U.S. NUCLEAR REGULATORY COMMISSION

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WEATHER-RELATED ADMINISTRATIVE CONTROLS AT INDEPENDENT SPENT FUEL STORAGE INSTALLATIONS

A. INTRODUCTION

Purpose

This regulatory guide (RG) describes an alternate method that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable, in limited situations, for specific or general licensees (licensees) of an independent spent fuel storage installation (ISFSI) and certificate of compliance (CoC) holders to comply with protection against environmental conditions and natural phenomena as required by 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" (Ref. 1).

Specifically, the RG provides the limited time and circumstances when licensees can use administrative controls as one method to demonstrate compliance with the requirements that structures, systems, and components (SSCs) important to safety (ITS) are designed to withstand the effects of weather-related wind and tornado natural phenomena without impairing their capability to perform their intended design functions during outdoor dry storage system (DSS) handling activities (ODHA).

Applicability

This RG applies to CoC holders and specific and general licensees subject to 10 CFR Part 72 as well as holders of an operating license subject to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities" (Ref. 2).

Applicable Rules and Regulations

- 10 CFR Part 72 provides requirements, procedures, and criteria for the issuance of licenses to receive, transfer, and possess power reactor spent fuel, power reactor related greater than Class C (GTCC) waste, and other radioactive materials associated with spent fuel storage in an ISFSI and the terms and conditions under which the Commission will issue these licenses. The NRC authorizes the storage of spent nuclear fuel (SNF) at ISFSIs under a site-specific or general license. The regulations in this part also establish requirements, procedures, and criteria for the issuance of CoCs approving spent fuel storage cask designs.

- 10 CFR Part 72, Subpart F, "General Design Criteria," establishes general design criteria for both site-specific and general licensees, and includes 10 CFR 72.122, "Overall requirements," which establishes requirements for protection against environmental conditions and natural phenomena.

- 10 CFR Part 72, Subpart K, "General License for Storage of Spent Fuel at Power Reactor Sites," establishes the process for issuance and requirements for generally licensed ISFSIs, and includes 10 CFR 72.212, "Conditions of general license issued under 10 CFR 72.210," which establishes conditions of general licenses.

- 10 CFR Part 72, Subpart L, "Approval of Spent Fuel Storage Casks," establishes requirements for CoC holders regarding the approval of spent fuel storage casks to be used at general licensed ISFSIs, and includes 10 CFR 72.236, "Specific requirements for spent fuel storage cask approval and fabrication," which establishes specific requirements for spent fuel storage cask approval and fabrication.

Related Guidance

- NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities—Final Report," issued April 2020 (Ref. 3), provides licensing guidance governing weather-related protection for ISFSIs.

- NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (Ref. 4), provides licensing guidance governing weather-related protection for nuclear power plants.

Purpose of Regulatory Guides

The NRC issues RGs to describe methods that are acceptable to the staff for implementing specific parts of the agency's regulations, to explain techniques that the staff uses in evaluating specific issues or postulated events, and to describe information that the staff needs in its review of applications for permits and licenses. Regulatory guides are not NRC regulations and compliance with them is not required. Methods and solutions that differ from those set forth in RGs are acceptable if supported by a basis for the issuance or continuance of a permit or license by the Commission.

Paperwork Reduction Act

This RG provides voluntary guidance for implementing the mandatory information collections in 10 CFR Part 72 that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These information collections were approved by the Office of Management and Budget (OMB), under control number 3150-0132. Send comments regarding this information collection to the FOIA, Library, and Information Collections Branch (T6-A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by email to Infocollects.Resource@nrc.gov, and to the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0132), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW, Washington, DC, 20503; e-mail: oira_submissions@omb.eop.gov.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

B. DISCUSSION

Reason for Issuance

This RG provides guidance to NRC staff and the industry for complying with and implementing certain requirements in 10 CFR Part 72. It endorses, with clarifications and exceptions, Nuclear Energy Institute (NEI) 22-02, Revision 2, "Guidelines for Weather-Related Administrative Controls for Short Duration Outdoor Dry Cask Storage [DCS] Operations," issued November 2022 (Ref. 5), which includes guidance on the use of administrative controls during ODHAs as one method to demonstrate compliance with the regulatory requirements that SSCs ITS are designed to withstand the effects of weather-related wind and tornado natural phenomena without impairing their capability to perform their intended design functions.

