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NUCLEAR ENERGY INSTITUTE

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Ms. Cindy K. Bladey
Chief, Rules, Announcements, and Directives Branch (RADB)
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: NEI Comments on Draft Regulatory Guide DG-1275, *Ultimate Heat Sink for Nuclear Power Plants*, *Fed. Reg.* Vol. 78, No. 174; Docket ID NRC-2013-0203

Project Number: 689

Dear Ms. Bladey:

On behalf of the nuclear energy industry, the Nuclear Energy Institute (NEI)[1] appreciates the opportunity to provide comments on the Draft Regulatory Guide DG-1275 as requested in the subject *Federal Register* notice.

Our detailed comments are provided under Attachment 1, and a supporting document is under Attachment 2. Attachment 3 is detailed comments on Section D of the Draft Regulatory Guide. Our overarching comments on the draft guide are provided in the following paragraphs.

The draft guide includes discussions of beyond design basis scenarios and implies they need to be considered by users of the document. Treatment of beyond design basis events will be codified as part of the rulemaking for Near Term Task Force Recommendation 1. That rulemaking is still in the early stages of development and the guide should be revised only after the rulemaking is promulgated. Further, some of the issues discussed, such as the "consideration of effects of climate change over the design life of the facility" are difficult to address since validated tools and methods are currently not available.

[1] The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

Other elements in the document are already addressed and implemented through other established regulatory documents, such as Fukushima-related flooding guidance, the ASME code, Generic Letter 89-13, etc., and are duplicative. This could potentially introduce confusion at a future point.

IAEA design standards are referenced. We believe that before adopting such standards they should receive stakeholder input through a formal public review process.

The discussion on licensees applying the requirements of the Maintenance Rule on dams and other water-controlling structures under the structures monitoring program may not be possible for many licensees. Many of these facilities may not be within their jurisdiction, i.e., dams and other water-control structures operated by other agencies. Moreover, the scoping of the Maintenance Rule was formally performed by expert panels and formal reviews, and ad hoc additions are not advisable.

Finally, our comments also address Section D, Implementation, which explains how the guidance is to be used by the NRC staff, as well as applicants and licensees. Our comments focus on the discussion of so-called "forward-fits" contained in Section D. That is, the imposition of new or different positions contained in Revision 3 on licensees that are voluntarily seeking changes to their current licensing basis. Disciplined application of the "forward-fit" concept is important to the industry because, unlike applicants, licensees justifiably rely on the adequacy of their current licensing bases to ensure compliance with NRC requirements. A stable (although not necessarily static) licensing basis is vital to ensuring predictable and reliable regulatory framework. Thus, the language in Section D that limits and conditions imposition of new or different positions on licensees that are voluntarily seeking changes to their current licensing bases must be applied in a consistent, reliable, and disciplined manner.

We appreciate the NRC staff's consideration of these comments. If you have any questions concerning this letter or the attached comments, please contact me. If necessary, we will be happy to have a meeting to further elaborate on the input being provided.

Sincerely,

Vijay M. Nilekani

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Attachments

ATTACHMENT 1

Industry Comment Sheet(s) on Draft Regulatory Guide DRG-1275, 09/2013
Ultimate Heat Sink for Nuclear Power Plants
NEI Comments

Comment #	Reference of Page, Para, Sentence	Specific Comment	General /Notes
1	Page 4 & 5 .B Discussion, Background, "Sufficient Conservatism..... capability of a single source"	Too prescriptive, with some elements that may not have an established or NRC endorsed mechanism to evaluate, and new design inputs that may belong to 'beyond design basis' considerations, a process still in regulatory development. For example, "consider the effects of climate changes that might occur over the design life of the facility", etc. What would be the criteria & methodology to quantify? Moreover, the Fukushima Flooding Task Force is working with NRC on various guidance on dam failures, etc. and language here is duplicative of other guidance.	
2	Page 6, last paragraph, "...the dam or other...Maintenance Rule at 10CFR 50.65" Also, Page 11, sect. 5, paragraph d: "...Structures Monitoring Program under the Maintenance Rule, 10 CFR 50.65."	The guidance for scoping of SSC's in the Maintenance Rule is in NUMARC 93-01 Rev. 4a, and endorsed by R.G. 1.160. Further, in many cases, the water controlling structures are not in the jurisdiction of the licensee, but other entities. Reference to the Maintenance Rule should be removed, as it is an arbitrary inclusion as written.	
3	Page 7, Harmonization with International Standards. 'IAEA Safety Guide No. NS-G-1.9'	Use of international standards should go through a formal endorsement review process, preferably with adequate stake holder input as applicable, similar to adoption of other standards.	

