

January 6, 2022

Committee Members

Committee on Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States

National Academies of Sciences, Engineering, and Medicine

Re: Recommendations for the Committee's Report

Dear Committee Members,

At the October 27-28, 2021 meeting of your committee, at which a number of the signers hereto made invited presentations, the committee requested that we provide you with suggestions for what should be in your committee's report. We are grateful for this request, and are hereby submitting those recommendations. We are a combination of technical experts, frontline communities, and public health and environmental advocates. We strongly recommend that your report include the following:

1. There should be a clear acknowledgment at the outset that significant harm to the health of nuclear workers and the public has been caused by the Manhattan Project, Atomic Energy Commission (AEC), Nuclear Regulatory Commission, Energy Research and Development Administration, and subsequently Department of Energy (DOE), and their contractors, by releases of radioactivity from facilities under their jurisdiction. This includes:
 - a. Radioactive fallout from nuclear weapons tests, producing both global and localized exposures (e.g., to mainland "downwinders" and to residents of Pacific Islands).
 - b. Uranium mining, milling, and enrichment, (e.g., un-remediated uranium mines and tailings piles on Indigenous lands, depleted uranium, etc).
 - c. Widespread fallout from and contamination of the nuclear complex nationwide which injured both surrounding and geographically distant downwind and downriver communities. Additionally, the nuclear complex has harmed large numbers of its workers by radiation exposure.
2. Many of these risks continue to this day and will continue to pose risks far into the future if significant resources and commitment are not devoted to cleaning up the sources of these radioactive exposures.
3. The Committee should also acknowledge that there is a larger ethical question at play—that people deserve the right to a safe environment. For many, this right has already been denied to them, as they have been injured from radiation exposure without their knowledge or consent. Furthermore, "cost-benefit" analyses always seem to impose the cost on innocent members of the public while bestowing the benefits to profit-making companies and the government.

4. We acknowledge that part of your mandate is to identify a research agenda to refine risk estimates. But, if you are going to work within a risk model, ethically fraught as it may be, you should acknowledge the suffering that has already been experienced by exposed populations and should at least follow the science that exists. And as indicated in item #10 below, the Academies’ own risk estimates, from Biological Effects of Ionizing Radiation (BEIR) VII, show that existing radiation regulatory limits are grossly non-protective.

5. The AEC and DOE have had a troubled history of attempting to suppress studies showing harm from radiation exposures, and have seriously violated ethical norms in many research projects involving human subjects. DOE thus has a credibility problem were it to be involved in any radiation health effects research program. This is especially true among impacted communities, who are unlikely to trust any research connected to DOE or entities with which it has substantial influence. During the October 27 and 28, 2021, sessions of the committee, multiple committee members raised the question of whether housing such a research program under an agency or institution other than DOE would resolve the credibility and independence concerns. Having other entities undertake such work would not necessarily solve the problem, given the potential influence of DOE and other parties responsible for causing radiation exposures to workers and the public. We have seen this occur in numerous settings. This committee itself has a potential conflict of interest, since it is funded by DOE and DOE is the sponsor of the study.

6. This committee should acknowledge that the history of nuclear weapons production, both in the United States and in activities conducted by the US government abroad, has been marked by environmental and scientific racism. For example, many nuclear facilities and activities disproportionately impact communities of color. Often, little or no effort was made to inform communities of the risks, and communities are often still fighting for compensation, acknowledgement, and cleanup. Radiation standards are based largely off “Reference Man,” an adult white male, ignoring Indigenous lifestyles and exposures (see item #9).

7. Task 7 of the committee is to “identify and, to the extent possible, quantify, potential *monetary* and health-related impacts to *Federal agencies*, the general public, *industry*, research communities, and other users of information produced by such research program” (emphasis added). This raises the prospect that the purpose of Task 7 is to identify a cherry-picked research program to help make the case against the Linear No Threshold (LNT) model that has been universally used for decades to set radiation standards. This is unacceptable, given the economic interests of the study sponsor and other nuclear interests in anything that could help relax radiation protection standards, compensation obligations, and contamination remediation requirements. LNT has been reaffirmed by the BEIR committees and is used by all regulatory agencies. This committee should not allow itself to be used by monetary interests to attempt to eviscerate LNT and thus markedly weaken protections for the health of workers and the public.

