

## **No Safe Dose**

# **Any radiation exposure, no matter how little, can cause cancer**

There is no safe level of exposure to radiation, only legally “allowable” or “permissible” doses. Every federal agency that regulates industrial releases and medical uses of ionizing radiation warns that any and all exposure to external or internal radiation doses, no matter how small, increases one’s risk of cancer. However, when a radiation accident happens, major news organizations are often quick to down-play or outright misstate the potential health and environmental consequences. The second or third sentence in reactor accident or radiation release stories often includes the phrase “no danger to the public” or the like.

A case in point is a *New York Times* report on increased cancer risk from low doses of radiation: “But even the new estimate that radiation is a more potent carcinogen than previously believed should cause no concern for the average person, experts said, because the public is not exposed to enough radiation to exceed levels considered safe.”<sup>1</sup> This is false. Today radiobiologists all agree that “one can no longer speak of a ‘safe’ dose level.”<sup>2</sup> What should have been reported is that the public is not supposed to be exposed to doses that exceed *allowable* levels. *None are safe*. Official U.S. government regulatory assessments make this clear.

### **U.S. Environmental Protection Agency**

“There is no firm basis for setting a ‘safe’ level of exposure above background ....”<sup>3</sup> “Based on current scientific evidence, any exposure to radiation can be harmful (or can increase the risk of cancer). ....no radiation exposure is completely risk free.”<sup>4</sup> “[T]here is no level below which we can say an exposure poses no risk. ... Radiation is a carcinogen. It may also cause other adverse health effects, including genetic defects in the children of exposed parents or mental retardation in the children of mothers exposed during pregnancy.”<sup>5</sup>

### **National Academy of Sciences**

The National Academy of Science’s 7th book-length report (BEIR-VII) on the effects of ionizing radiation concludes that “there is a linear dose-response relationship between exposure to ionizing radiation and the development of radiation-induced solid cancers in humans. The committee further judges it unlikely that a threshold exists for the induction of cancers...”<sup>6</sup> As committee member Herbert L. Abrams of Harvard said, “There appears to be no threshold below which

exposure can be viewed as harmless.”<sup>7</sup> “Current evidence suggests that any exposure to radiation poses some risk, i.e. there is no level below which we can say an exposure poses no risk.”<sup>8</sup>

### **National Council on Radiation Protection**

“... every increment of radiation exposure produces an incremental increase in the risk of cancer.”<sup>9</sup>

### **U.S. Department of Energy**

“[T]he effects of low levels of radiation are more difficult to determine because the major effect is a very slight increase in cancer risk. However, U.S. Government regulations assume that the effects of all radiation exposures are cumulative and should be limited as much as reasonably possible.”<sup>10</sup>

### **U.S. Nuclear Regulatory Commission**

“[T]he radiation protection community conservatively assumes that any amount of radiation may pose some risk for causing cancer and hereditary effect, and that the risk is higher for higher radiation exposures. A linear no-threshold dose-response relationship is used to describe the relationship between radiation dose and the occurrence of cancer. ... any increase in dose, no matter how small, results in an incremental increase in risk.”<sup>11</sup>

### **U.S. Department of Health and Human Services**

“Ionizing radiation is invisible, high-frequency radiation that can damage the DNA or genes inside the body.

“Some patients who receive radiation to treat cancer or other conditions may be at increased cancer risk. ... it is possible that there is a small risk associated with this exposure.

“... children whose mothers received diagnostic X-rays during pregnancy. ... were found to have increased risks of childhood leukemia and other types of cancer, which led to the current ban on diagnostic X-rays in pregnant women.”<sup>12</sup>

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<sup>7</sup> Sharon Daniel, *Stanford Report*, Stanford University, Oct. 25, 2005

<sup>8</sup> *Ibid*

<sup>9</sup> National Council on Radiation Protection, “Evaluation of the Linear-Non-threshold Dose-Response Model for Ionizing Radiation,” NCRP report 136, Bethesda, MD, June 4, 2001, cited in *Science for Democratic Action*, IEER, June 2005

<sup>10</sup> U.S. Dept. of Energy, DOE/NE-0074, “Understanding Radiation,” pp. 8 & 9, <<http://www.ne.doe.gov/pdfFiles/UNDERRAD.PDF>>

<sup>11</sup> U.S. NRC, “How Does Radiation Affect the Public?” [www.nrc.gov/what-we-do/radiation/affect.html](http://www.nrc.gov/what-we-do/radiation/affect.html)

<sup>12</sup> U.S. Dept. of Health & Human Services, “Cancer and the Environment: Ionizing radiation,” p. 10, <[www.cancer.gov/images/Documents/5d17e03e-b39f-4b40-a214-e9e9099c4220/Cancer%20and%20the%20Environment.pdf](http://www.cancer.gov/images/Documents/5d17e03e-b39f-4b40-a214-e9e9099c4220/Cancer%20and%20the%20Environment.pdf)>

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<sup>1</sup> Philip Hilts, “Higher Cancer Risk Found in Low-Level Radiation,” *New York Times*, Dec. 20, 1989

<sup>2</sup> Ian Fairlie & Marvin Resnikoff, “No dose too low,” *Bulletin of the Atomic Scientists*, Nov. 1997, p. 54

<sup>3</sup> [http://epa.gov/radiation/understand/health\\_effects.html#anyamount](http://epa.gov/radiation/understand/health_effects.html#anyamount), updated July 8, 2011

<sup>4</sup> U.S. EPA, “Ionizing Radiation Series,” No.2, Air & Radiation, 6601J, EPA 402-F-98-010, May 1998

<sup>5</sup> U.S. EPA, “Radiation: Risks & Realities,” Air & Radiation, 6602J, EPA 402-K-92-004, Aug. 1993

<sup>6</sup> National Academy of Sciences, “Health Risks from Exposure to Low Levels of Ionizing Radiation,” BEIR VII, Phase 2, 2006; Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, National Research Council, June 29, 2005