Presentation to
NRC Meeting on Executive Order 14300 Section 5(b)

Implications of Weakening Radiation Protection Standards

by Daniel Hirsch

Retired Director, Program on Environmental and Nuclear Policy
at the University of California, Santa Cruz
and President, Committee to Bridge the Gap

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The Dirty Little Secret of the Nuclear Executive Order

It could result in allowing radiation exposures to the public **100 to 1000 times higher** than permitted today.

Radiation at those levels is estimated to cause **cancer in 4 out of 5 people exposed**

Executive Order 14300 Issued 23 May 2025

“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.”

https://www.whitehouse.gov/presidential-actions/2025/05/ordering-the-reform-of-the-nuclear-regulatory-commission/

The EO Thus Flies in the Face of More Than Half a Century of Findings by the National Academy of Sciences and Virtually All Other International Scientific Bodies

Indeed, Radiation Risk Estimates Per Unit Dose Have Generally Increased Over Time

TABLE 4-4 Comparison of Lifetime Excess Cancer Risk Estimates from the BEIR III and BEIR V Reports

	Continuous Lifetime Exposure, 1 mGy/y (deaths per 100,000)		Instantaneous Exposure, 0.1 Gy (deaths per 100,000)	
	Males	Females	Males	Females
Leukemia				
BEIR III[a]	15.9	12.1	27.4	18.6
BEIR V	70	60	110	80
Ratio BEIR V/ BEIR III	4.4	5.0	4.0	4.3
Nonleukemia				
BEIR III				
Additive risk model	24.6	42.4	42.1	65.2
Relative risk model	92.9	118.5	192	213
BEIR V	450	540	660	730
Ratio BEIR V/ BEIR III	4.8–18.3	4.6–12.7	3.4–15.7	3.4–11.2

[a] Based on Table V-16, page 203, and Table V-19, page 206 ($\overline{LQ-L}$ model for nonleukemia) (NAS80).

BEIR V was 3-18 times higher than BEIR III.

And the BEIR VII excess cancer risk estimate is a further 35% larger than BEIR V

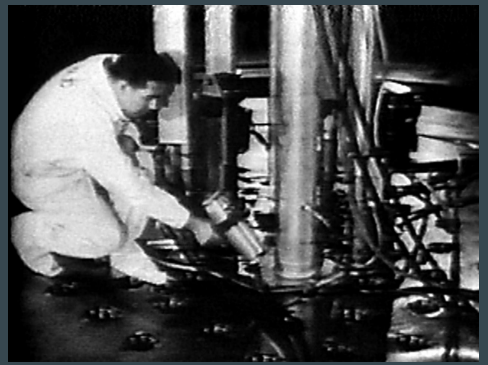
Source: National Academy of Sciences BEIR V, pg. 176

As recently as four years ago, the NRC itself, citing this scientific consensus, strongly rejected Petitions for Rulemaking to reject LNT.

NRC, Linear No-Threshold Model and Standards for Protection Against Radiation, Petition for rulemaking; denial., 86 FR 156, 2021
https://www.govinfo.gov/content/pkg/FR-2021-08-17/pdf/2021-17475.pdf

Recent Science Continues to Support LNT

Recent high quality studies such as INWORKS and EPI-CT have further reinforced LNT, confirmed cancer risks in the low-dose range, and in fact found low-dose cancer risks greater than one would presume from extrapolating from A-bomb survivors who were exposed to higher doses. The INWORKS research, for example, found excess relative rates for solid cancer mortality at low doses “larger than estimates currently informing radiation protection.”



https://pubmed.ncbi.nlm.nih.gov/37586731/

https://epi-ct.iarc.fr/

Furthermore, NRC regulations *do not* require exposures be below background, as claimed by the EO.

"10 CFR ∫ 20.1301 Dose limits for individual members of the public. (a) Each licensee shall conduct operations so that—

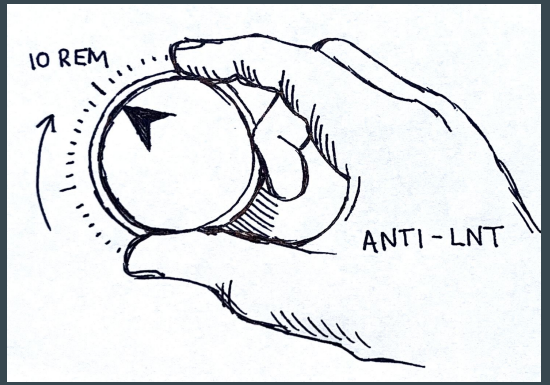
(1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, ***exclusive of the dose contributions from background radiation*** ..."
(emphasis added)

