Comments on NRC Draft Letter to NEI Regarding
"Clarification of Regulatory Paths for Lead Test Assemblies"
NRC Docket ID NRC-2018-0109

Submitted by Rick Ennis
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1.0 BACKGROUND

By *Federal Register* notice (FRN) dated June 7, 2018 (83 FR 26503), as supplemented by FRN dated July 2, 2018 (83 FR 30989), the U.S. Nuclear Regulatory Commission (NRC) solicited public comments on a draft letter to the Nuclear Energy Institute (NEI) "clarifying the regulatory paths for the use of lead test assemblies (LTAs)" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18100A045).

As a former NRC staff member, I previously raised a number of concerns on the proposed regulatory framework regarding use of LTAs. These concerns were summarized in an internal NRC memo to the NRC's General Counsel, dated March 22, 2018, which I co-authored with Mr. Harold Chernoff. The March 22, 2018, memo raised concerns regarding an earlier version of the draft letter to NEI. Following my retirement from the NRC, Mr. Chernoff filed a non-concurrence on the current version of the NEI letter (ADAMS Accession No. ML18151B016). Appendix A to Mr. Chernoff's non-concurrence includes a redacted version of the memo dated March 22, 2018 (including redaction of my name as one of the authors).

2.0 SUMMARY OF CONCERNS

Based on my review of the regulatory framework discussed in the current version of the draft letter to NEI, I continue to have the same concerns expressed in the memo to the NRC's General Counsel dated March 22, 2018. Specifically, the draft letter provides guidance that is inconsistent with the NRC's Principles of Good Regulation. With respect to "Openness," the guidance would establish a new regulatory framework that would exclude the public from any meaningful participation in licensee use of LTAs (i.e., since license amendments would generally not be needed). With respect to "Clarity," the guidance would establish positions that are not coherent, not logical, and not readily understood based on past practice and numerous safety evaluations expressing different positions. With respect to "Reliability," the guidance leads to uncertainty and a lack of regulatory stability. In addition, the guidance is not fully consistent with the NRC's regulations and applicable laws. My specific comments in response to the FRNs are provided below.

3.0 COMMENTS

3.1 Comment 1 – Draft Letter Regulatory Framework is Not Legally Justified

I fully endorse the positions stated in Mr. Chernoff's non-concurrence. The positions stated by Mr. Chernoff are logical, coherent, and fully consistent with the regulations and precedence. The NRC's response to the non-concurrence (see pdf pages 72 through 85 of ML18151B016), offers weak, misleading, and unconvincing arguments to support the positions stated in the draft letter to NEI. The regulatory framework in the draft letter is not legally justified. As such, the draft letter to NEI should be revised in a manner consistent with the regulatory framework discussed by Mr. Chernoff in his non-concurrence and the memo to the NRC's General Counsel dated March 22, 2018, including its enclosures.

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3.2 Comment 2 – NRC's Position is Contrary to Safety of Public and Environment

This proposed effort to change the regulatory framework for licensing of LTAs appears to be driven by the NRC's recent vision for innovative and transformative change. While innovation and transformation are warranted in some areas, the NRC must be careful not to take actions which may impact its main goal of "protecting people and the environment." The effect of the proposed LTA framework would be to reduce NRC licensing oversight of fuel assemblies with new cladding and pellet materials. As discussed in Section 2.1, "Safety Margin," of Enclosure 2 to the memo to the NRC's General Counsel dated March 22, 2018, the margin of safety (i.e., the third standard in 10 CFR 50.92) is associated with the confidence in the ability of the fission product barriers (i.e., fuel cladding, reactor coolant pressure boundary, and containment structure) to limit the level of radiation dose to the public. Maintaining the integrity of the fuel cladding is one of the fundamental concepts with respect to the plant safety margin. Furthermore, a nuclear core reload utilizing fuel assemblies with the following attributes could potentially represent a significant hazard due to a significant reduction in safety margin: (1) fuel assemblies different than those previously found acceptable to the NRC; and (2) fuel assemblies whose analytical methods have not been previously approved by the NRC. The NRC's apparent willingness to abdicate the authority to review new fuel assembly designs, before they are utilized in the reactor core, is unwise and contrary to the goal of ensuring the safe use of radioactive materials in order to protect people and the environment.

