

Examples Illustrating Implementation of Definition of "Construction" in the LWA Rule

Non-Safety-Related Structures

The intent of the revised Limited Work Authorization (LWA) rule is to preclude the need for a LWA or COL for construction activities for Structures, Systems and Components (SSCs) that lack a reasonable nexus to radiological health and safety and common defense and security, and do not meet the criteria in 10 CFR 50.10(a)(1).

The following examples illustrate why certain activities that current or near-term NRC applicants propose to undertake do not fall within the scope of construction, as defined in the LWA rule. Generally, the structures, systems and components implicated or involved in these activities do not present a direct and reasonable nexus to radiological health and safety and/or common defense and security when 10 CFR 50.10(a)(1) criteria are applied.

The activities associated with the listed examples should be considered preconstruction activities unless there are unique design, siting or location features and circumstances that result in the activities having a reasonable nexus to radiological health and safety or common defense and security, or unique and company specific circumstances that warrant a different categorization.

Example 1: Cooling Tower

NEI agrees with the Supplementary Information statement (See 72 *Fed. Reg.* 57,432) that cooling towers are an example of an SSC that would not be within the scope of "construction" if used to cool non-safety related functions, such as the turbine condenser. Most cooling towers in nuclear plants meet this criterion and thus do not have a reasonable nexus to the radiological health and safety of the public or the common defense and security within the meaning of the LWA rule.

The cooling tower is not relied upon for mitigation of accidents or in the emergency operating procedures. The cooling tower serves as the water basin for the circulating water system inventory as well as the heat sink for the turbine cycle. Loss of the cooling tower function, through loss of the water in the basin under a very highly unlikely event, would result eventually in a loss of condenser vacuum.

The loss of cooling tower function alone does not initiate a plant trip. The indirect effect on radiological health and safety and common defense and security of the cooling tower structure is therefore "so low as to be considered negligible." (See 72 *Fed. Reg.* 57,429.)

Cooling towers used to cool the turbine condenser are outside the scope of construction SSCs because they do not meet any of the criteria in Section 50.10(a)(1), as discussed below:

(i) Safety-related structures, systems, or components of a facility, as defined in 10 CFR 50.2;

Cooling towers used to cool the main turbine condenser (and potentially other cooling towers based on plant design) are not safety-related. Criterion not met.

(ii) SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures;

The cooling tower is non-safety-related and is not relied upon to mitigate accidents, nor is it used in plant emergency operating procedures. Criterion not met.

(iii) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function;

Failure of the cooling tower will not prevent the function of a safety related structure, system or component. Criterion not met.

(iv) SSCs whose failure could cause a reactor scram or actuation of a safety-related system;

Loss of cooling tower function will not directly cause a reactor scram or actuation of a safety system.¹ Criterion not met.

(v) SSCs necessary to comply with 10 CFR part 73;

The cooling tower is not necessary to meet security requirements. Criterion not met.

(vi) SSCs necessary to comply with 10 CFR 50.48 and criterion 3 of 10 CFR part 50, appendix A; and

The cooling tower is not necessary to meet fire protection requirements. Criterion not met.

¹ The LWA rule explicitly recognizes that the determination of SSCs that do not have a “reasonable nexus” to radiological health and safety or common defense and security depends on the design of the facility. (See *72 Fed. Reg.* 57,429.)

(vii) Onsite emergency facilities, that is, technical support and operations support centers, necessary to comply with 10 CFR 50.47 and 10 CFR part 50, appendix E.

The cooling tower is not necessary to meet emergency preparedness. Criterion not met.

Conclusion

These structures should not be included in the definition of construction, and NRC approval via an LWA or COL is not required to conduct activities for the cooling tower structure. It should be noted that a cooling tower used to cool safety-related cooling water systems would be categorized as construction.

Example 2: Buried Circulating Water System Piping up to the Turbine Building

In the Supplementary Information for the LWA final rule, the NRC states that the criteria in Section 50.10(a) are intended to exclude from the definition of construction activities relating to those structures, systems and components described in the FSAR “which do not actually directly affect the radiological health and safety of the public or the common defense and security, and their indirect effect on such health and safety or common defense and security is so low as to be considered negligible.” (72 Fed. Reg. 57,429.)