Background

The NRC authorizes the storage of SNF at an ISFSI facility under a site-specific or general license. Subpart F of 10 CFR Part 72 sets forth the design, inspection, testing, and operational requirements of SSCs ITS for ISFSIs. For both site-specific and general licensees, 10 CFR 72.122(b)(1) and (2), require, in part, that SSCs ITS for ISFSIs must be designed to accommodate and withstand the effects of natural phenomena, including tornadoes, without impairing their capability to perform their intended design functions. The design bases for these SSCs must reflect, in part, appropriate consideration of the most severe of the natural phenomena reported for the site and surrounding area.

Separately, Subpart L of 10 CFR Part 72 sets forth the CoC holder requirements for approval of spent fuel storage casks to be used by ISFSI general licensees. For CoC holders, 10 CFR 72.236 requires, in part, that the spent fuel storage cask and its systems ITS 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 under normal, off-normal, and credible accident conditions.

Additionally, 10 CFR 72.212(b)(6) requires, in part, that a general licensee review the final safety analysis report (FSAR) referenced in the CoC, as amended, and the related NRC safety evaluation report, before use of its 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.

NUREG-2215 contains the current licensing guidance governing weather-related protection. Section 4.5.5 describes the design-basis loads caused by normal and off-normal winds. Section 4.5.3.3.3 and section 4.5.3.3.4 describe the design-basis loads caused by accident winds and accident tornado missiles, respectively, and section 16.5.2.9 describes the means to evaluate these loads on SSCs ITS. This guidance generally specifies that SSCs ITS should demonstrate, by engineering analysis, that they will continue to perform their intended safety functions during the maximum credible loads.

ODHAs are necessary at many sites to accomplish moving SNF from wet to dry storage. These activities begin when the DSS with SNF leaves the indoor reactor facility and end when it is placed in its storage location at the ISFSI. Additionally, ODHAs may be necessary to accomplish infrequently performed maintenance or inspection of the DSS and ISFSI. ODHAs are performed as expeditiously as possible considering safety, personnel dose, and time in an appropriate balance. To complete ODHAs, it normally takes no longer than a single work shift but may take a maximum of 24 hours.

NRC requirements in 10 CFR 72.122 and 10 CFR 72.236 do not differentiate between the requirements for protection during storage operations and ODHAs. Further, NUREG-2215, section 4.5.3.3, provides the existing staff guidance:

- The NRC does not accept the presumption that there will be sufficient warning of tornadoes so that operations, such as transfer between the fuel transfer facility and storage site, may never be exposed to tornado effects.... Ensure that the SAR shows that the cask system will continue to perform its intended safety functions (i.e., criticality, radioactive material release, heat removal, radiation exposure, and retrievability).

Therefore, historically, the NRC has required ISFSI licensees and CoC holders to perform engineering analysis to demonstrate that SSCs ITS will continue to perform their intended design functions during normal, off-normal, and credible accident conditions.

With this guidance, ISFSI licensees and CoC holders may, instead of engineering analysis, use administrative controls during ODHAs as one method to demonstrate compliance with the regulatory requirements that SSCs ITS are designed to withstand the effects of weather-related wind and tornado natural phenomena without impairing their capability to perform their intended design functions.

The NRC is making this change due to the increased reliability and accuracy of weather forecasting and detailed licensee implementation of administrative controls.

