

August 31, 2026

ELECTRONIC SUBMISSION

Attn: NRC-2025-1140

Caylee Kenny
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Ms. Kenny:

On July 15th, 2026, the U.S. Nuclear Regulatory Commission (NRC) published the proposed rule, “Reforming and Modernizing the NRC’s Radiation Protection Framework.”¹ The proposed rule amends the regulations governing the NRC’s standards for protection against radiation, perhaps most significantly by replacing the “As Low As Reasonably Achievable” (ALARA) standard, with a more objectively graded approach to dose management, within the broader context of maintaining the NRC’s longstanding linear no-threshold (LNT) model.

Whilst it is encouraging to see the NRC move from the uneconomical, unscientific, subjective, and unreasonably cautious ALARA model in favor of a more objective standard, it is deeply disappointing to see the NRC retain the LNT model. NRC’s proposal is particularly disappointing given that the Administration expressly instructed the NRC to reconsider reliance on the LNT model in Section 5(b) of its recent Executive Order (EO) 14300.²

Discussion

I. The NRC is Wrong to Ignore the Instructions of EO 14300 to Maintain the Linear No-Threshold (LNT) Model

a. Maintaining the LNT Approach has Effectively Led the NRC to Neglect its Mission to Deploy Civilian Nuclear Energy Technology in a Safe and Secure Manner

In EO 14300, the President specifically noted that, “Between 1954 and 1978, the U.S. authorized construction of 133 since-completed civilian nuclear reactors at 81 power plants.

¹ U.S. Nuclear Regulatory Commission, “Reforming and Modernizing the NRC’s Radiation Protection Framework,” *Federal Register*, Vol. 91, No. 134, July 17, 2026, p. 43,456.

² Exec. Order No. 14,300, “Ordering the Reform of the Nuclear Regulatory Commission,” *Federal Register*, Vol. 90, No. 102, May 29, 2025, p. 22,587.

Since 1978, the [NRC] has authorized only a fraction of that number; of these, only two reactors have entered into commercial operation.”³ In the context of this complaint, it is worth recalling that the NRC first adopted LNT in 1975,⁴ just at the time that nuclear construction costs in the United States started skyrocketing,⁵ and just before the period in which the EO identifies the collapse in nuclear development. This is not a coincidence, but directly related to the fact that, at this time, the NRC began regulating nuclear power plants, not with the goal of keeping radiation at safe levels, but rather on the unrealistic assumption that nuclear radiation is unsafe at any level.

As a result, the NRC’s alleged commitment to its two-pronged mission statement became grievously unbalanced. The NRC, under its mission statement, promises both to protect public health and to deploy nuclear energy technology in a safe and secure way.⁶ Yet by assuming that there is no safe threshold whatsoever, the NRC has effectively handicapped its mission to promote the deployment of nuclear energy technology, while fixating on its public health mission with a degree of caution that extends well past the point of demonstrable improvement.

b. Treating All Radiation as Dangerous Ignores the Reality that Humans have Always been Exposed to Natural Radiation, Long Before the Nuclear Era

In the current Notice, the NRC reiterated its decision to reject hormesis as a grounds to revisit LNT five years ago,⁷ and its conclusion that “there is...no compelling evidence as to whether hormesis is valid,”⁸ notwithstanding the fact that research has in fact shown that low-dose radiation can actually be beneficial to humans.⁹ It was rather disappointing to see that the NRC responded to EO 14300’s instruction to revisit LNT simply by quoting its finding on hormesis from five years ago, rather than by, at minimum, addressing the research that has found potential benefits for humans, and explaining in detail why NRC chose to disregard that research.

Even so, the NRC does not need to find in favor of hormesis in order to disavow the LNT hypothesis. Given the level of popular discomfort with the very real health effects of nuclear radiation, it may sound counterintuitive to argue that radiation could ever be harmless, much less

³ *Id.*

⁴ U.S. Nuclear Regulatory Commission, “Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents,” *Federal Register*, Vol. 40, No. 87, May 5, 1975, p. 19,439 (establishing Appendix I to Part 50, in which the ALARA was introduced while setting the quantitative bounds for reactor effluents).

⁵ See Jessica R. Lovering, Arthur Yip, Ted Nordhaus, “Historical construction costs of global nuclear power reactors,” *Energy Policy*, Volume 91, 2016, Pages 371-382, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2016.01.011>.

⁶ U.S. Nuclear Regulatory Commission. (n.d.). *About Us*. <https://www.nrc.gov/about-nrc>

⁷ 91 *Fed. Reg.* at 43,461.

⁸ U.S. Nuclear Regulatory Commission, “Linear No-Threshold Model and Standards for Protection Against Radiation,” *Federal Register*, Vol. 86, No. 156, August 17, 2021, p. 45,923 at 45,929.