8. The evidence presented to the committee makes clear that there is no new research that could be reasonably done that could conclusively demonstrate that the longstanding scientific consensus on LNT is wrong and that instead there are doses below which there is no harm, or even, that radiation at those levels is beneficial. The population size necessary for

epidemiological studies to prove such a claim is far larger than possible, and there are so many biological effects at the cellular level that proving that below certain doses there is no harm or even net benefit is not possible through cellular research. The committee should say so.

9. Additional research on more precisely quantifying the risk per unit dose may have some utility, but there are many other factors that more greatly affect radiation risk and that deserve greater attention. For example, current regulatory practices do not take into account higher exposure risks for Indigenous communities and nations due to air, land, water, food, and dwelling contamination. They also do not account for unique exposure pathways that exist due to more land-based lifestyles and activities like hunting, fishing, immersion in water for ceremonies, gathering and harvesting plants, clay production, agricultural and forestry jobs, collecting rainwater, and drinking from natural water sources. Due to these activities, Indigenous communities often have increased cumulative and multiple exposures compared to other demographics. Standards also do not account for increased risk to people who are pregnant and to infants who are chest-feeding, especially given that radionuclides and other toxins found at nuclear facilities can cross the placental barrier. They also fail to include the greater impacts per unit dose on females, babies, and children, and noncancer health effects. Because of these kinds of risks, standards should be set based on the most vulnerable populations. For example, groups like Tewa Women United have proposed setting a standard based on Indigenous pregnant women, called “Nava To’i Jiya” in the Tewa language, which translates to “Land Worker Mother.” In addition, certain populations may face worse outcomes from radiation injury due to factors like inequitable access to nutritious food and health care. Another example of why standards are inadequate is that drinking water standards for the public do not include exposure to radon indoors from the water, or ingestion of garden produce irrigated by contaminated water. Furthermore, DOE continues to attempt to use models for setting cleanup standards that EPA says are non-protective. Attention to these kinds of issues may be considerably more likely to enhance protection from radioactivity than research further refining the risk per unit dose.

10. Most critically, for decades, past work of the National Academies has been ignored by the regulatory agencies in setting radiation protection standards, standards which, based on the BEIR reports, are grossly non-protective. A major part of the committee’s report should focus on agency refusal to utilize the Academies’ prior primary work—the BEIR reports. As the committee heard on October 27, 2021, DOE and NRC worker protection standards—5000 millirem (5 rem) per year—are 60 years out of date and would result in 1 in 5 workers who received the permissible dose over their lifetimes getting cancer from their occupational exposures, based on BEIR VII.¹ And the DOE and NRC radiation standards for the public—100 millirem per year—would result in approximately 1 in every 100 people exposed over their lifetime to the “acceptable” dose getting a cancer from it, using BEIR VII’s figures for risk per unit dose.² These risk levels are 100 to 10,000 times higher than the “acceptable risk range” set for all other carcinogens. The Committee needs to say this clearly, and to call on the regulatory

¹ See BEIR VII ((Table 12D-3, Lifetime Attributable Risk of Solid Cancer Incidence and Mortality, for 10mGy (1 rem) per year, for ages 18-65.

² See BEIR VII (Table 12D-3, Lifetime Attributable Risk of Solid Cancer Incidence and Mortality), for 1 mGy (100 mrem) per year, over a lifetime. That risk coefficient is 1.17×10^{-3} cancers/person-rem for exposures averaged over a lifetime.

agencies to *immediately revise (to be more protective) their radiation protection standards, using the BEIR VII risk numbers, to bring the standards within the risk range allowed for all other carcinogens.* More Academies-recommended research is of little practical utility when the actual radiation protection standards in place in this country ignore decades of prior Academies research and are clearly non-protective.