In the United States, the National Weather Service (NWS) is an agency under the National Oceanic and Atmospheric Administration, within the U.S. Department of Commerce. NWS weather forecasting is recognized as being accurate and reliable in the windows of time associated with planning and carrying out ODHAs. Due to the higher reliability of shorter term weather forecasting, administrative controls can be relied upon to help ensure safety of 10 CFR Part 72 SSCs ITS when a transfer activity occurs. These administrative controls would include provisions to (1) preclude ODHAs during periods of actual adverse weather events or when adverse weather is predicted to occur, and (2) provide compensatory measures to place SSCs ITS in an analyzed condition, through engineering analysis, to maintain confinement of radioactive material during ODHAs.

As such, this RG provides the parameters by which ISFSI licensees and CoC holders may choose to use administrative controls rather than engineering analysis, to demonstrate that SSCs ITS will withstand the effects of weather-related wind and tornado natural phenomena without impairing their capability to perform their intended design functions during ODHAs.

Accordingly, the staff has determined that, in limited circumstances, namely during ODHAs, formally documented administrative controls form an appropriate basis for demonstrating compliance with 10 CFR 72.122(b) and 10 CFR 72.236(l) in lieu of solely using an engineering analysis for weather-related wind and tornado events.

Consideration of International Standards

The International Atomic Energy Agency (IAEA) works with member states and other partners to promote the safe, secure, and peaceful use of nuclear technologies. The IAEA develops Safety Requirements and Safety Guides for protecting people and the environment from harmful effects of ionizing radiation. This system of safety fundamentals, safety requirements, safety guides, and other relevant reports, reflects an international perspective on what constitutes a high level of safety. To inform its development of this RG, the NRC considered IAEA Safety Requirements and Safety Guides pursuant

to the Commission's International Policy Statement (Ref. 6) and Management Directive and Handbook 6.6, "Regulatory Guides" (Ref. 7). The NRC staff did not identify any IAEA Safety Requirements or Guides with information related to the topic of this RG.

Documents Discussed in Staff Regulatory Guidance

This draft RG endorses, in part, the use of one or more codes or standards developed by external organizations, and other third party guidance documents. These codes, standards and third party guidance documents may contain references to other codes, standards or third party guidance documents ("secondary references"). If a secondary reference has itself been incorporated by reference into NRC regulations as a requirement, then licensees and applicants must comply with that standard as set forth in the regulation. If the secondary reference has been endorsed in a RG as an acceptable approach for meeting an NRC requirement, then the standard constitutes a method acceptable to the NRC staff for meeting that regulatory requirement as described in the specific RG. If the secondary reference has neither been incorporated by reference into NRC regulations nor endorsed in a RG, then the secondary reference is neither a legally-binding requirement nor a "generic" NRC approved acceptable approach for meeting an NRC requirement. However, licensees and applicants may consider and use the information in the secondary reference, if appropriately justified, consistent with current regulatory practice, and consistent with applicable NRC requirements.

C. STAFF REGULATORY GUIDANCE

The NRC staff proposes to endorse NEI 22-02, Revision 2, as generally acceptable for use in complying with the requirements in 10 CFR 72.122(b) and 10 CFR 72.236(l). However, the NRC staff provides clarifications and exceptions to specific statements in NEI 22-02, Revision 2, as described below.

1. **NEI 22-02, Revision 2, Section 2.1, "Short Duration Outdoor DCS Activities," defines, in part, the applicable short duration outdoor DCS activities covered by NEI 22-02, as follows:**

   > This guidance is applicable to short duration DCS [DSS] operations conducted outdoors that are necessary at many sites to accomplish moving SNF from wet to dry storage. These activities occur between when the cask loaded with SNF leaves the indoor plant facility and when it is in its storage location at the ISFSI.

   Section 1, "Introduction," also states that, "Of particular interest is the potential occurrence of a tornado during DCS [DSS] operations occurring outdoors between the time the loaded SNF cask is exposed to outdoor conditions and before it is in its storage location at the ISFSI. The activities of interest are short duration DCS operations that are necessary to transfer the SNF to the ISFSI."

