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Cc: Michael Tschiltz; HOLTZMAN, Benjamin; Steven Nesbit; Chisholm, Brandon M.; O'NEILL, Martin; Pate, Barton Landon
Subject: [External_Sender] TICAP PDC White Paper
Attachments: TICAP Proposal for Non-LWR PDC_final.pdf

Dear Messrs Eric Oesterle and Joe Sebrosky,
Please find attached TICAP's PDC white paper. The paper provides the technical and regulator bases for TICAP's proposed approach for developing PDC by those applicants that use NEI-18-04 methodology. We will be happy to discuss the paper, if desired.
Best regards,
Amir

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Acceptability of the Industry-Led Technology Inclusive Content of Application Project (TICAP) Proposal for Non-LWR Principal Design Criteria

July 2021

Purpose

This paper provides the basis for the acceptability of the approach for developing and identifying design-specific Principal Design Criteria (PDC) proposed by the industry-led Technology Inclusive Content of Application Project (TICAP). Specifically, this paper explains how a non-light water reactor (non-LWR) license applicant satisfies applicable NRC requirements in 10 CFR Part 50/52 when it demonstrates that its proposed PDC, combined with its programmatic requirements, meet the intent of the safety concepts described in the NRC’s General Design Criteria (GDC) and/or the Advanced Reactor Design Criteria (ARDC), insofar as those safety concepts are germane to the applicant’s specific reactor technology. This paper further explains that, in doing so, a non-LWR applicant need not demonstrate “compliance” with the GDC or ARDC per se, which, as the NRC has acknowledged, provide guidance but impose no regulatory requirements on non-LWR applicants. Thus, it follows that a non-LWR applicant need not directly compare or correlate the contents of its application to the GDC or ARDC to satisfy the applicable NRC regulations. Imposing such a requirement on non-LWR applicants would run counter to the TICAP affirmative safety case-based approach as well as the legal principles and regulatory precedent discussed below.

Introduction

TICAP was initiated to provide guidance on the content of application for those applicants that use the Nuclear Energy Institute (NEI) 18-04 methodology¹ for developing and evaluating their safety cases. As part of its guidance, TICAP provides a systematic, comprehensive, and technology-inclusive approach for developing PDC directly from the steps taken and the analyses performed as part of developing a Licensing Modernization Project (LMP)-based safety case. Regarding radiological releases during off-normal operations impacting the public, such PDC, together with the programmatic requirements identified during the development of an LMP-based safety case, fully meet the intent of the applicable safety concepts that are described in the NRC’s GDC and ARDC, and which help inform the NRC’s adequate protection finding.

Regulatory Requirements for Non-LWR Principal Design Criteria

PDC are required to be identified as part of nuclear power reactor license applications in the following regulations: 10 CFR 50.34; 10 CFR 52.47, 52.79, 52.137, and 52.157. More specifically, 10 CFR 50.34(a)(3)(i) states:

¹ This methodology is also referred to as the Licensing Modernization Project (LMP) approach. See NEI 18-04, “Risk-Informed Performance-Based Technology-Inclusive Guidance for Non-Light Water Reactor Licensing Basis Development, Revision 1 (August 2019) (ADAMS Accession No. ML19241A336). In Regulatory Guide (RG) 1.233 (June 2020) (ADAMS Accession No. ML20091L698), the NRC endorsed NEI 18-04 as one acceptable method for informing the licensing basis and determining the appropriate scope and level of detail for parts of applications for licenses, certifications, and approvals for non-LWRs.

Preliminary safety analysis report. Each application for a construction permit shall include a preliminary safety analysis report. The minimum information^[5] to be included shall consist of the following:

. . . The preliminary design of the facility including:

- (i) The principal design criteria for the facility.^[8] Appendix A, General Design Criteria for Nuclear Power Plants, establishes minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design and location to plants for which construction permits have previously been issued by the Commission and provides guidance to applicants for construction permits in establishing principal design criteria for other types of nuclear power units;
- (ii) The design bases and the relation of the design bases to the principal design criteria;
- (iii) Information relative to materials of construction, general arrangement, and approximate dimensions, sufficient to provide reasonable assurance that the final design will conform to the design bases with adequate margin for safety.