And Background Radiation is Far From Harmless

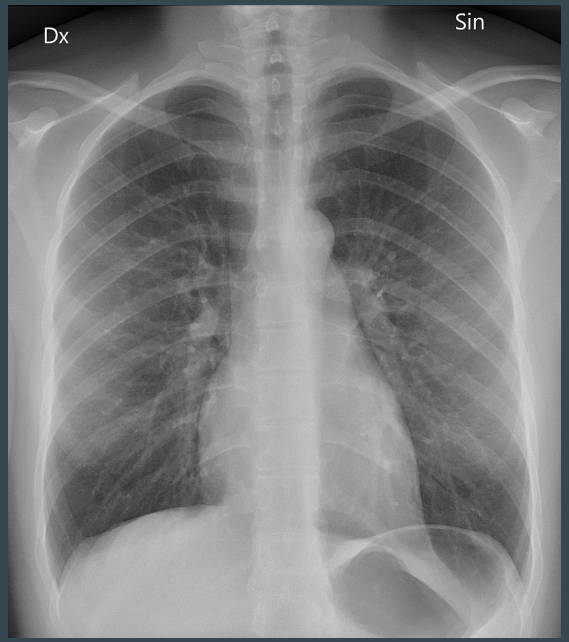
The NAS BEIR VII report's risk factors indicate that ~10 million of the current U.S. population will get cancer from background radiation. Adding to that exposure adds to the risks.

WHAT WOULD BE THE PUBLIC HEALTH IMPACT IF REGULATIONS BASED ON LNT WERE OVERTURNED?

The LNT Petition for Rulemaking that NRC rejected in 2021 proposed increasing permissible workers doses to 10 Rem/year and limits for the public to the same amount. Anti-LNT advocates generally claim a “low dose” threshold of 10 Rem.



Equivalent to 5000 Chest X-rays Annually



If dose limits for the public were increased to 10 Rem/year, that would be the equivalent of 5000 chest X-rays per year, from conception to death.

100 to 1000 Times Higher Than Current Permissible Limits

10 rem/year would be ***100 times higher*** than the current NRC 10 CFR 20.1301(a)(1) limit of 100 mrem/yr

10 rem/year would be *~1000 times higher* than the current EPA limit for cleanup of contaminated sites and *~1000 times* the current EPA 40 CFR 190 & NRC 10 CFR 20.1301(e) limits for public exposures from nuclear fuel cycle facilities*

*40 CFR 190 and 10 CFR 20.1301(e) establish for nuclear fuel cycle facilities limits to the public of 25 mrem/yr whole body, 75 thyroid, and 25 to any other organ. EPA has determined that to be generally equivalent to 10 mrem/yr effective dose equivalent. (EPA, "Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination," OSWER No. 9200.4-18, Aug. 22, 1997, Attachment B, p. 4) EPA has further found that for cleanup of contaminated sites, any dose greater than 12 mrem/yr is outside the acceptable risk range. (EPA, "Radiation Risk Assessment at CERCLA Sites: Q&A," OSWER 9285.6-20, June 13, 2014

Key Risk Figure for Addressing Adequacy of Radiation Protection Limits

1.17×10^{-3} cancers/person-rem at what are considered "low doses."

Source: National Academy of Sciences, Committee on Biological Effects of Ionizing Radiation, *Health Risks from Exposure to Low Levels of Ionizing Radiations*, BEIR VII Phase 2; (derived from Table 12D-3, for 100 mrem/year over a lifetime)

EPA Affirms Essentially the Same Risk Figure

Drawing from the National Academy's BEIR VII, EPA uses 1.16 x 10^{-3} cancers/person-rem.

So, roughly 1 cancer per 1000 people exposed to 1 rem.

EPA, Radiogenic Cancer Risk Models and Projections for the U.S. Population, ("Blue Book"), EPA 402-R-11-001

10 Rem/Year Over a Lifetime Would Thus Result in an Excess Cancer in More Than 80% of People Exposed

1.16×10^{-3} cancers per person-rem x

10 rem/year x 70 years = .81 = 8.1×10^{-1} = 81%

Hugely Unacceptable Risk

The EPA acceptable cancer risk range for exposure to carcinogens is 10^{-6} to 10^{-4} (1 in a million to 1 in 10,000). If LNT and regulations based thereon are thrown out and replaced with a "low dose" threshold of 10 Rem/year, the risk to members of the public at such exposures would be ***nearly 10,000 to 1,000,000 times higher than the acceptable risk range.***

NRC Radiation Regulations Should Be Changed

They should be markedly tightened.