Comment #	Reference of Page, Para, Sentence	Specific Comment	General /Notes
4	Page 9, paragraph j: "UHS active components....should auto-start"	Pumps and some valves typically require operator action to start. Operator action times have been evaluated to ensure they meet system requirements. Either eliminate this paragraph on 'auto-start', or include flexible language to permit operator manual action to start the system.	
5	Page 11, sect. 5, paragraph a: entire paragraph.	This is duplicative of Item III page 6 of GL 89-13 and could be deleted.	
6	Page 11, sect. 5, paragraph b: entire paragraph: This paragraph would move HX testing from GL 89-13 into the IST program.	GL 89-13 allows HX testing frequency to be based on test results from each HX. IST frequency is time-based. This would increase work scope with no increase in safety margins.	
7	Page 11, sect. 5, paragraph c: "Performance testing of UHS heat exchangers should be in accordance with ASME OM-2009, Part 21". Part 21 section 7.3 states that test temperatures should be as close as possible to accident conditions as possible to minimize errors from fluid property changes. See attached page from ASME 2012, Part 21.	The available heat load for most HX testing is much lower than design basis. Therefore the testing must be performed at cooling water temperatures much lower than design so that that the temperature differential between shell-side and tube-side fluids is maximized. Otherwise, temperature instrument error and test uncertainty could yield a meaningless result. See attached ASME OM-2012, Part 21 page. Delete this paragraph or further clarify. Please note that ASME OM-2012 supersedes OM 2009.	
8	Page 11, sect. 6, paragraph a: entire paragraph on chemical treatment of service water.	This is duplicative of paragraph B of Enclosure 1 of GL 89-13 and could be deleted.	
9	Page 11, sect. 6, paragraph b: entire paragraph on flushing redundant and	This is duplicative of paragraph C of Enclosure 1 of GL 89-13 and could be deleted.	

Comment #	Reference of Page, Para, Sentence	Specific Comment	General /Notes
	infrequently used cooling loops.		
10	D. Implementation, 'Use by NRC Staff' 2nd para, last sentence, 'This is not considered backfitting as defined in 10CFR 50.109(a)(1).....(Ref.19)"	This is not industry's understanding of the appropriate application of backfit requirements. Please see Attachment 3 on Section D.	

specifically limited or prohibited by the exclusion criteria for a specific testing or monitoring method.

If traversal of flow regimes does occur, the additional uncertainty introduced by applying the required corrections shall be properly accounted for.

CAUTION: The uncertainty associated with traversal of flow regimes on the shell side is much greater than the uncertainty associated with traversal of flow regimes on the tube side. This may significantly affect the overall accuracy of the calculated value for the thermal performance of the heat exchanger.

7.3 Temperatures

Testing shall be conducted at temperatures as close to design accident conditions as practicable to minimize the errors introduced by changes in fluid properties when extrapolating from test to design accident conditions.

8 ERRORS, SENSITIVITIES, AND UNCERTAINTIES

Statistical methods shall be employed to ensure that both measurement errors and result sensitivities are considered when calculating the total uncertainty of any test or monitoring result. Measurement errors associated with measurement parameters used as equation inputs shall be propagated through the equation to determine the sensitivity of each measurement parameter on the test or monitoring result and to determine the total uncertainty of the test or monitoring result.

The total uncertainty shall be determined every time a test or monitoring is performed, because the total uncertainty will depend significantly upon the heat load available during the test and the cleanliness of the heat exchanger during the test. In fact, the cleaner the heat exchanger is, the more sensitive the test result will be to errors in the measurement parameters. This is primarily because of the reduction in terminal temperature differences associated with a clean heat exchanger, making those differences (and thus the LMTD) more sensitive to errors in their individual temperatures.

A 95% confidence level shall be applied to the calculated result for the purpose of comparing the testing or monitoring results to the acceptance criteria. Based on the heat exchanger design values and the plant design requirements for each heat exchanger function, a "required action limit" for corrective actions shall be established (see para. 9.3 and Fig. 1).