   Clarification—In addition to moving SNF from wet to dry storage, ODHAs may also include DSS operations performed outdoors associated with infrequently performed maintenance and inspection of a DSS (e.g., aging management inspections).

2. **NEI 22-02, Revision 2, Section 2.1, states, in part, the following:**

   > The specific types of these activities and ancillary equipment involved vary by 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. Each licensee must individually determine what, if any, short duration outdoor DCS activities are conducted at its site and the time frames involved.

   Exception—With one exception noted in the next paragraph, NEI 22-02 applies only to DSS SSCs ITS under the regulatory authority of 10 CFR Part 72. Other than the exception noted, this guidance does not apply to SSCs licensed under 10 CFR Part 50, or any effect that an SSC ITS licensed under 10 CFR Part 72 may have on an SSC licensed under 10 CFR Part 50. For SSCs licensed under 10 CFR Part 50, the existing 10 CFR Part 50 licensing basis applies.

   The only instance in which this guidance applies to DSS SSCs ITS outside of the 10 CFR Part 72 regulatory authority is for GTCC or Class B/C waste casks, store under the provision of a 10 CFR Part 50 license, that possess a shell structural and confinement boundary similar in design to the 10 CFR Part 72 CoC that the cask is based upon. The cask must also have ODHAs that are similar to those of a 10 CFR Part 72 CoC that the cask is based upon. The GTCC or Class B/C waste must also be in a solid and dry form. If these conditions are satisfied, then this guidance also applies to those GTCC or Class B/C waste casks.

   Lastly, the guidance only applies to a DSS when the DSS's confinement boundary has been established as required by its licensing basis.

3. **NEI 22-02, Revision 2, Section 2.2, "Licensing Basis and Administrative Controls," explains the following:**

> Dry storage systems (vertical and horizontal) and transfer casks are designed and analyzed for tornado winds and tornado missiles in accordance with 10 CFR 72.122(b).

Clarification—In its description of licensing basis conditions, NEI 22-02 explains that SSCs are designed and analyzed for accident conditions associated with tornado winds and tornado missiles in accordance with 10 CFR 72.122(b). Throughout the remainder of the document, NEI 22-02 focuses on these specific accident conditions.

In 10 CFR 72.122(b), the NRC requires that SSCs ITS 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" (emphasis added). Similarly, 10 CFR 72.236(l) states that ITS SSCs "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 under *normal, off-normal,* and credible accident conditions." Accordingly, 10 CFR 72.122 and 10 CFR 72.236 also include requirements for normal and off-normal conditions.

Normal and off-normal conditions may not be specifically analyzed in detail in the DSS FSAR, as their load condition may be bounded by more limiting accident condition loads described in detail in the FSAR. However, the licensee or CoC holder must continue to ensure compliance with 10 CFR 72.122(b) or 10 CFR 72.236(l).

Accordingly, this regulatory guidance applies and ensures that licensees continue to comply with weather conditions associated with normal and off-normal operation, maintenance, testing, and accident conditions, including normal and off-normal winds, accident winds, hurricane winds, hurricane missiles, tornado winds, tornado missiles, and tornado pressure drops.

4. **NEI 22-02, Revision 2, section 1, defines the term "safe condition and forecast" as follows:**

> A safe condition and forecast is considered to be the absence of: tornado and severe thunderstorm watches, tornado and severe thunderstorm warnings, and hazardous weather outlook indicating a moderate or high risk of severe thunderstorms for the current date (Day 1).

This definition is reiterated in Section 3.2, "Use of Safe Condition and Forecast to Guide Decision-making."

Section 3.1, "Resources" states, in part, the following:

> The NWS Active Alerts web page has several useful links to determine if a safe condition and forecast is in effect for the site for the upcoming time periods of interest, including:
>
> - Warnings by State
> - Latest Warnings
> - Thunderstorm/Tornado Outlook
> - Hurricanes

Clarification—The term "safe condition and forecast" is clarified as follows:

A safe condition and forecast is considered to be the absence of: (1) forecasted weather for winds (including gusts) that would exceed an SSC's design criteria and (2) a hazardous weather outlook indicating a risk of severe storms that could generate, for example, tornado missiles or pressure differentials, or hurricane missiles, that would exceed an SSC's design criteria, for the expected duration of the ODHA.

