02, NEI states, “thus, use of the administrative controls and commitment to not move casks to the ISFSI pad during inclement weather give the utility reasonable assurance of adequate protection without having conducted tornado missile analyses during these short-term windows.” This is an incorrect use of the phrase “reasonable assurance of adequate protection.” The NRC, through its licensing review, determines whether a design complies with the regulations that provide adequate protection of public health and safety. The NRC can conclude that there is reasonable assurance of safety if the regulations are met. NEI should correct the use of the phrase “reasonable assurance of adequate protection” in Section 2.2.
- O-8. In Section 2.2 of NEI 22-02, NEI states, “portable lifting devices such as boom cranes and cask transport vehicles (whether classified as important to safety or not) may not be designed or analyzed for high winds and/or tornado missiles because they are used intermittently and for short periods of time to lift and move the loaded cask and these devices are not operated during times when severe weather is forecast.” 10 CFR Part 72 regulations concern important to safety (ITS) systems, structures, and components. If a lifting device is relied on for safety, it should be categorized as ITS. If an SSC is not ITS, the regulations do not require an evaluation or assignment of any controls for the SSC, including the weather-related administrative controls described in this guidance. Further information on ITS SSCs can be found in the definition of structures, systems, and components important to safety in 10 CFR 72.3 and NRC guidance in NUREG/CR-6407. NEI should reconsider the inclusion of the statement “whether classified as important to safety or not” in Section 2.2 or explain how and why the guidance should apply to SSCs that are not ITS.
- O-9. In Section 3.1 of NEI 22-02, NEI states, “however, mobile phone applications should be considered defense in depth and not a replacement for written procedures or instructions.” Was this statement meant to compare the phone applications to the use of the National Weather Service website instead of procedures and instructions?