For completeness, footnotes [5] and [8] state:

^[5] The applicant may provide information required by this paragraph in the form of a discussion, with specific references, of similarities to and differences from, facilities of similar design for which applications have previously been filed with the Commission.

. . . ^[8] General design criteria for chemical processing facilities are being developed.

Additional information on PDC is provided in Appendix A of 10 CFR 50. The Introduction section of 10 CFR 50 Appendix A states:

Under the provisions of § 50.34, an application for a construction permit must include the principal design criteria for a proposed facility. Under the provisions of 10 CFR 52.47, 52.79, 52.137, and 52.157, an application for a design certification, combined license, design approval, or manufacturing license, respectively, must include the principal design criteria for a proposed facility. The principal design criteria establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety; that is, structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.

These General Design Criteria establish minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design and location to plants for which construction permits have been issued by the Commission. The General Design Criteria are also considered to be generally applicable to other types of nuclear power units and are intended to provide guidance in establishing the principal design criteria for such other units.

Regulatory Guide (RG) 1.232 also notes that the GDC are not applicable to non-LWRs (see first bolded statement in the below-quoted text from RG 1.232). Although the NRC developed RG 1.232 to identify ARDC, the guide states unequivocally that neither the GDC nor the ARDC are final and binding regulatory requirements for non-LWRs (emphasis added):

Together, these requirements recognize that different requirements may need to be adapted for non-LWR designs and that ***the GDC in 10 CFR 50 Appendix A are not regulatory requirements for non-LWR designs*** but provide guidance in establishing the PDC for non-LWR designs. The non-LWR design criteria developed by the NRC staff and included in Appendices A to C of this regulatory guide are intended to provide stakeholders with insight into the staff's views on how the GDC could be interpreted to address non-LWR design features; however, ***these are not considered to be final or binding regarding what may eventually be required from a non-LWR applicant***. It is the applicant's responsibility to develop the PDC for its facility ***based on the specifics of its unique design***, using the GDC, non-LWR design criteria, ***or other design criteria*** as the foundation. Further, the applicant is responsible for considering public safety matters and fundamental concepts, such as defense in depth, in the design of their specific facility and for identifying and satisfying ***necessary safety requirements***.

As reflected in their June 23, 2021, public meeting slides² the NRC staff acknowledged that neither the GDC nor the ARDC are regulatory requirements for non-LWR applicants.

TICAP Approach for Developing LMP-Based PDC

Two major objectives for the TICAP effort are:

1. To satisfy regulatory requirements without imposing undue burden upon applicants that utilize the NEI 18-04 approach³ (i.e., the LMP approach) and the TICAP guidance for submitting an application under 10 CFR Part 50 or Part 52; (including minimizing the number of exemptions required for an applicant to comply with the applicable existing regulations); and
2. To maximize the advantages afforded to an applicant that uses a risk-informed and performance-based (RIPB) approach to safety and licensing.

In keeping with Objectives 1 and 2, the draft TICAP guidance document⁴ describes an approach to identifying a set of design-specific PDC for a non-LWR that:

- Need not be evaluated against the GDC or ARDC because demonstrating compliance with the GDC and/or ARDC are not regulatory requirements for non-LWR applicants;
- Includes design criteria related to the Required Safety Functions that will be present in the facility's design to ensure that the plant will meet the performance objectives of the Fundamental Safety Functions (FSFs) during Design Basis Accidents (i.e., the design-specific Required Function Design Criteria); and

² ADAMS Accession Number: ML21173A262.

³ ADAMS Accession Number: ML19241A472.

⁴ ADAMS Accession Number: ML21106A013.