3.3 Comment 3 – NRC's Interpretation of Technical Specification 4.2.1 is Ludicrous

Pages 2 through 4 of the NRC's draft letter to NEI discuss the interpretation of the language in Standard Technical Specification (STS) 4.2.1, "Fuel Assemblies." This interpretation is contrary to a plain language reading of the STS 4.2.1 as well as a substantial history of license amendments and other NRC documents. In accordance with typical plain language writing guidance: (1) a paragraph should be about one topic; (2) each paragraph should start with a topic sentence that captures the essence of everything in the paragraph; and (3) the main idea should be placed before exceptions and conditions. The following is a breakdown of my comments on the NRC's interpretation of each portion of STS 4.2.1 as stated in the draft letter to NEI:

3.3.1 First Two Sentences of STS 4.2.1

The first two sentences of STS 4.2.1 state:

> The reactor shall contain [###] fuel assemblies. Each assembly shall consist of a matrix of [Zircaloy or ZIRLO] fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO2) as fuel material.

The NRC's draft letter to NEI states that "[t]he first sentence should be read to include LTAs (i.e., LTAs are fuel assemblies and count toward the specified [XXX] number of fuel assemblies)." I agree with this statement. The draft NRC letter does not explicitly provide an interpretation of the second sentence of STS 4.2.1. However, when interpreting the fifth sentence of STS 4.2.1, the NRC's draft letter indicates that LTAs may have different material design specifications than the approved co-resident fuel assemblies defined earlier in STS 4.2.1. Since LTAs are part of the total number of fuel assemblies in the core (i.e., first sentence), and the second sentence starts by saying **"each assembly"** (and no exception is discussed), it is clear that the second sentence also applies to LTAs. To argue otherwise is

ludicrous and is contrary to a plain language reading of the first two sentences. To argue that the second sentence does not apply to LTAs is also contrary to the numerous license amendments issued for the express purpose of revising the second sentence of this TS to describe different LTA materials. A list of amendments issued for use of LTAs is included as Table 1 in Enclosure 2 to the memo to the NRC's General Counsel dated March 22, 2018. Based on the above considerations, a licensee desiring to use an LTA, with a cladding or pellet material composition different that specified in this TS, needs prior NRC approval by a license amendment.

3.3.2 Forth Sentence of STS 4.2.1

The fourth sentence of STS 4.2.1 states:

> Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases.

The NRC's draft letter to NEI states that the fourth sentence "applies to the use of fuel assemblies for batch loading and reconstituted fuel." However, the fourth sentence in STS 4.2.1 contains no language to indicate an exception to the topic of the paragraph (i.e., all fuel assemblies). As such, consistent with a plain language reading of this sentence, in the context of the entire paragraph, it is clear that the fourth sentence also applies to LTAs. In fact, the expectation that LTAs be analyzed with approved methods and meet the fuel safety design bases is supported by a September 23, 1981, letter from the NRC (T.A. Ippolito) to General Electric (R. Engel), "Lead Test Assembly Licensing" (ADAMS Legacy Library Accession No. 8110090006). This letter, which pre-dates the requirements later incorporated into the STSs, stated that one of the "key elements" for licensee use of LTAs was "analysis of the LTAs using approved methods" and that the analysis meets the approved criteria. The September 23, 1981, "Ippolito letter" was later referenced in NRC-approved topical report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (referred to as the GESTAR II). Specifically, Section 1.2, "Basis for Fuel Licensing Criteria," in Revision 23 to GESTAR II (ML16250A043) dated September 2, 2016, states that NRC-approved analytical models and analysis procedures will be used to evaluate new fuel designs and that the method for licensing LTAs (called "lead use assemblies" in GESTAR II) will be in accordance with the September 23, 1981, Ippolito letter.

The position that LTAs need to analyzed with approved codes and methods is further supported by TS requirements regarding the Core Operating Limits Report (COLR). This TS (TS 5.6.3 in the STS) states that "The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC." This TS also lists the specific NRC-approved topical reports which provide the methods for analyzing the core operating limits. For example, for a boiling water reactor (BWR), plant TSs would typically list NEDE-24011-P-A. There is nothing in STS 4.2.1 that would exclude LTAs from being analyzed with the approved methods listed in STS 5.6.3 (i.e., licensees are required to comply will all provisions of their TSs).

In summary, any assertion that LTAs do not need to be analyzed with NRC staff approved codes and methods is contrary to a plain language reading of STS 4.2.1, the requirements in STS 5.6.3, and the NRC's long-standing policy as stated in the 1981 Ippolito letter and as further stated in NRC-approved GESTAR II.

3.3.3 Fifth Sentence of STS 4.2.1

The fifth sentence of STS 4.2.1 states:

> A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions.

