

date: Jun 1, 2022, 3:30 PM
subject: NuScale Power Response to Proceedings of the National
Academy of Sciences' Paper
mailed-by: nuscalepower.com

Summary

Regarding the paper recently published in the Proceedings of the National Academy of Sciences, we are providing our response to the academy due to the factual errors related to NuScale's technology and design contained within the paper. The paper uses outdated design information for the energy capacity of the NuScale fuel design and wrong assumptions for the material used in the reactor reflector, and on burnup of the fuel. With the correct inputs, NuScale's design compares favorably with current large pressurized water reactors on spent fuel waste created per unit of energy. These inputs are publicly available to the paper's authors and their omission undermines the credibility of the paper and its conclusions. Please see the letter our Co-Founder and Chief Technology Officer, José N. Reyes, Ph.D., has written to Editor-in-Chief sharing these concerns, and please reach out with any questions you may have.

Full text copy:

May 31, 2022

Professor May R. Berenbaum
Editor-in-Chief
Proceedings of the National Academy of Sciences

Subject: Correction of Factual Error in PNAS Paper titled
"Nuclear waste from small modular reactors"

Dear Professor Berenbaum:

I respectfully write this letter to inform you of a factual error in the paper titled Nuclear waste from small modular reactors, authored by Lindsay M. Krall, Allison M. Macfarlane, and Rodney C. Ewing and published May 30, 2022 in the Proceedings of the National Academy of Sciences (PNAS). Because PNAS is widely recognized as an authoritative source of high-impact original

research, publications in PNAS are widely read and frequently cited. As such, errors in PNAS papers require prompt correction.

The authors mistakenly assert that NuScale Small Modular Reactors (SMRs) will produce significantly more spent nuclear fuel (SNF) than existing Light Water Reactors. The basis for this statement is their analysis of the NuScale 160 MW thermal core as opposed to the NuScale 250 MW thermal core implemented in NuScale VOYGR plants. In January 2021, NuScale provided the characteristics of the 250 Mwt core to the National Academies of Science, Engineering, and Medicine (NASEM) Ad hoc Committee to evaluate and assess the “Merits and Viability of Different Nuclear Fuel Cycles and Technology Options and the Waste Aspects of Advanced Nuclear Reactors.” NuScale’s response to the NASEM ad hoc committee questionnaire is publicly available and states that the NuScale fuel has an average fuel burnup of approximately 45,000 MWD/t at discharge and that it has a design basis maximum exposure of 62 GWD/MTHM. These values are within the values typically observed in the existing fleet of LWRs. Therefore, the NuScale 250 Mwt design does not produce more SNF than the small quantities typically observed in the existing LWR fleet. One of the authors of the subject paper, Dr. MacFarlane, was also a member of the NASEM ad hoc committee that received our questionnaire responses.

I have copied Richard Meserve, Chairman of the Ad Hoc Committee on “Merits and Viability of Different Nuclear Fuel Cycles and Technology Options and the Waste Aspects of Advanced Nuclear Reactors” and Charles Ferguson, NASEM project officer for the Nuclear Fuel Cycle Study so that this error in the subject paper is not incorporated into the NASEM Fuel Cycle Study.

Lastly, I note that the authors did not contact NuScale for information or clarifications regarding NuScale fuel burn-up even though a publicly available document on the subject was available. We learned of the subject paper by five members of the media who had received advanced copies of the PNAS paper. As a member of the Academy, I was not aware of the policy to issue advanced copies of PNAS papers to the media.

Jose N. Reyes, Ph.D.
Chief Technology Officer and Co-founder

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6/1/2022

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