- Does **not** include design philosophies, programmatic capabilities, and/or defense-in-depth measures (i.e., “fabrication, construction, testing, and performance requirements”). These aspects of a facility’s safety case will be addressed elsewhere in the Safety Analysis Report (SAR) as other elements⁵ of an affirmative LMP-based safety case developed using the methodology described in NEI 18-04 and endorsed by the NRC in RG 1.233.

As described in the draft TICAP guidance document and slides from public meetings⁶ between the TICAP team and NRC staff, an affirmative safety case is a collection of technical and programmatic evidence which documents the basis that the performance objectives of the technology-inclusive FSFs are met by a design during design-specific Anticipated Operational Occurrences, Design Basis Events, Beyond Design Basis Events, and Design Basis Accidents. This is accomplished by the following:

- Identifying design-specific safety functions that are adequately performed by design-specific Structures, Systems, and Components (SSCs); and
- Establishing design-specific features (programmatic, e.g., inspections, or physical, e.g., passive, redundant, or diverse) to provide reasonable assurance that SSC functions are reliably performed and demonstrate Defense-in-Depth (DID) adequacy.

The term safety case is a collection of statements that, when confirmed to be true by supporting technical information, establishes reasonable assurance of adequate protection of the public from Licensing Basis Events during operation of the nuclear power plant described in the application. An affirmative safety case is a holistic approach that focuses on demonstrating that a set of FSFs will be accomplished. It may be contrasted with a traditional compliance-oriented safety case that demonstrates the satisfaction of pre-established requirements using a prescribed set of processes or equipment.

Technical Basis for TICAP Proposed PDCs and Programmatic Requirements Meeting the GDC and ARDC Safety Concept

As illustrated in Figure 1, the LMP-based affirmative safety case philosophy can be thought of as systematically and comprehensively addressing the following questions⁷ in assessing nuclear power plant design and operations for the protection of the public health and safety:

- **What** are the performance objectives for the FSFs?
- **When** do the performance objectives of the FSFs need to be demonstrated?
- **How** do plant capabilities (functional and structural) demonstrate that the FSFs are met?

⁵ For example, the Complementary Design Criteria are identified in SAR Chapter 5, “special treatment” requirements are listed in SAR Chapters 6 and 7 for Safety-Related SSCs and Non-Safety-Related SSCs with Special Treatment, respectively, and plant programs are identified in SAR Chapter 8. Note that the TICAP SAR organization differs from the standard light water reactor organization (i.e., RG 1.70).

⁶ Including ADAMS Accession Numbers: ML21173A262, ML21146A089, and ML21138A874.

⁷ For brevity, the elements of the safety case that answer individual questions are referred to using the bolded words of the corresponding question (e.g., “How” or “How Well”), and collectively the information is abbreviated using the term “WVHHW constituents.”

- **How well** do these capabilities need to be performed to provide reasonable assurance of adequate protection to the public?