A standard statistical method for calculating the total uncertainty in the result is presented in Nonmandatory Appendix C of this Part, para. C-11. More sophisticated statistical methods may be used, which use additional effects (i.e., nonsymmetrical error, calculational bias, and redundant measurements), to improve the accuracy of the result, provided these methods are technically justifiable.

NOTE: If the total uncertainty of the test or monitoring result is determined to be too great to allow for meaningful results (i.e., the total uncertainty is greater than the available margin), then either

(a) measurement errors should be decreased as outlined in para. 8.1 and Nonmandatory Appendix C of this Part, section C-11 or

(b) whatever actions are necessary should be taken to increase the available margin

8.1 Measurement Errors

Instrumentation accuracies used for testing and monitoring shall be such that, for each method selected, the determination of measurement errors, in conjunction with the result sensitivities, allows corrective actions to be performed so as to maintain heat exchanger operational readiness at all times. The measurement error consists of bias (fixed), precision (random), and spatial errors. A conventional method for calculating measurement errors is summarized in Nonmandatory Appendix C of this Part, section C-11.

The following considerations shall be addressed to minimize measurement errors:

(a) selection, calibration, and placement of instruments (see Nonmandatory Appendix C of this Part, section C-11)

(b) test and monitoring conditions (see section 7)

(c) instrument response times, transport delay times, and other factors (see Nonmandatory Appendices A and B of this Part)

8.2 Result Sensitivities

Result sensitivities refers to how the previously discussed measurement errors are propagated through the calculational process. These sensitivities will be influenced by the test or monitoring method selected. There are two basic methods for determining result sensitivities: analytically and numerically. Due to the complexity of calculating the partial derivatives of a heat exchanger test result (e.g., fouling factor) with respect to each of the measurement parameters (i.e., the analytical method), the numerical method is the preferred method for this application. This method (sometimes called the "numerical perturbation" method) is summarized in Nonmandatory Appendix C of this Part, section C-11.

8.3 Total Uncertainty

Total uncertainty refers to how the previously discussed result sensitivities are combined to arrive at a total uncertainty for the test or monitoring result. This total uncertainty will be influenced by the test or monitoring method selected. A method for determining the total uncertainty is summarized in Nonmandatory Appendix C of this Part, section C-11.

8.4 Calculations and Averaging

All measured parameters shall be collected (sampled) at the same time, for each test interval, to minimize errors associated with variations in test conditions that

Backfitting Comments
DG-1275: Ultimate Heat Sink

Section D. Implementation

The stated purpose of this section is to provide information on how applicants and licensees may use Revision 3 to Regulatory Guide 1.127, as well as to explain how the NRC plans to use Revision 3. Section D states that applicants and licensees may voluntarily use the guidance contained in Revision 3 to demonstrate compliance with underlying regulations, but leaves open the possibility of alternative methods. Section D also clarifies that "voluntary" use of the guidance by a licensee means that "the licensee is seeking the action of its own accord, without the force of a legally binding requirement or an NRC representation of further licensing or enforcement action."[1]

Importantly, with respect to maintenance of a licensee's current licensing basis, the guide states: "Current licensees may continue to use guidance the NRC found acceptable for complying with the identified regulations as long as their current licensing basis remains unchanged."[2] Further, Section D clarifies that unless Regulatory Guide 1.127 is part of the licensing basis for the facility, the NRC staff may not take the position that failure to comply with the guide constitutes a violation of the agency's requirements. NEI agrees with these statements regarding maintenance of a licensee's current licensing basis. Imposition of new or different positions contained in Revision 3, in the circumstances described above, would likely meet the definition of backfitting provided in 10 C.F.R. § 50.109, and must be analyzed as such prior to being imposed on licensees.

Section D goes on to describe limited circumstances in which the NRC staff may request that a licensee adopt new or different positions in Revision 3, or an equivalent alternative:

> If an existing licensee voluntarily seeks a license amendment or change and (1) the NRC staff's consideration of the request involves a regulatory issue directly relevant to this new or revised regulatory guide and (2) the specific subject matter of this regulatory guide is an essential consideration in the staff's determination of the acceptability of the licensee's request, then the staff may request that the licensee either follow the guidance in this regulatory guide or provide an equivalent alternative process that demonstrates compliance with the underlying NRC regulatory requirements. This is not considered backfitting . . . or a violation of any of the issue finality provisions in 10 CFR Part 52.[3]