The presence of a safe condition and forecast ensures that design criteria are not exceeded when administrative controls are used in lieu of engineering analysis during an ODHA.

Further, section 3.1 is clarified as follows:

The NWS Active Alerts web page has several useful links to determine if a safe condition and forecast is in effect for the site for the upcoming time periods of interest, including, but not limited to:

- Warnings by State
- Latest Warnings
- Thunderstorm/Tornado Outlook
- Hurricanes

In addition, monitoring of weather below the threshold of severe weather may be necessary to ensure the SSC ITS is not exposed to weather conditions that exceed its licensing basis.

5. NEI 22-02, Revision 2, Section 3.5, "Specific Implementation Guidance for General Licensees," states, in part, as follows:

> The procedures or instructions should include the following:
>
> a. The type of activity, configuration, and equipment being used in short duration outdoor DCS activities.
>
> b. The location…of each short duration outdoor activity when the SNF cask and associated equipment are in an unanalyzed configuration.
>
> c. Site-specific characteristics that could affect the times frames for short duration outdoor DCS activities.
>
> d. The use of operating experience from previous short duration outdoor DCS activities.
>
> e. The definition of "analyzed configuration" as determined by the CoC holder.
>
> f. The time frames required to move the cask to an analyzed configuration.
>
> g. The site structures available to temporarily place the cask should a safe condition and forecast be lost during short duration outdoor DCS activities.

Clarification—The licensee procedures or instructions as described in NEI 22-02, section 3.5, should include the following process to determine a "safe condition and forecast":

Before implementing NEI 22-02, licensees should determine whether DSS and DSS auxiliary/handling SSCs ITS used for ODHAs meet the requirements of 10 CFR 72.122(b) through analyzed engineering analysis (i.e., an analyzed condition) or if they are or should be subject to administrative controls as a means of controlling a design function (i.e., unanalyzed condition).

- Licensees should identify DSS and DSS support/ancillary SSCs ITS under 10 CFR Part 72 that are used for ODHAs.

- For each SSC ITS identified, the licensee should determine the weather-related wind, tornado, and/or hurricane-related licensing-basis design conditions (i.e., normal, off-normal, and accident events) for the SSC ITS during ODHAs. This should include a review of the FSAR for the DSS, general design criteria required by 10 CFR 72.122(b), and site-specific parameters as required by 10 CFR 72.212(b)(6). The licensee should consider that the FSAR does not discuss certain normal and off-normal events because their effects are bounded by other accident-related events that are analyzed. For example, the FSAR may not specifically evaluate a normal wind because it has been determined to be less limiting than the tornado wind.

- For each SSC ITS identified, the licensee should then review the resultant design conditions and the associated load conditions during weather-related wind, tornado, and/or hurricanes conditions and determine whether the SSC ITS is analyzed, by engineering analysis, for all licensing-basis design conditions.

- Based upon the above, the licensee should review what licensing basis design conditions are unanalyzed for each SSC ITS and perform the necessary engineering analysis or implement administrative controls to comply with 10 CFR 72.122(b).

- For SSCs ITS that are determined to be fully analyzed by engineering analysis, administrative controls may be implemented but are not required to comply with 10 CFR 72.122(b).

- From the load conditions, the qualitative or quantitative criteria that define/outline a "safe condition and forecast" should be determined. These criteria will form the acceptance criteria of the procedure establishing the administrative control.