The Circulating Water System is a cooling system that performs no safety-related function. The Circulating Water System provides non-safety-related cooling water to the main turbine condenser to remove heat as part of the power generation steam cycle. The circulating water piping transfers the circulating water from the discharge of the circulating water pumps to the main condenser and from the main condenser back to the heat sink (e.g. cooling tower, reservoir). Activities relating to such systems are not intended to fall within the definition of construction. (See 72 Fed. Reg. 57,432.) Consistent with the guidance in the Supplementary Information, buried circulating water piping does not meet the definition of construction in Section 50.10(a). Circulating water piping is described in the FSAR, but similar to the cooling tower, it does not actually directly affect (and has no “reasonable nexus” to) the radiological health and safety of the public and any indirect effect on health and safety is so low as to be considered negligible.

The circulating water system, including buried pipework, does not meet the criteria for construction SSCs in Section 50.10(a)(1) as discussed below:

(i) Safety-related structures, systems, or components of a facility, as defined in 10 CFR 50.2;

Buried circulating water system piping running from the water source to the cooling tower, from the water source to the turbine building, or from the cooling tower to the turbine building does not meet the definition of a safety-related SSC. Criterion not met.

(ii) SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures;

Buried circulating water system piping is non-safety related and is not relied upon to mitigate accidents, nor is it used in plant emergency operating procedures. Criterion not met.

(iii) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function;

Leakage of buried circulating water system piping will not prevent the function of a safety related structure, system or component. Criterion not met.

(iv) SSCs whose failure could cause a reactor scram or actuation of a safety-related system;

Leakage would be identified and actions taken including orderly plant shutdown, if necessary, long before system leakage would cause sufficient loss of vacuum to result in a turbine trip. Leakage from buried circulating water system piping will not directly cause a reactor scram or actuation of a safety system. Criterion not met.

(v) SSCs necessary to comply with 10 CFR part 73;

Buried circulating water system piping is not necessary to meet security requirements. Criterion not met.

(vi) SSCs necessary to comply with 10 CFR 50.48 and criterion 3 of 10 CFR part 50, appendix A; and

Buried circulating water system piping is not necessary to meet fire protection requirements. Criterion not met.

(vii) Onsite emergency facilities, that is, technical support and operations support centers, necessary to comply with 10 CFR 50.47 and 10 CFR part 50, appendix E.

Buried circulating water system piping is not necessary to meet emergency preparedness. Criterion not met.

Conclusion

Based on the function and potential consequences of a failure of buried circulating water system piping described above, this piping does not have a reasonable nexus to radiological health and safety. Activities relating to buried circulating water system piping should fall outside of the scope of

construction, as defined in Section 50.10(a)(1), and NRC approval via an LWA or COL would not be required.

Example 3: Intake Structure

The Intake Structure (raw water system) is a non-safety-related structure (located outside of the protected area) that provides the structure for the location of equipment to provide make-up water to the cooling towers and circulating water system from a designated non-safety water source (lake, river, wells, etc.). A failure of the Intake Structure would not directly cause a plant trip and is not directly or indirectly linked to a system that has a nexus to radiological health and safety.

It should be noted that the categorization process may result in a different determination at different sites because of unique site or design specific circumstances. Also, even though the activities may have not been categorized as construction, an applicant may have to seek approvals from state, local or other federal agencies.

(i) Safety-related structures, systems, or components of a facility, as defined in 10 CFR 50.2;

The Intake Structure does not meet the definition of a safety-related structure as defined in 10 CFR 50.2. Criterion not met.

(ii) SSCs relied upon to mitigate accidents or transients or used in plant emergency operating procedures;

The Intake Structure may not be described in the DCD and is not relied upon to mitigate accidents or transients or used in plant emergency operating procedures. Criterion not met.

(iii) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function;

The Intake Structure is a non-safety related structure whose failure could not prevent safety-related SSCs from fulfilling their safety-related function. DCD analysis may not consider failure of the Intake Structure in any safety-analysis. Criterion not met.

(iv) SSCs whose failure could cause a reactor scram or actuation of a safety-related system;

The Intake Structure is a non-safety related structure whose failure could not directly cause a reactor scram or actuation of a safety-related system. DCD analysis may not consider failure of the Intake Structure in any safety analysis. Criterion not met.

(v) SSCs necessary to comply with 10 CFR part 73;

The Intake Structure is a non-safety-related, non-seismic structure whose construction is not necessary to comply with security requirements of 10 CFR Part 73. Criterion not met.

(vi) SSCs necessary to comply with 10 CFR 50.48 and criterion 3 of 10 CFR part 50, appendix A; and

The Intake Structure is a non-safety-related structure whose construction is not necessary to comply with 10 CFR 50.48 and Criterion 3 of 10 CFR Part 50, Appendix A. Criterion not met.