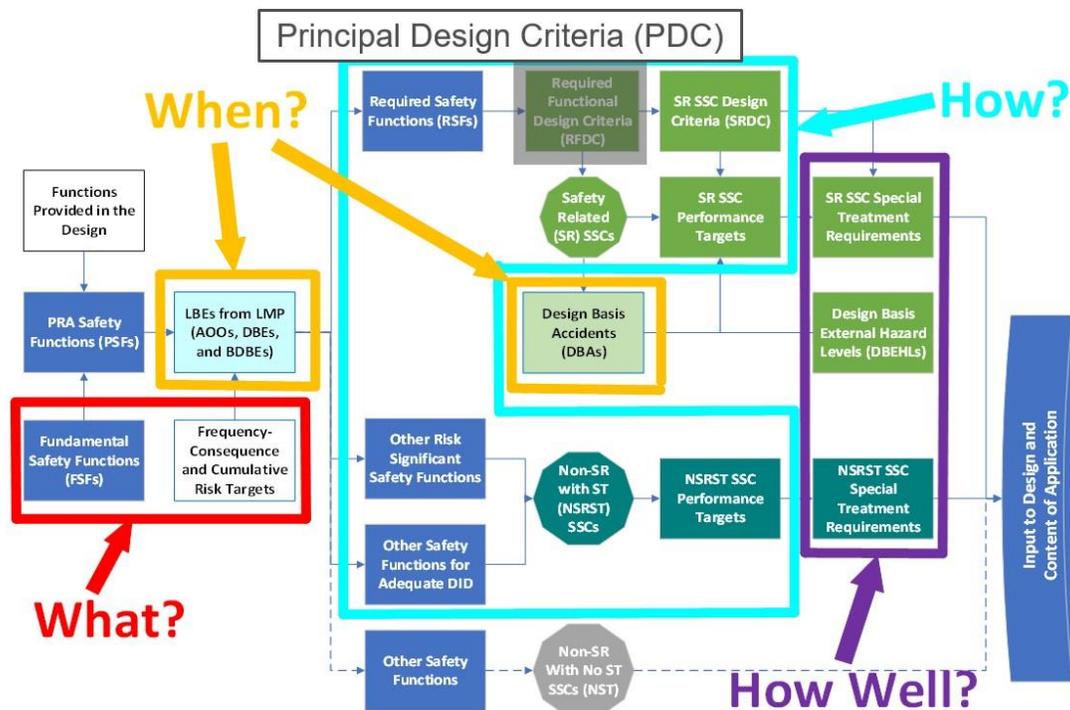


Figure 1. WWHHW Constituents of the LMP-Based Safety Case

The use of the LMP approach establishes a comprehensive set of requirements for meeting the performance objectives of the FSFs through the systematic development of a safety case that includes:

- The “How” constituent, including Required Safety Functions (RSFs), Required Functional Design Criteria (RFDC), and Safety-Related Design Criteria (SRDC); as well as
- The “How Well” constituent, including Special Treatments applied to certain SSCs and Plant Programs.

The safety concepts utilized to develop the GDC and the ARDC are based upon a set of prescriptive criteria that, to a large degree, identify programs and equipment that pertain to both the “How” and the “How Well” constituents of a safety case; furthermore, the design criteria presume functionality requirements that may or may not be applicable to any specific technology or its RIPB safety case. Although both the “How” and “How Well” constituents are fundamental and necessary aspects of a design-specific safety case, the approach proposed by LMP and TICAP is to satisfy these concepts while including them in the SAR, such that PDC formulation covers only functional requirements (i.e., “How?”). The programmatic requirements and configurations applied to the SSCs performing the functions (i.e., “How Well?”) are described; however, these programmatic requirements and configurations are not labeled as PDC. This methodology, while comprehensively addressing the required elements of the design-specific safety case, facilitates efficient (i) preparation by an applicant, (ii) review by the regulator, (iii) maintenance by the licensee, and (iv) ease of use by stakeholders, including the public.

Specifically, as documented in the draft TICAP guidance document,⁸ the TICAP team’s proposal is that an applicant’s design-specific PDC are comprised of the set of design-specific RFDC, which are derived from the RSFs developed using the LMP approach described in NEI 18-04 and endorsed in RG 1.233. Importantly, the RFDC includes **the complete set** of functional design criteria related to phenomena that could result in a failure to meet the performance objectives of the FSFs, without presuming which phenomena may or may not be applicable to the RIPB safety case of a given design.

The PDC established using this approach will not include information regarding special treatment items such as fabrication, construction, and testing requirements for SSCs. However, these topics are included in an affirmative LMP-based safety case as design philosophies, programmatic capabilities, and DID measures. As such, the information pertaining to the “How Well” constituent of the design-specific safety case (e.g., fabrication, construction, and testing requirements) will be described in a SAR developed using the TICAP guidance.⁹

In summary, the TICAP methodology develops the description of the affirmative LMP-based safety case that provides:

- The same type of information in the GDC or ARDC, although the information is not uniformly identified as PDC; and
- A more complete and systematic basis¹⁰ for a facility’s safety based on the specifics of its unique design. The RFDC, SRDC, applied Special Treatments, Complementary Design Criteria, and description of both programmatic and plant capability-specific requirements provide a more complete picture of the design-specific safety case than that provided by the GDC or ARDC.