The NRC's draft letter to NEI states that "[b]ecause LTAs may, by definition, incorporate new design features or materials, this sentence can be read as separate from the other limitations placed on fuel assemblies. As such, LTAs may comprise features with different mechanical or material design specifications than the approved co-resident fuel assemblies defined earlier in STS Section 4.2.1." As discussed above in Section 3.3.1, it is clear that the second sentence of STS 4.2.1 applies to LTAs. Although the fifth sentence contains an exception to certain provisions for LTAs, the exception in no way relates to the cladding and pellet material specifications stated in the second sentence of STS 4.2.1. Once again, the NRC's argument is ludicrous and is contrary to a plain language reading of STS 4.2.1.

3.4 Comment 4 – NRC Position is Contrary to Perry Decision

Pages 4 and 5 of the NRC's draft letter to NEI discuss use of approved methods. The letter states, in part, that:

> The NRC staff's position is that approved methods should be used wherever possible; however, approved methods for the LTA fuel (e.g., assembly-specific CHF correlations) may not exist. In those instances, the licensee should perform a conservative evaluation of the LTAs using the approved codes and methods for the core.

The draft letter to NEI also states that:

> The evaluation of LTA campaigns necessarily requires some engineering judgment due to incomplete representative data availability prior to irradiation of the LTAs, and **evaluation may necessitate modifications to approved codes and methods or the use of such codes and methods outside the bounds for which they were explicitly approved.** [emphasis added]

The *Perry* decision (Commission Memorandum and Order CLI 96-12, 44 NRC 315, December 6, 1996, ADAMS Accession No. ML16355A465) is sometimes referenced in the context of establishing or refining the NRC criteria for when a change being proposed by a licensee requires an application for an amendment of their operating license.

Section 189a of the Atomic Energy Act (AEA) requires that the Commission provide interested parties notice of, and an opportunity for a hearing on, the "granting, suspending, revoking, or **amending**" of any license or construction permit [emphasis added]. In the *Perry* decision, the Commission looked at the legislative history of the AEA. As discussed on page 326 of the *Perry* decision, the Commission stated that:

> That history, unfortunately does not clarify what constitutes a license amendment within the meaning of section 189a. But it does make clear that Congress wished to provide hearing rights for only "*certain* classes of agency action," not

> all. As initially proposed, the AEA did not contain any hearing rights provision. A later draft proposed a hearing opportunity to parties "materially interested in any 'agency action.'" But this provision was found "too broad, broader than it was intended to be," and led to section 189a's very specific list of Commission actions warranting hearing rights. If a form of Commission action does not fall within the limited categories enumerated in section 189a, the Commission need not grant a hearing.
>
> In evaluating whether challenged NRC authorizations effected license amendments within the meaning of section 189a, courts repeatedly have considered the same key factors: did the challenged approval grant the licensee any "greater operating authority," or otherwise "alter the original terms of a license"? If so, hearing rights likely were implicated.

On page 327 of the *Perry* decision, the Commission cited applicable case law that provided examples where certain NRC approvals did not trigger AEA section 189a hearing rights. The Commission clarified its position as follows:

> Where the NRC approval does not permit the licensee to operate "in any greater capacity" than originally prescribed and all relevant safety regulations and license terms remain applicable, the NRC approval does not "amend" the license.
>
> Only those actions falling "beyond the ambit of prescriptive authority granted under the license" necessitate a license amendment.

Clearly, if a licensee is performing an evaluation that modifies approved codes and methods or the use of codes and methods outside the bounds for which they were explicitly approved, then the licensee would be operating with greater operating authority than was granted for use of those approved codes and methods. As such, consistent with the *Perry* decision, and contrary to the positions stated in the draft letter to NEI, the licensee would need to request prior NRC approval via a license amendment request under the specified circumstances.

3.5 Comment 5 – Exemption Requests Are Legally Required Until Rule Change

Pages 7 and 8 of the NRC's draft letter to NEI discusses whether exemptions from 10 CFR 50.46 are needed for fuel systems that do not use uranium oxide fuel within zircaloy or ZIRLO cladding (i.e., the materials currently specified in 10 CFR 50.46). The letter argues that exemptions are not needed for LTAs that use other pellet or cladding materials. This is a new interpretation of the rule as is evidenced by the long history of exemptions issued for LTAs. Table 2 of Enclosure 2 of the March 22, 2018, memo to the General Counsel lists examples of exemptions for use of LTAs from 1991 through 2017. The new interpretation of the rule, as described in the draft letter to NEI, appears to have been initiated by NRC technical staff members (e.g., during the 2017 Regulatory Information Conference (RIC)), contrary to the understanding of the relevant regulations and history by NRC staff in the licensing organization. Statements by staff outside the licensing organization have created the confusion in the industry that didn't exist previously. Hence, the need for a clarification letter. The draft letter tries to downplay the regulatory history by indicating that "[i]n the past some licensees have requested exemptions to expand the applicability of 50.46 to other zirconium alloys. The NRC staff has granted these exemptions." In other words, the NRC letter is implying that the licensees didn't realize exemptions weren't needed, but since the licensees submitted applications, the NRC staff just went ahead and processed the requests. Given that the NRC staff performs

