UNITED STATES NUCLEAR INFRASTRUCTURE COUNCIL
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June 8, 2016

Mr. Michael E. Mayfield
Director
Division of Engineering, Infrastructure, and Advanced Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: U.S. Nuclear Infrastructure Council (NIC) Comments on Draft Advanced Non-Light Water Reactor Design Criteria

Dear Mr. Mayfield:

The United States Nuclear Infrastructure Council ("NIC") is pleased to submit these comments on the Nuclear Regulatory Commission's ("NRC") draft advanced non-light water reactor design criteria ("ARDC"), including the draft sodium fast reactor design criteria ("SFR-DC") and draft modular high temperature gas reactor design criteria ("mHTGR-DC").

We are encouraged that NRC is taking this step to begin develop developing a non-light water reactor ("LWR") Advanced Reactor licensing framework. We commend the NRC for moving forward on this effort while noting that this is just a first step in establishing an integrated risk-informed, performance-based licensing process for Advanced Reactors.

Our more than dozen member companies that represent individual Advanced Reactor development concepts will be submitting separate comments to the NRC regarding the specific elements of the Draft Advanced Non-LWR Design Criteria Table. As a general comment, our separate review indicates that with few major exceptions, principally in the areas of containment boundary, emergency core cooling and residual heat removal, the large majority of the LWR Design Criteria would apply to non-LWR, advanced reactors.

We have a few generic concerns regarding the proposed ARDC. First, in our review of the proposal, we recognized that in the Department of Energy's ("DOE") December 2014 report (Guidance for Developing Principal Design Criteria for Advanced (Non-Light Water) Reactors), the Department noted many more areas where the NRC could adapt and modify its LWR general design criteria to be in better alignment with the emerging Advanced Reactor design concepts. However, NRC has not indicated in its Non-LWR Design Criteria Table why it has chosen not to adopt DOE's proposed modifications. We believe that the language included in the DOE Guidance represented an appropriate balance between those criteria needed to protect public health and the environment and the inherent safety profile of Advanced Reactor technologies consistent with the 2008

Commission Policy Statement on Advanced Reactors. For these reasons, we would urge the NRC to revise this proposal to more closely follow the recommendations made in the December 2014 report from DOE.

Second, as the development efforts on advanced non-LWR concepts continue to proceed, and as we apply risk informed insights to their future regulation, it will be inevitable that further alignment and adaptation of the LWR design criteria to Non-LWR concepts should be made. Therefore, the NRC should provide and establish a clear process for modifying and updating Non-LWR design criteria when and where appropriate. Indeed, we believe that other categories of Advanced Reactors, including molten salt and lead bismuth among others, would benefit from a specific set of criteria as has been provided for sodium fast reactors and modular high temperature gas reactors. We urge the NRC to work with DOE to address these additional categories of reactors for specific General Design Criteria ("GDC") in future revisions to the ARDC.

As it relates to specific comments on the ARDC, there are a few areas where we have more specific comments. First, in ARDC 10 and other elements of the proposal, the NRC recognizes that HTGRs do not have traditional core cooling requirements and the language contained in the ARDC refers to "reactor system and associated heat removal". We believe this is an appropriate recognition of this design difference. We also note that there are other types of Advanced Reactor categories, including molten salt reactors, for which similar treatment should be adopted in further refinements to the ARDC. Similar comments relate to ARDC 33 and 34 among others.

Second, as it relates to the proposed ARDC 13-16 regarding the issue of functional containment, we believe this is a positive step forward and urge the NRC to consider adopting a similar approach for other applicable types of Advanced Reactor categories.

Third, with regard to ARDC 17, NIC believes that the NRC has provided an insufficient explanation regarding what defense-in-depth considerations are applicable. Some Advanced Reactor technologies rely on passive safety and inherent safety design features that do not need offsite power (or for that matter, onsite power) to safely shut down or cool the reactors. In some cases, the only electrical equipment that will be needed in an emergency situation will be computer-monitoring systems. Thus, the emergency power needs for many of these Advanced Reactor designs will be very minimal and do not justify multiple, expensive AC power lines running to the site as is the case with traditional LWRs. Additionally, given the fact that these reactors may be providing heat and not power, or may be operating in remote locations off the grid, the need to have a mandatory off-site AC connection to the grid is inappropriate. We encourage additional engagement with developers to refine this particular ARDC to the realistic circumstances of Advanced Reactor designs.

Fourth, in the proposed ARDC 50, the NRC recognizes that mHTGRs can rely on "a multi-barrier function containment configuration to control the release of radionuclides." In that the NRC recognizes that these designs will not rely on a traditional containment building structure, we believe this is a very positive and appropriate step. However, as

we have stated in earlier comments, we believe that there are a number of Advanced Reactor designs beyond HTGRs that would benefit from similar flexibility to deploy these types of alternative functional containment configurations. Additionally, as some of these designs are intended to operate at atmospheric temperature, the use of traditional "pressure boundary" based criteria in the ARDC are not applicable and should be appropriately tailored.

Recognizing that the current proposal to establish ARDC is a work in progress and that a process for further adaptation and change will need to be established by the Agency, we encourage the NRC to move forward promptly and finalize the proposed ARDC taking into account and addressing the public comments received at this stage.

Finally, we would encourage the NRC to expedite its efforts in establishing risk-informed source term and related emergency planning requirement appropriately applicable to Non-LWR Advanced Reactor concepts.

We look forward to working with the Commission and staff as NRC establishes a comprehensive risk-informed, performance-based licensing process for non-LWR Advanced Reactors.

Please note that while these comments and viewpoints represent the consensus of the Council, they do not necessarily represent the specific views of individual members.

If you have any questions concerning the industry's comments, please contact me.

Sincerely,

The Honorable Jeffrey S. Merrifield
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Chairman, NIC Advanced Reactor Task Force
Commissioner, US Nuclear Regulatory Commission (1998-2007)

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