Rationale for TICAP Approach to Developing PDC

In the June 23, 2021, public meeting,¹¹ NRC staff members posited that the description of PDC provided in the Introduction section of Appendix A of 10 CFR 50 (provided above) may be a regulatory requirement, such that, without directly relating/comparing design-specific PDC to ARDC, the above-described TICAP strategy of focusing the PDC strictly on functional design criteria may not comply with current NRC regulations and thus may require an exemption. Notably, this staff position did not reflect input from the Office of General Counsel. Moreover, in that same meeting, the NRC staff acknowledged that the ARDC “. . . are not considered to be final or binding regarding what may eventually be required from a non-LWR applicant.”¹² This position that the ARDC are not binding is consistent with the established

⁸ ADAMS Accession Number: ML21106A013.

⁹ For example, Special Treatments for Safety-Related SSCs will be identified in Chapter 6 of the SAR, and Plant Programs will be identified in Chapter 8 of the SAR.

¹⁰ The exception to this “more complete basis” is the set of design criteria pertaining to aspects of the application content outside of the scope of TICAP, such as effluents during normal operations.

¹¹ ADAMS Accession Number: ML21173A262.

¹² June 23, 2021 Public Meeting, NRC Staff Meeting Slide 6 (ADAMS Accession Number ML21173A262).

understanding of a regulatory guide as being one of multiple methods for meeting regulatory expectations.¹³

From the perspective of the TICAP team, the TICAP proposal is sufficient to satisfy the basic requirements of 10 CFR 50.34(a)(3)(i) or equivalent, and this methodology does not require exemptions because the proposed TICAP approach for describing the design-specific safety case (which includes describing PDC, CDC, and programmatic requirements):

- Has been shown to provide the information that covers the intent of the applicable safety concepts included in ARDC; and
- Would include required design-specific safety features identified by the RIPB LMP approach that may not be included in the ARDC (or GDC).

The TICAP team respectfully disagrees with the position that the single-sentence description of the PDC contained in the Introduction to Appendix A to 10 CFR 50 imposes any binding regulatory requirement on non-LWR license applicants. As discussed below, reading the sentence in question to impose such a requirement runs counter to settled principles of regulatory interpretation, is inconsistent with the regulatory history of Appendix A, and contravenes recent statements made by the NRC staff in multiple regulatory documents, including non-LWR guidance. In short, Appendix A does not impose requirements on non-LWR applicants, who may establish design-specific terms for their design-specific PDC in accordance with NRC's current non-LWR and LMP-specific guidance in RG 1.232 and RG 1.233, respectively.

Legal Interpretation of Appendix A to 10 CFR 50 Applicability to Non-LWRs

Drawing from well-established judicial principles, the Commission has held that the interpretation of a regulation “begins with the language and structure of the provision itself.”¹⁴ It has further held that “[i]n construing a regulation’s meaning, it is necessary to examine the agency’s entire regulatory scheme.”¹⁵ As such, “provisions are not to be read in isolation without regard to the regulatory scheme in its totality,” and “must be ‘construed in connection with every other part or section so as to produce a harmonious whole.’”¹⁶ In this case, the introductory sentence at issue must be viewed in connection with Appendix A as a whole to fully ascertain its intended purpose and effect.

In applying these principles, it is clear that the description of the PDC contained in the Introduction to Appendix A does not itself impose any specific requirements or constraints on non-LWR applicants. (Clearly, the Atomic Energy Act itself and other NRC regulations require all reactor applicants to provide reasonable assurance that their facilities can be operated without undue risk to the health and safety of the public). The clear and overarching purpose of Appendix A to Part 50 is to codify the GDC, which

¹³ See, e.g., RG 1.232 at 3 (“Regulatory guides are not substitutes for regulations and compliance with them is not required. Methods and solutions that differ from those set forth in RGs will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.”).