⁹ Sykes, Pamela J., “The Benefits of Low Dose Radiation and the Hazards of the Media,” *Pathology* 44 (2012), [https://doi.org/10.1016/s0031-3025\(16\)32610-1](https://doi.org/10.1016/s0031-3025(16)32610-1).

that there could be *any* hermetic region (i.e., a beneficial dosage amount). However, the benign health effects at low-dose levels in fact makes perfect sense, when one realizes that humans are constantly exposed to radiation at small doses in nature, and always have been, since long before the nuclear age.

In this vein, it is worth reviewing, in detail, the criticism of the LNT methodology, as articulated in EO 14300:

“The NRC utilizes safety models that posit there is no safe threshold of radiation exposure and that harm is directly proportional to the amount of exposure. Those models lack sound scientific basis and produce irrational results, such as requiring that nuclear plants protect against radiation below naturally occurring levels.”¹⁰

The EO’s observation that the NRC’s use of the LNT model leads to overly cautious results is hardly surprising; the NRC has itself acknowledged to the U.S. Environmental Protection Agency (EPA) that “the LNT model is a conservative basis for radiation-dose standards and may overestimate risks.”¹¹ Indeed, the EO effectively makes two criticisms of the LNT model in this short space: first, that positing no safe threshold leads to an overly cautious approach; and second, that the NRC’s use of the LNT model ignores the fact that humans are already exposed to radiation in nature, and that the use of a model with no threshold effectively requires nuclear plants to reduce radiation below levels that occur naturally. To some extent, the Notice here addresses EO 14300’s criticism of the LNT model’s overly cautious approach;¹² however, the Notice entirely ignores the point made in EO 14300, that use of the NLT approach effectively requires nuclear facilities to reduce radiation below levels found in nature.

It is well-known and uncontroversial that humans are exposed to radiation on a daily basis. We are exposed to naturally occurring cosmic radiation from outer space, particularly from the sun.¹³ Similarly, we also gain exposure to terrestrial radiation, from radioactive minerals within the rocks and soil earth itself.¹⁴ In fact, our very bodies contain trace amounts of radiation, absorbed through the food and water that we consume.¹⁵ To quote the Canadian

¹⁰ 90 *Fed. Reg.* at 22,587.

¹¹ Sean W. O’Donnell, Inspector Gen., EPA, Hotline: EPA Is Taking Steps to Update Its Federal Radiation Guidance, Report No. 22-E-0016, at 4 (Jan. 6, 2022), https://www.epa.gov/system/files/documents/2022-01/epa_oig_20220106-22-e-0016.pdf.

¹² *E.g.*, 91 *Fed. Reg.* at 43,462.

¹³ U.S. Environmental Protection Agency. (2025, October 7). *Cosmic Radiation*. EPA.gov. <https://www.epa.gov/radtown/cosmic-radiation>.

¹⁴ U.S. Environmental Protection Agency. (2026, February 19). *Radiation Sources and Doses*. EPA.gov. <https://www.epa.gov/radiation/radiation-sources-and-doses>.

¹⁵ *Id.*

Nuclear Safety Commission, “Life has evolved in a world with significant levels of ionizing radiation and our bodies have adapted to it.”¹⁶

The fact that there are so many sources of natural radiation effectively allows for something of a natural experiment, because while there are many sources of natural radiation, they do not affect the entire world equally. While the total worldwide average effective dose from natural radiation amounts to 2.40 millisieverts (mSv) annually, that rise to an average of 3.00 mSv in the U.S., 6.30 mSv in Yangjiang, China, and 12.50 mSv in the Kerala Coast, in India.¹⁷

Yet despite the significant difference in the levels of natural background radiation across these areas, there is no evidence of any variation in the cancers associated with radiation exposure.¹⁸ Given the solid indications that radiation at these naturally occurring levels does not in fact lead to greater cancers, it makes little sense that the NRC would rely on an ICRP model that uses epidemiological data from high doses to predict risk at very low doses, effectively by using mathematical models as a surrogate to replace scientifically demonstrated outcomes.¹⁹ It is thus mystifying that the NRC has not seen fit even to address the issue of natural variation in low-dose radiation, given that EO 14300, in requiring NRC to reexamine the LNT model, specifically criticized the LNT model for ignoring the fact that a natural, baseline level of radiation already exists, even absent nuclear commercialization or development.

c. Retaining the LNT Approach Effectively Elevates the Precautionary Principle Over Scientifically-Based Policy

It is interesting that, in its response to EO 14300 § 5(b), the NRC acknowledged the uncertainty in even measuring radiation effects at such low dosage levels.²⁰ Yet to treat low-dose radiation as dangerous, even in the face of such uncertainty, is effectively to embrace the precautionary principle²¹ as a basis for nuclear regulation. Yet this approach effectively shifts the burden of proof, in a way that makes little sense. If the NRC seeks to regulate emissions at such low dosage levels, it is incumbent on the NRC to demonstrate that even natural doses of radiation are harmful. It is nonsensical to shift the burden of proof to the nuclear energy

¹⁶ Canadian Nuclear Safety Commission. (2020, November). *Natural Background Radiation*. <https://api.cnscc-scsn.gc.ca/dms/digital-medias/Fact-Sheet-Background-Radiation-eng.pdf/object>.