11. As to what radiation research agenda the committee should recommend, we urge that it be community-driven and –overseen. We suggest that the committee recommend the reinstatement, with greater funding, of the Community Monitoring and Technical Assistance Fund. See <https://www2.clarku.edu/research/kaspersonlibrary/mtafund/> The MTA Fund was overseen by a committee consisting of representatives from affected communities. Communities and organizations assisting those communities submitted grant applications for research projects that could assist in addressing technical issues associated with radioactive contamination and other exposures. Independent researchers, chosen by the impacted communities, conducted the work. This research had positive benefits in efforts to increase radiation protection of impacted sectors of the public.

12. Any other research should also be community-driven and –overseen. There need to be Oversight Panels composed of community members and independent experts in which they have confidence. The Oversight Panel for the epidemiological study of Santa Susana Field Laboratory workers is a good model. See https://www.ssflpanel.org/files/panel_worker_radiation.pdf We intend to provide in the coming weeks an appendix to this letter that provides more detailed examples of and recommendations for processes for community-directed research and studies. However, we do not think that the Consortium for Risk Evaluation with Stakeholder Participation (CRESP) is a good model, because of its deep ties to DOE.

13. As to risk communication, one should not be calling 10 rem “low dose.” It is not. Consistent units must be used; having radiation regulations in millirem and risk studies in SI units obscures the risks from “allowable” levels of radiation. One should clearly communicate doses, in readily understandable terms, in plain English, by indicating how many chest X-rays that the dose in question is equivalent to. And most importantly, one should translate the dose figures into risk, using BEIR VII. “1 mSv per year” means nothing to the public; but every hundredth person exposed to that dose getting a cancer from it is understandable and worrisome. This is especially true when we are supposed to regulate carcinogens at levels that are 100-10,000 times more protective. Because it is misleading, one should not try to belittle cancer risks from anthropogenic exposures by comparing them to the total expected cancers in a population or the cancer risks from background radiation. Background radiation is not safe—the BEIR reports’ radiation risk factors indicate that ~10 million people in the U.S. would get cancer from background radiation.

14. Lastly, while research along the lines identified in items #11 and #12 above would be helpful, what is most needed is concretely advancing public protection from radiation, on the ground, for impacted communities. The committee should say, loudly and clearly, that what is most critical is for contaminated sites around the country to be promptly and fully remediated, and for DOE, NRC, DOD, and industry to stop breaking commitments for cleanup and

compensation, and to ensure that communities are not further exposed. In addition, compensation must be provided to radiation-exposed civilians, service members, and workers, and should address the medical harms, decreased earning potential, and other losses due to cancers and other diseases designated under existing compensation programs (e.g. EEOICPA, RECA), recognizing the immense pain, loss and other suffering these exposures have caused.

As to report preparation, we urge that the committee establish a review process that includes substantial independent review by people who are members of or are chosen by impacted communities, and that they be compensated in the same fashion as the other reviewers.

Signed,

Invited Speakers from Oct 27 + 28th, 2021 Public Meeting

Bemnet Alemayehu
Staff Scientist
Natural Resources Defense Council

Terrie Barrie
Founding Member
Alliance of Nuclear Worker Advocacy Groups

Mary Dickson
Utah Downwinders

Daniel Hirsch
Committee to Bridge the Gap
Retired Director, Program on Environmental Nuclear Policy, UC Santa Cruz

Keith Kiefer
National Commander
National Association of Atomic Veterans

Trisha Pritikin
Author of *The Hanford Plaintiffs*

Benetick Kabua Maddison
Assistant Director & Project Specialist for Youth, Climate, and Nuclear Issues
April L. Brown, Ph.D.
Cofounder & President
Marshallese Educational Initiative

Beata Tsosie and Belin Marcus
Breath of My Heart Birthplace

Additional Signers

Robert Alvarez
Associate Fellow
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Board of Directors
Consequences of Radiation Exposure (CORE)

Jeff Carter
Physicians for Social Responsibility

Tina Cordova
Tularosa Basin Downwinders Consortium

Diane D’Arrigo
Nuclear Information and Resource Service

Thomas De Pree, Ph.D. & M.S.
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Dennis Nelson
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