Based upon the licensee's review described above, the licensee should determine quantitative and qualitative acceptance criteria for weather forecast conditions under which short duration outdoor DSS operations may be conducted to ensure that a corresponding "safe condition and forecast" exists in alignment with licensing-basis design conditions. In this determination, forecast conditions should provide a conservative threshold, including an appropriate error margin, to ensure that SSCs ITS are not subjected to any load combinations beyond those analyzed.

In determining a "safe condition and forecast" as originally defined (without NRC clarification) by NEI 22-02, Revision 2, licensees should be aware that while an acceptance criterion of "tornado and severe thunderstorm watches, tornado and severe thunderstorm warnings, and hazardous weather outlook indicating a moderate or high risk of severe thunderstorms" may protect an SSC from tornado accidents, it may not alone protect an SSC ITS from all normal, off-normal, and accident wind conditions, and therefore additional evaluation may be necessary to demonstrate an analyzed wind speed that is appropriate for short-term operations. For example, a crane used for lifting and movement of a DSS may only be analyzed for wind speeds of 20 mph, and therefore a "safe condition and forecast" should include a quantitative acceptance criterion of wind gusts to be less than 20 mph.

6. **NEI 22-02, Revision 2, section 3.1, states, in part, the following:**

> Licensees should use the NWS's hazardous weather outlook information unless another resource for the site is already used or can be justified as providing equivalent information in terms of timeliness and accuracy.

Clarification—The staff clarifies this statement as follows:

Licensees should use the NWS's hazardous weather outlook and forecast information unless another resource can be justified as providing equivalent information in terms of timeliness and accuracy.

NEI 22-02 identifies that licensees may use weather resources for the site that are already in use. NEI 22-02 does not require that these resources provide an equivalent level of information in terms of timeliness and accuracy to the NWS or any other standard of quality, which does not ensure that these sources of information provide a quality forecast. Accordingly, if a licensee uses these resources, they must demonstrate that they provide an equivalent level of information in terms of timeliness and accuracy to the NWS. Alternatively, these resources may be used as supplementary weather resources in addition to those clarified above.

7. **NEI 22-02, Revision 2, Section 3.3, "Implementation," states, in part, the following:**

> The procedures or instructions should require a check for any active weather conditions that would be contrary to a safe condition and forecast before outdoor DCS activities commence. The expectation is that unless the weather forecast is acceptable for the entire duration of short duration outdoor activities, such activities will not commence. Even though near-term weather forecasts are highly reliable, the procedures or instructions should also include checking the future radar projections for the plant site.
>
> Depending on the expected duration of the DCS activity, the procedures or instructions should include additional checks of the weather forecast one or more times during the activity. Licensees should decide if, and how frequently, additional weather forecast checks should be performed and include that frequency in procedures or instructions.

Section 3.5 "Specific Implementation Guidance for General Licensees," states, in part, the following:

> Implementing procedures or instructions should contain specific steps to document the satisfactory execution of the weather forecast check before and, if required, periodic checks during the outdoor activity.

Clarification— The licensee's procedures requiring a check for a safe condition and forecast should occur immediately before the start of ODHAs. Additionally, the licensee should determine the expected "duration of short duration outdoor activities" by either benchmarking or dry runs. The ODHA duration should be periodically assessed based upon operating experience, including equipment malfunctions, and expected delays, before each DSS loading campaign.

In establishing the frequency of weather checks performed during the activity, the licensee should also consider the time required to perform "response actions" to place the DSS in an analyzed condition before the severe weather occurs.

8. NEI 22-02, Revision 2, section 3.5, states, in part, the following:

> Malfunctions and unexpected delays during short duration outdoor activities can and do occur. However, they are infrequent and the likelihood of a malfunction or delay occurring at the same time as the unexpected loss of a safe condition and forecast is so low, it should be considered non-credible. Such malfunctions and delays are outside the scope of this guidance and should be handled on a case-specific basis and within the site's corrective action program, at the licensee's discretion.