¹⁷ *Id.*

¹⁸ Ludwik Dobrzysnki, Krzysztof W. Fornalski, and Ludwig E. Feinendegen, “Cancer Mortality among People Living in Areas with Various Levels of Natural Background Radiation,” *Dose Response* 13, 3 (July 2, 2015), <https://pmc.ncbi.nlm.nih.gov/articles/PMC4674188/>.

¹⁹ See 91 *Fed. Reg.* at 43,462.

²⁰ See *Id.* at 43,461-65.

²¹ See D. Kriebel, J. Tickner, P. Epstein, J. Lemons, R. Levins, E.L. Loechler, M. Quinn, R. Rudel, T. Schettler, and M. Stoto, “The Precautionary Principle in Environmental Science,” *Environmental Health Perspectives*, 109, 9 (September 2001), <https://pmc.ncbi.nlm.nih.gov/articles/PMC1240435/>.

companies themselves, to prove that there is no harm, when harm at such low levels has not been demonstrated in the first place.

II. The NRC's Proposal to Replace the Minimization that has come to Define the ALARA Principle, with an Approach Based in Optimization, is Commendable

Whilst it would be preferable for the NRC to eliminate the LNT standard altogether, the NRC's proposal to eliminate the ALARA standard, and to replace that standard with a more objective, and more scientifically based optimization approach, grounded specifically in the NRC's proposed, graded approach to dose management, represents an encouraging step in the right direction. ALARA, as codified in the NRC's regulations, is something of a misnomer; while the acronym stands for "As Low As Reasonably Achievable," the NRC in fact has long defined the term to mean "making *every* reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical...."²² Even while the regulatory term has long included the word "reasonable" as part of the regulatory term, the very definition has undercut that element, by prefacing the list of considerations with the mandate that companies take "every reasonable effort" to keep dosage rates, not just low, but below the dosage limits. This approach has not just been part of the NRC's regulatory definition for ALARA, but also part of its regulatory guidance.²³

Combined with the LNT model, ALARA has effectively strangled new nuclear energy projects in the crib. The existence of an LNT model that posits literally no safe level of nuclear radiation, even at naturally occurring doses, when combined with a governance approach that requires regulated stakeholders to take "every" reasonable effort to maintain exposures as low as they can, has made it impossible for nuclear energy to develop in any cost-effective way. It is ironic because, traditionally, lawyers use the "reasonableness" factor to try to find objectivity;²⁴ yet the NRC has turned this approach on its head, long and openly acknowledging that "since [ALARA] is not a quantitative limit, it is subjective to a degree."²⁵ The presumption that there is no threshold at which cancer becomes a risk, combined with the subjectivity of the ALARA approach, has resulted in the absence of any meaningful, objective limiting factor to constrain the regulatory burden on the nuclear energy industry.

²² 10 CFR 20.1003 (emphasis added).

²³ U.S. Nuclear Regulatory Commission. (2021, March 9). *ALARA*. <https://www.nrc.gov/reading-rm/basic-ref/glossary/alara>

²⁴ Oliver Wendell Holmes, Jr., *The Common Law* 108-09 (Macmillan 1881), <https://archive.org/details/commonlaw00holmuoft/page/108/mode/2up>.

²⁵ *Supra*, n. 23.

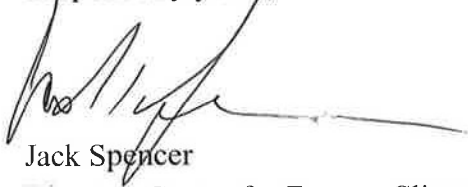
Conclusion

In essence, the NRC's proposal, as written, represents half a step forward. Regulations should be based on actual risk, not on mathematical models that extrapolate known risks at high levels of exposure, to establish linear estimates of the risk at low levels of exposure, absent scientific proof. Eliminating the ALARA principle from the NRC's regulations, and replacing the minimization approach inherent in ALARA with a more scientifically grounded optimization approach, thus represents an important move in a more sustainable direction for nuclear energy.

Nonetheless, it is disappointing that the NRC has rejected the criticisms of EO 14300 regarding the LNT principle, even to the point of entirely ignoring EO 14300's express concerns about regulating emissions even below naturally occurring levels. If the NRC insists on retaining the LNT principle, we would strongly urge the NRC at least to address these concerns more directly, and more comprehensively, than they have in the proposal as written.

Thank you for the opportunity to comment.

Respectfully yours,



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²⁶ Institutional affiliation provided for identification purposes only. These comments are submitted in my personal capacity, and do not necessarily represent the views of The Heritage Foundation.