¹⁴ Northeast Nuclear Energy Co. (Millstone Nuclear Power Station, Unit 3), CLI-01-10, 53 NRC 353, 361 (2001).

¹⁵ *Id.* at 366.

¹⁶ U.S. Department of Energy (High-Level Waste Repository), LBP-04- 20, 60 NRC 300, 335 (quoting 2A Norman J. Singer, Sutherland Statutory Construction § 46.05 (6th ed. 2000)).

“establish minimum requirements for the principal design criteria for *water-cooled nuclear power plants* similar in design and location to plants for which construction permits have been issued by the Commission.”¹⁷ The Introduction of Appendix A further states that, while the GDC are also considered to be “generally applicable” to other types of nuclear power units, they only “are intended to provide guidance in establishing the principal design criteria for such other units.”¹⁸ Notably, 10 CFR 50.34(a)(3)(i) describes the purpose and effect of Appendix A in essentially the same terms:

Appendix A, General Design Criteria for Nuclear Power Plants, establishes minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design and location to plants for which construction permits have previously been issued by the Commission and provides guidance to applicants for construction permits in establishing principal design criteria for other types of nuclear power units.¹⁹

Thus, the notion that the single introductory sentence in Appendix A cited by the staff during the June 23, 2021, public meeting establishes binding, prescriptive requirements for non-LWR applicants is contrary to the express purpose, language, and structure of Appendix A (and 10 CFR 50.34(a)(3)(i)). Indeed, upon closer inspection, it is quite clear that the sentence in question is strictly prefatory in nature. Namely, it is intended to provide a very high-level *description* of the contents of what follows—the GDC—not a binding definition of “principal design criteria.” Even a cursory review of the GDC makes clear that they address, in large part, the broad categories of activities to which the prefatory sentence logically refers—i.e., design, fabrication, construction (also called erection), testing, and performance requirements for SSCs important to safety. If the Commission had intended to establish such a binding definition, then it could have formally defined that term in any number of places; for example, in 10 CFR 50.2, 10 CFR 50.34(a)(3), the “Definitions and Explanations” section of Appendix A, and/or in 10 CFR 52. The Commission’s decision not to do so is significant and telling.

Supporting Regulatory History and Case Law (That Appendix A Does Not Impose Requirements on Non-LWR Applicants, and That Such Applicants Establish the PDC Based on Their Specific Designs)

The regulatory history of Appendix A further supports the conclusion that the introductory sentence cited by the NRC staff does not constitute a legally binding definition of PDC or other requirements for non-LWR applicants. When the Commission proposed to amend Part 50 to add Appendix A in 1967, it noted that “[t]he purpose of the proposed amendment would be to provide guidance to applicants in developing the principal design criteria to be included in applications for Commission construction permits.”²⁰ It emphasized that “[t]hese General Design Criteria would *not add any new requirements*, but are intended to describe more clearly present Commission requirements to assist applicants in preparing applications.”²¹ The Commission also noted that the “principal design criteria for the facility” would be “established by an applicant” and, if accepted by the Commission, would be incorporated by reference in

¹⁷ 10 CFR 50, Appendix A, Introduction (emphasis added).

¹⁸ *Id.*

¹⁹ 10 CFR 50.34(a)(3)(i).

²⁰ General Design Criteria for Nuclear Power Plant Construction Permits; Proposed Rule, 32 Fed. Reg. 10213, 10214 (July 11 1967).