acceptance reviews on applications for items needed prior NRC approval, the staff should have told the licensees to withdraw the LTA exemption requests if they weren't necessary. However, the evidence shows the NRC has routinely accepted exemption requests for review for LTA cladding materials different than those listed in 10 CFR 50.46.

Further evidence that the draft letter to NEI provides a new interpretation of 10 CFR 50.46 are recent industry documents that acknowledge the need for exemptions for LTAs with cladding or fuel pellet materials different than specified in 10 CFR 50.46. One example is a Westinghouse Report (prepared under contract to the Department of Energy) titled "Development of LWR Fuels with Enhanced Accident Tolerance Final Technical Report," dated October 30, 2015: http://www.iaea.org/inis/collection/NCLCollectionStore/_Public/47/046/47046013.pdf Section 3.5 of the report, "Future Regulatory Actions," states, in part, that:

> Prior to full scale implementation of ATF [accident tolerant fuel], changes to a number of regulations will be required. While Phase 1 and 2 can be completed with the use of exemption requests, to move towards a more efficient loading process and implementation plan, rulemaking will be needed to remove the references to "zirconium-based" cladding and UO_2 pellets. In particular, rulemaking will be required to modify the requirements contained in 10 CFR 50.46 and 10 CFR 50, Appendix K.

Section 6 of the report, "Phase 2 - Lead Test Assembly Activities," states in, part, that:

> Similar to the LTR [lead test rod] process, exemption requests from NRC regulations regarding cladding and fuel pellet material will be required during the LTA phase. As with the LTRs, these exemption requests will need to be filed 2 years in advance of LTA load.

The bottom line is that the NRC's letter to NEI provides a new interpretation of 10 CFR 50.46 that is not supported by the language and history of the rule. To argue otherwise is not credible.

There are a number of decisions of the Commission, the Atomic Safety and Licensing Appeal Board Panel, and the Atomic Safety and Licensing Board Panel that weigh in on the issue of how the specific language in a rule and agency practice should be considered in interpretation of the NRC regulations. Specifically, Section 6.21.5, "Agency's Interpretation of its Own Regulations," in NUREG-0386, Digest 16, "United States Nuclear Regulatory Commission Staff Practice and Procedure Digest, Commission, Appeal Board and Licensing Board Decisions, July 1972 – September 2010," cites the following decisions pertinent to this issue:

> Agency practice, of course, is one indicator of how an agency interprets its regulations. See Power Reactor Development Co. v. International Union, 367 U.S. 396, 408 (1961) Yankee Atomic Electric Co. (Yankee Nuclear Power Station), CLI-96-6, 43 NRC 123, 129 (1996); Sequoyah Fuels Corp. (Gore, OK, Site Decommissioning), CLI-01 -2, 53 NRC 2, 13 (2001); Private Fuel Storaqe, L.L.C. (Independent Spent Fuel Storage Installation), CLI-99-10, 49 NRC 318, 324 (1999); Sequoyah Fuels Corp. (Gore, OK, Site Decommissioning), CLI-01-2, 53 NRC 2, 14 (2001).
>
> Where NRC interprets its own regulations and where those regulations have long been construed in a given way, the doctrine of stare decisis will govern absent compelling reasons for a different interpretation; the regulations may be modified,

> if appropriate, through rulemaking procedures. New England Power Co. (NEP Units 1 & 2), Public Service Co. of New Hampshire (Seabrook Station, Units 1 & 2) ALAB-390, 5 NRC 733, 741-42 (1977).

In the *Perry* decision (CLI-96-13, 44 NRC 315, 1996), the Commission (44 NRC 315 at 325) stated that:

> The Staff is certainty free to change rule interpretations if appropriate. **But the staff may not adopt an interpretation unsupported by the language and history of the rule.** [emphasis added]

Based on the above, it is concluded that exemption requests should continue to be the path forward, until the necessary rulemaking is completed.