Exception—Generally, malfunctions and delays are within the scope of 10 CFR 72.122(b)(2)(i)(B) and 10 CFR 72.236(l), which require considering appropriate combinations of the effects of normal and accident conditions and the effects of natural phenomena. Accordingly, licensees should have procedures to ensure the DSS can be placed into an analyzed condition (i.e., relying on engineered controls supported by engineering analysis) in the event of a malfunction or delay. The procedures should direct action as expeditiously as possible considering safety, personnel dose, and time in an appropriate balance. The procedures should include provisions for additional weather checks, notification of site management, documentation of the malfunction or delay in the corrective action program, compensatory protective measures, and a list of contingency equipment and personnel needed with general steps to resolve common malfunctions and delays.

D. IMPLEMENTATION

The NRC staff may use this RG as a reference in its regulatory processes, such as licensing, inspection, or enforcement. However, the NRC staff does not intend to use the guidance in this RG to support NRC staff actions in a manner that would constitute backfitting as that term is defined in 10 CFR 72.62, "Backfitting," and as described in NRC Management Directive 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests" (Ref. 8). The staff also does not intend to use the guidance to support NRC staff actions in a manner that constitutes forward fitting as that term is defined and described in Management Directive 8.4. If a licensee believes that the NRC is using this regulatory guide in a manner inconsistent with the discussion in this Implementation section, then the licensee may file a backfitting or forward fitting appeal with the NRC in accordance with the process in Management Directive 8.4.

GLOSSARY

Accident Condition. The extreme level of an event or condition that has a specified resistance, limit of response, and requirement for a given level of continuing capability that exceeds off-normal events or conditions. Accident conditions include both design-basis accidents and conditions caused by natural and humanmade phenomena. These conditions include events that are Design Events III and IV in American National Standards Institute/American Nuclear Society (ANSI/ANS) 57.9, "Design Criteria for an ISFSI (Dry Storage Type)." (Reference 10 CFR 72.3, "Definitions")

Certificate of Compliance (CoC) User. The general licensee that has loaded a DSS, or purchased a DSS and plans to load it, in accordance with a CoC issued under 10 CFR Part 72. (Reference 10 CFR 72.3)

Confinement Boundary. In a DSS for SNF, the outer boundary of the confinement system that prevents the release of radioactive material to the environment. (Reference NUREG-2215)

Current Licensing Basis (Licensing Basis). The set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design bases (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The current licensing basis includes the NRC regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 52, 54, 55, 70, 72, 73, and 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2, "Definitions," as documented in the most recent FSAR as required by 10 CFR 50.71, "Maintenance of records, making of reports," and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports. (Reference 10 CFR 54.3, "Definitions")

Design Bases. That information that identifies the specific functions to be performed by an SSC of a facility or of a spent fuel storage cask and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values may be restraints derived from generally accepted state-of-the-art practices for achieving functional goals or requirements derived from analysis (based on calculation or experiments) of the effects of a postulated event under which an SSC must meet its functional goals. The values for controlling parameters for external events include—

(1) Estimates of severe natural events to be used for deriving design bases that will be based on consideration of historical data on the associated parameters, physical data, or analysis of upper limits of the physical processes involved; and

(2) Estimates of severe external man-induced events to be used for deriving design bases that will be based on analysis of human activity in the region taking into account the site characteristics and the risks associated with the event. (Reference 10 CFR 72.3)

Design Criteria. The criteria the facility or cask designer uses to show that the design meets all of the requirements in 10 CFR Part 72. Design criteria can include, but are not limited to, safety margins, maximum stresses, maximum or minimum material temperatures, dose rates, and k-effective (k_{eff}). (Reference NUREG-2215)

Dry Storage System (DSS). A system that typically uses a cask or canister in an overpack as a component in which to store SNF in a dry environment. A DSS provides confinement, radiological shielding, subcriticality control, structural support, and passive cooling of its SNF during normal, off-normal, and accident conditions. (Reference NUREG-2215)