This language describes an important category of so-called "forward fits,"[4] to which the backfitting rule and issue finality provisions in 10 CFR Part 52 do not apply. In a June 2010 letter, the NRC General Counsel described "forward-fits" as follows:

> [T]here are guidance documents which the NRC staff intends only to be "forward fit," that is, the guidance will be applied only to: (i) future applicants; and **(ii) applications from existing licensees for license amendments, requests for exemptions, and other**

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[1] DG-1275, at FN3.
[2] Id. at pg. 12.
[3] Id. *See also*, Letter from Stephen Burns (General Counsel, NRC) to Ellen Ginsberg (Vice President, General Counsel, and Secretary, NEI) (June 14, 2010), at FN2.
[4] Id.

requests for dispensation from compliance with otherwise-applicable legally binding requirements (an example of such a request would be an application to use an alternative under 10 CFR 50.55a). In these circumstances, the NRC does not consider the issuance of "forward fit" interpretive guidance to constitute "backfitting." As the NRC has stated in several different contexts, the Backfit Rule does not protect the expectations of future applicants (including licensees seeking NRC permission to conduct licensed activities in a manner different than what the NRC previously approved) regarding the regulatory requirements that they must meet to obtain NRC approval.[5]

The second category of "forward-fits" highlighted in the above-quoted passage is of particular concern to industry because it applies to existing licensees, rather than "future applicants." Unlike "future applicants," licensees justifiably rely on the adequacy of their current licensing bases to ensure compliance with NRC requirements. A stable (although not necessarily static) licensing basis is vital to ensuring predictable and reliable regulatory framework. In this vein, a primary purpose of the backfitting rule and issue finality provisions in 10 C.F.R. Part 52 is to ensure that changes to that framework are properly evaluated and justified, prior to being imposed on licensees. Thus, it is vital that the language in Section D that limits and conditions imposition of new or different positions on licensees that are seeking voluntary changes to their current licensing bases be applied in a consistent, reliable, and disciplined manner.

Specifically, new or different positions contained in Revision 3 (or acceptable alternatives to such positions) may be imposed on licensees that voluntarily seek changes to their current licensing bases, without prior application of the backfitting rule or issue finality provisions, **only where**:

1. The NRC staff's consideration of the licensee's voluntary request involves a regulatory issue **directly relevant** to Revision 3; and

2. The specific new or different position contained in Revision 3 that the staff wishes to impose on the licensee is an **essential consideration** in the staff's determination of the acceptability of the licensee's voluntary request.

Criteria 1 – *i.e.*, the "direct relevance" criteria – should limit application of the forward-fit concept to voluntary requests for changes involving issues that are directly and explicitly addressed in Section C. "Staff Regulatory Guidance" of Revision 3. These issues include:

- System design considerations for the Ultimate Heat Sink
- Natural phenomena and site hazards for the Ultimate Heat Sink (UHS)
- Defense-in-Depth considerations for the UHS
- Technical Specifications explicitly addressing the UHS

[5] *Id* (emphasis added).

- In-service testing, maintenance, and performance testing of the UHS piping, structures and components
- Water testing and microbiological control of water used in the UHS

Applied in this way, the "direct relevance" criteria appropriately limits application of the forward-fit concept to voluntary licensee requests dealing with changes that are directly and explicitly covered by the specific regulatory guidance actually provided in Revision 3 to Regulatory Guide 1.127.

Criteria 2 – *i.e.*, the "essential consideration" criteria – should limit application of the forward-fit concept to new or different positions contained in Revision 3 that are indispensable in order for the NRC staff to approve the voluntary licensee request at hand. For example, a new or different position in Revision 3 dealing with missile protection and the effects of pipe whip would not be an "essential consideration" in approving a voluntary licensee request to change a portion of the current licensing basis dealing with UHS water chemistry.[6] Thus, in this example, the backfitting rule would need to be addressed prior to imposition new or different positions on missile protection and the effects of pipe whip, notwithstanding the fact that the licensee is voluntarily requesting a change to its CLB on UHS water chemistry. Applied in this way, the "essential consideration" criteria would appropriately limit application of the forward-fit concept to issues that are indispensable to the staff's approval of the voluntary licensee request at hand.

[6] This example is included purely for illustrative purposes. It is not meant to imply that there are actually new or different positions on missile protection or the effects of pipe whip in Revision 3.