Current Public Limits Are 35 Years Old
Worker Limits are Two Thirds of a Century Old

In finalizing the current regulations in 1991, NRC noted that BEIR V had come out after its proposed rule and had *s*ubstantially increased radiation risk per unit dose, but NRC declined to tighten the permissible exposures. Even decades ago, NRC conceded its radiation limits produced risks higher than standard allowable risks, and the situation has only gotten worse since then.

Peterson et. al., NRC, "OVERVIEW OF THE REVISED 10 CFR PART 20, "STANDARDS FOR PROTECTION AGAINST RADIATION"; NRC, Standards for Protection Against Radiation, Proposed Rule, 51 FR 1092, pp. 1102-1103

NAS BEIR VII/EPA Excess Cancer Risk Estimate for NRC's Current Worker Dose Limit: 1 in 5 Would Get Cancer

The current archaic U.S. occupational dose limit is 5,000 millirem/year, equivalent to 10 chest X-rays every day you work. Over a working life from age 18-65, that would yield a risk of excess cancer of approximately 1 in 5, according to BEIR VII.

In other words, if 100 workers began nuclear employment and received radiation each year at the permissible level, 20 of them would be predicted to get cancer from their occupational exposure. This is grossly non-protective.

NRC Radiation Limits for the Public Are Far Outside the Acceptable Risk Limits for Any Other Carcinogen

BEIR VII risk coefficients indicate that the NRC's current regulatory permissible dose for the public of 100 millirem/year received over a lifetime result in approximately a cancer risk of 1 in 100. That is 100 to 10,000 times outside the standard acceptable risk range for all carcinogens (10^{-6}-10^{-4}).

EPA: Radiation Should Not be a Privileged Pollutant

"To put it bluntly, radiation should not be treated as a privileged pollutant. You and I should not be exposed to higher risks from radiation sites than we should be from sites which had contained any other environmental pollutant."

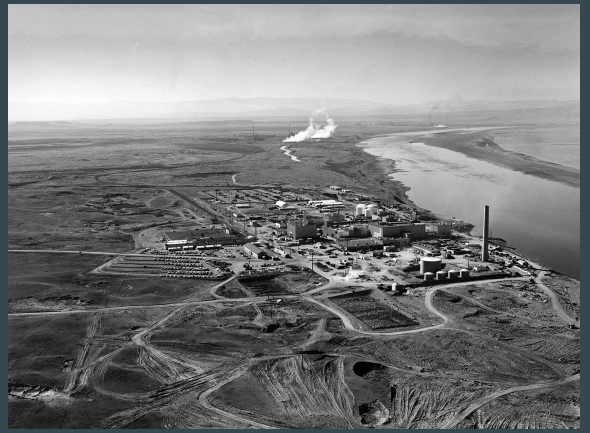
Photo: Janak Bhatta CC BY-SA 4.0

Statement on the Nuclear Regulatory Commission's Rule on Radiological Criteria for License Termination, by Ramona Trovato, Director, EPA Office of Radiation and Indoor Air, April 21, 1997.

What Would be the Real World Effects if LNT and the Regulations Derived Therefrom Were Abandoned?

Cleanup of Contaminated Sites Would Almost Completely Stop

- Cleanup would be abandoned at numerous highly contaminated Superfund sites that are part of the DOE nuclear weapons complex (e.g. Hanford, Los Alamos, Oak Ridge).
- Cleanup obligations would be voided for abandoned uranium mines on tribal lands such as Navajo Nation.
- Former Manhattan Project contamination (e.g., Westlake MO.) would never be cleaned up.
- Decommissioned nuclear plants would be able to leave much of their radioactive contamination and just walk away.



Hanford Superfund Site

Allowing Massively Increased Radioactive Releases from Nuclear Power Plants

Diablo Canyon Power Plant in California sits right on the Pacific Ocean.
Photo: Doc Searls CC BY-SA 2.0

Eliminating most controls for routine radioactive releases into air, rivers, lakes and oceans.

Authorize High Level Waste Repositories Even if Projected Doses From Leakage Far Exceed Current Limits

The EO To Gut Radiation Protections Should Cause Great Concern For Both Critics & Supporters of Nuclear Power

- Critics should worry about the harm that would result from extreme increases in permissible radiation exposures to the public.

- Supporters of nuclear expansion should worry that massively weakening radiation protection standards will damage prospects for public support since it demonstrates that nuclear plants can't operate unless allowed to expose the public to unacceptable radiation levels.

Conclusion

Radiation protection standards should be markedly strengthened, not gutted.