(vii) Onsite emergency facilities, that is, technical support and operations support centers, necessary to comply with 10 CFR 50.47 and 10 CFR part 50, appendix E.

The Intake Structure is a non-safety-related structure whose construction is not necessary to comply with 10 CFR 50.47 and 10 CFR Part 50, Appendix E. Criterion not met.

Conclusion

Activities relating to the Intake Structure should not be included in the definition of construction in Section 50.10(a)(1), since it is non-safety-related structure and has no influence on other safety-related SSCs. NRC approval via an LWA or COL is not required to construct an Intake Structure.

For items such as the Intake Structure that are not within the NRC scope of "construction," review and approval by local, state or federal entities (other than NRC) may be needed before the applicant can proceed.

Example 4: Retaining walls that support plant construction but do not affect the permanent facility or seismic analysis

Specific Example: Retaining wall to support backfill and foundation for the construction crane

The LWA rule provides that construction includes "placement of...permanent retaining walls within an excavation" which are for SSCs that meet the criteria in Section 50.10(a)(1).

Crane foundations and support pads (at plant surface grade) are required to support the massive crane (1,000 ton lifting capacity) used to facilitate the placement of the large structural modules being used to construct the nuclear island and other power block structures. Construction of the crane foundation and pad can be accomplished via installation of a mechanically stabilized earthen (MSE) wall, or other type of retaining wall, to support the crane foundation within the excavation. Part of the retaining wall will be placed around portions of the perimeter of the nuclear island and power block structures.

The retaining wall will be positioned at an adequate distance from the nuclear island foundation and structure walls to remain outside of the influence of the structural and seismic design criteria of the nuclear island, while also providing adequate annulus space to safely facilitate construction of the nuclear island. Typically, the retaining wall will not be removed after placement. It is considered part of the crane foundation, not part of the permanent plant facility needed to support plant operations, and therefore does not meet the definition of permanent retaining walls that are for SSCs that meet the criteria in Section 50.10(a)(1).

The construction of the wall and the wall itself has no direct or indirect nexus to radiological safety, and the equipment that the retaining wall is designed to support does not meet the construction categorization criteria.

Conclusion

The retaining wall is part of the crane foundation, not part of the overall facility. Activities associated with the installation of the retaining wall are categorized as preconstruction activities and a LWA or COL is not required, even if the wall is not removed.

Example 5: Temporary materials used for construction purposes only

Specific Example: Dewatering Systems

In the final LWA rule, Section 50.10(a)(2)(iii) states that construction *does not include*:

“Preparation of a site for construction of a facility, including clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas.” Additionally, Section 50.10(a)(2)(v) excludes excavation from the scope of “construction.” (See 72 Fed. Reg. 57,441.)

The Supplementary Information for the final rule states that an LWA is required if temporary materials (drainage, retaining walls, etc.) are not removed from the excavation (abandoned in place). (See 72 Fed. Reg. 57,429.) This statement, however, needs to be read in conjunction with other statements in the Supplementary Information relating to the need for an SSC to have a “reasonable nexus to radiological health and safety of the public or the common defense and security” in order for the SSC to fall within the scope of construction.

Excavation often requires temporary dewatering measures to control erosion and water drainage/removal during excavation. Temporary dewatering systems to facilitate construction that consist of vertical wells will be installed, maintained and abandoned in accordance with federal and state laws and regulations. Typical state regulations require dewatering wells to be constructed under the direction of a professional engineer or a professional geologist and to be constructed in accordance with specific national consensus codes and state regulations.

Waterproofing for the plant is provided by a permanent waterproofing membrane (safety-related in the case of safety-related structures), which is installed as part of the foundation and around the

structural walls. This waterproofing is part of the standard design of some plants and requires regulatory approval prior to installation because of its inherent design function.

Groundwater dewatering systems and ground surface storm drainage systems are installed as non-safety-related systems. They help disperse water away from the power block structures but serve no safety-related function for keeping water from intrusion into the nuclear island structures.

Often it is impractical to remove such dewatering systems as preconstruction activities progress. Excavation, which is clearly allowed by the rule as a preconstruction activity, may require dewatering measures. An LWA should not be required to allow materials or items that are not considered part of the permanent facility to be left in the excavation, provided it can be shown that there is no adverse effect on safety-related foundations and the seismic analysis, and that the activity or the structure, if left in place, does not present a radiological hazard.

Conclusion

Using temporary water drainage methods related to excavation activities only, regardless of the permanency of the items within the excavation, should require no prior NRC approval for their placement if they have no bearing on the safety-related structures or the seismic analysis of the facility and do not present a radiological hazard.