²¹ *Id.* (emphasis added).

the construction permit.²² Finally, in the originally-proposed Appendix A text, the Commission conveyed its expectation that “additional criteria will be needed ... for new and advanced types of reactors” and that “[w]ithin this context, the General Design Criteria should be used as a reference allowing additions or deletions as an individual case may warrant.”²³

When the Commission issued Appendix A in final form in 1971, the Commission added the sentence now cited by the NRC staff 50 years later to the Introduction of Appendix A, but did not elaborate on its reason for doing so.²⁴ However, it reiterated that the GDC—the subject of Appendix A—“establish minimum requirements for water-cooled nuclear power plants” and provide only “guidance” relative to other types of nuclear power plants.²⁵ The Commission noted again that the PDC are established by an applicant for review and approval by the Commission.²⁶ Additionally, in text that is still found in Appendix A, the Commission clarified that “[t]he development of these [GDC] is not yet complete” and cited the need for “amplification” of some of the definitions and specific design requirements.²⁷

In decisions issued not long after Appendix A’s issuance, the U.S. Court of Appeals and the Commission confirmed the advisory nature of the GDC. In *Nader v. NRC*, 513 F.2d 1045, 1053 (D.C. Cir. 1975), the D.C. Circuit noted that “when the Commission announced the General Design Criteria, it took pains to point out that they were only a regulatory beginning and not the end product.” In a 1978 adjudicatory decision, the Commission, quoting the *Nader* decision, expanded on this point, emphasizing the flexibility accorded applicants in demonstrating the safety of their reactor designs:

General design criteria (GDC), as their name implies, are “intended to provide engineering goals rather than precise tests or methodologies by which reactor safety [can] be fully and satisfactorily gauged.” *Nader v. NRC*, 513 F.2d 1045, 1052 (1975). They are cast in broad, general terms and constitute the minimum requirements for the principal design criteria of *water-cooled nuclear power plants*. *There are a variety of methods for demonstrating compliance with GDC*. Through regulatory guides, standard format and content guides for safety analysis reports, Standard Review Plan provisions, and Branch Technical Positions, license applicants are given guidance as to acceptable methods for implementing the general criteria. **However, applicants are free to select other methods to achieve the same goal.** If there is conformance with regulatory guides, there is likely to be compliance with the GDC. *Even if there is nonconformance with the staff’s guidance to licensees, the GDC may still be met.*²⁸

This Commission decision underscores that Appendix A, the source of the GDC, does not impose binding requirements on non-LWR applicants or dictate how such applicants establish the PDC for their proposed

²² *Id.*

²³ *Id.* at 10215.

²⁴ See General Design Criteria for Nuclear Power Plants; Final Rule, 36 Fed. Reg. 3255, 3257 (Feb. 20, 1971).

²⁵ *Id.* at 3256, 3257.

²⁶ *Id.* at 3256.

²⁷ *Id.* at 3257.

²⁸ “Petition for Emergency and Remedial Action,” CLI-78-6, 7 NRC 400, 406-07 (1978) (emphasis added).

facilities. As discussed in the next section, this conclusion is consistent with current NRC guidance for non-LWRs and recent NRC staff statements.

Current NRC Guidance and Recent Staff Statements Further Confirm that Appendix A Imposes No Requirements on Non-LWRs and That No Exemption from Appendix A Is Necessary

As noted above, the NRC staff developed RG 1.232 for use by designers, applicants, and licensees in developing PDC for non-LWR designs, including adapting relevant GDC in Appendix A for non-LWRs. RG 1.232 reinforces the view that non-LWR applicants have considerable latitude in how they establish the PDC for their facilities. Specifically, it indicates that:

- The GDC in 10 CFR 50 Appendix A are not regulatory requirements for non-LWR designs but provide guidance in establishing the PDC for non-LWR designs.²⁹
- The non-LWR design criteria developed by the NRC staff and included in Appendices A to C of RG 1.232 (which include the ARDC) are intended to provide stakeholders with insight into the staff's views on how the GDC could be interpreted to address non-LWR design features; however, they are not considered to be final or binding on non-LWR applicants.³⁰
- The applicant is responsible for developing the PDC for its facility based on the specifics of its unique design, using the GDC, non-LWR design criteria, *or other design criteria* as the foundation.³¹
- Since the GDC in Appendix A are not regulatory requirements for non-LWR designs but provide guidance in establishing the PDC for non-LWR designs, *non-LWR applicants would not need to request an exemption from the GDC in 10 CFR Part 50 when proposing PDC for a specific design.*³²

The last statement is especially significant because it contradicts the claim that a non-LWR applicant must seek an exemption from Appendix A for purposes of establishing the PDC for its unique facility. Moreover, it is illogical to conclude that a non-LWR applicant must seek an exemption from a single prefatory sentence contained in the Introduction to Appendix A when that applicant is not required to seek an exemption from the GDC themselves.