General License. Authorizes the storage of SNF in an ISFSI at power reactor sites to persons (i.e., general licensees) authorized to possess or operate nuclear power reactors under 10 CFR Part 50 or 10 CFR Part 52. The general license is limited to (1) that SNF which the general licensee is authorized to possess at the site under the specific 10 CFR Part 50 or 10 CFR Part 52 license for the site, and (2) storage of SNF in casks approved under the provisions of 10 CFR Part 72, Subpart L. See 10 CFR 72.210, "General license issued," and 10 CFR 72.212(a)(1)–(2). (Reference 10 CFR 72.3)

Normal Events and Conditions. Conditions that are intended operations, planned events, and environmental conditions that are known or reasonably expected to occur with high frequency during storage operations. "Normal" refers to the maximum level of an event or condition that is expected to routinely occur (similar to Design Event I in ANSI/ANS 57.9). The DSS SSCs are expected to remain fully functional and to experience no temporary or permanent degradation of that functionality from normal operations, events, and conditions. Specific normal conditions to be addressed are evaluated for the DSS or dry storage system (DSF) and are documented in the safety analysis report for that system or facility. (Reference NUREG-2215)

Off-Normal Events or Conditions. An event or condition that, although not occurring regularly, can be expected to occur with moderate frequency and for which there is a corresponding maximum specified resistance, limit of response, or requirement for a given level of continuing capability. Off-normal events and conditions are similar to Design Event II in ANSI/ANS 57.9. The DSS and DSF SSCs are expected to experience off-normal events and conditions without permanent degradation of the capability to perform their full function (although operations may be suspended or curtailed during off-normal conditions) over the full storage term (the license period for a specific license facility or the storage period equivalent to the certificate term for a DSS). Off-normal events or conditions are referred to as anticipated occurrences in 10 CFR 72.104, "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS." (Reference NUREG-2215)

Structures, Systems, and Components (SSC) Important to Safety (ITS). Those features of the ISFSI, monitored retrievable storage, and spent fuel storage cask whose functions are—

(1) To maintain the conditions required to store spent fuel, high-level radioactive waste, or reactor related GTCC waste safely;

(2) To prevent damage to the spent fuel, the high-level radioactive waste, or reactor-related GTCC waste container during handling and storage; or

(3) To provide reasonable assurance that spent fuel, high-level radioactive waste, or reactor-related GTCC waste can be received, handled, packaged, stored, and retrieved without undue risk to the health and safety of the public. (Reference 10 CFR 72.3)

REFERENCES[1]

1. *U.S. Code of Federal Regulations*, Title 10, Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste," Chapter 1, Title 10, "Energy."

2. *U.S. Code of Federal Regulations,* Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," Chapter 1, Title 10, "Energy."

3. U.S. Nuclear Regulatory Commission (NRC), NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities," Washington, DC. (ML20121A190)

4. NRC, NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Washington, DC.

5. Nuclear Energy Institute (NEI), NEI 22-02, Revision 2, "Guidelines for Weather-Related Administrative Controls for Short Duration Outdoor Dry Cask Storage Operations," Washington, DC, November 2022. (ML22339A035)[2]

6. NRC, "Nuclear Regulatory Commission International Policy Statement," *Federal Register*, Vol. 79, No. 132, July 10, 2014, pp. 39415–39418, Washington, DC.

7. NRC, Management Directive 6.6, "Regulatory Guides," Washington, DC, May 2, 2016. (ML18073A170)

8. NRC Management Directive 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests," Washington, DC. (ML18093B087)

1 Publicly available NRC published documents are available electronically through the NRC Library on the NRC's public website at http://www.nrc.gov/reading-rm/doc-collections/ and through the NRC's Agencywide Documents Access and Management System (ADAMS) at http://www.nrc.gov/reading-rm/adams.html. For problems with ADAMS, contact the Public Document Room staff at 301-415-4737 or (800) 397-4209, or email pdr.resource@nrc.gov. The NRC Public Document Room (PDR), where you may also examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time (ET), Monday through Friday, except Federal holidays.

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