The NRC staff has made statements similar to those listed above in other recent documents. For example, when the staff responded to stakeholder comments on DG-1330 (the draft version of RG 1.232), it noted that “[a] vendor can propose design-specific terms for their design-specific PDCs,” and that “[a]n exemption is not needed since the GDC in 10 CFR 50 Appendix A are not requirements for non-LWRs.”³³ In a November 17, 2020, letter to Oklo concerning its Aurora micro-reactor license application, the staff stated, “Non-LWRs are not required to demonstrate compliance with Appendix A,” which “provides guidance for PDC development.”³⁴ In the Appendix to a February 2021 draft white paper concerning the

²⁹ RG 1.232, Rev. 0, at 7.

³⁰ *Id.*

³¹ *Id.* (emphasis added).

³² *Id.* at 11 (emphasis added).

³³ Response to Public Comments on Draft Regulatory Guide DG-1330, “Guidance for Developing Principal Design Criteria for Non-Light Water Reactors”, at 19, 23 (Apr. 30, 2018) (ML17325A616).

³⁴ Letter from J. Mazza, NRC, to C. Cochran, Oklo, “Oklo Step 1 Technical Review of Key Safety and Design Aspect Activities Related to the Applicability of Regulations,” Encl. 1 at 1 (Nov. 17, 2020) (ML20300A593).

applicability of NRC regulations to non-LWRs, the NRC staff noted that RG 1.232 represents only one means for satisfying the requirement that an application includes PDC and that an applicant may address the relevant safety concepts through other means.³⁵ Finally, in its July 2021 update to the aforementioned draft white paper, the staff noted that while a non-LWR applicant should ensure it has adequately addressed the “safety concepts” described in 10 CFR Part 50, Appendix A, “as applicable to the applicant’s specific reactor technology,” “Appendix A is not a requirement” for non-LWR applicants.³⁶ It also reiterated that “RG 1.232 is guidance, and as such represents only one means for satisfying the regulation.”³⁷

Summary

NRC regulations require reactor applicants under 10 CFR 50 and 52 to identify their PDC. The TICAP proposal is that applicants following NEI 18-04 use the design-specific RFDC as PDC, and describe other elements (including CDC and programmatic requirements) in the SAR without labelling them as PDC. RFDC and programmatic requirements are identified using the systematic, risk-informed LMP process and are both key elements of the LMP-based affirmative safety case. NRC regulations and guidance acknowledge that there is no requirement to apply either the GDC in 10 CFR 50 Appendix A or the ARDC in RG 1.232 to advanced reactors. Accordingly, applicants following the NEI 18-04 and TICAP approach to identifying PDC are not required to:

1. Demonstrate compliance with the GDC or ARDC per se (i.e., as if they were binding, prescriptive requirements for non-LWRs), or directly compare or correlate the GDC or the ARDC to the contents of their LMP/TICAP-based applications (i.e., as if they GDC or ARDC were non-LWR-specific requirements or acceptance criteria rather than a source of safety concepts to be addressed, as applicable, in a non-LWR’s design-specific affirmative safety case); or
2. Request exemptions from NRC regulations to support the LMP/TICAP approach to identifying PDC.

³⁵ Appendix to NRC Staff Draft White Paper: Analysis of Applicability of NRC Regulations for Non-Light Water Reactors, at 3 (Feb. 2021) (ML21049A098).

³⁶ Updated NRC Staff Draft White Paper Analysis of Applicability of NRC Regulations for Non-Light Water Reactors (July 2021), at 16 n.5, 34 (ML21175A287).

³⁷ *Id.* at 34.