

Letter to the American Nuclear Society

July 19, 2014; sent to NAS on December 12, 2014

SUBJECT: RESOLVING THE ISSUE OF THE SCIENCE OF BIOLOGICAL EFFECTS OF LOW LEVEL RADIATION

Public understanding and opinion about radiation associated with nuclear plants are sharply divided. Those who support nuclear power understand that this energy source results in a lower health impact and a lower environmental impact than all other energy sources for generating significant quantities of electricity. For over fifty years, however, opponents of nuclear power have relied on misrepresentations, graphic imagery and gross exaggeration to increase and spread public fear of radiation from nuclear power generating stations.

The American Nuclear Society, utilities, and other professional nuclear organizations have public education and community outreach programs that provide fact-based information to the public about nuclear energy. Still, far too many doubt its safety or oppose nuclear power outright. This is largely due to the anti-nuclear campaign that spreads irrational fear of radiation, based on lack of knowledge or willful misrepresentation.

If this problem is not addressed now, comprehensively, nuclear energy will be lost along with its many societal benefits. Changes in public opinion are desperately needed. This will not come without hard organized work and strong, prompt response to developments and crises.

The American Nuclear Society and our nuclear industry as a whole cannot continue to act as they have during the past fifty years and expect to get the changes in public opinion that are desperately needed.

The unique aspect of nuclear energy, not attributed to other energy systems, is radiation. Although everyone agrees that high levels of radiation can be harmful, there is considerable dispute about whether exposure to low levels of radiation increases health risks. Many in the scientific community and most of the regulatory community adhere to the simplistic [Linear No-Threshold \(LNT\) hypothesis of radiation carcinogenesis](#), which predicts the number of excess fatal cancers that will result from any amount of radiation. Others in the scientific community point to considerable evidence that contradicts this hypothesis—data that indicate no increase in cancer incidence up to a dose at a particular threshold.

Further, there exists a preponderance of evidence that **time** is a significant factor in the biological response to radiation. The [LNT](#) makes no allowance for this key factor, i.e. it does not distinguish between acute and chronic doses. Yet the medical community has recognized for decades that the human body responds more favorably to small doses administered over time as opposed to the same total dose administered in a single setting.

Until the authorities acknowledge the **ACTUAL** health effects of low level radiation (both for acute and chronic doses) and communicate them to the entire scientific community, the public will remain fearful of **ANY AMOUNT** of radiation—thus thwarting the development of nuclear

energy sources so desperately needed by our expanding global population. If the [LNT](#) scenario had been applied to the medical applications of radiation over the last five decades, our society would have foregone the countless lives that have been saved or improved through rational assessment of the true health impacts from radiation.

Therefore, we Past Presidents, Fellows and Members of the American Nuclear Society, members of other societies/associations around the world, and other supporters respectfully propose that a resolution of this issue is so important that the ANS immediately commit to taking the following steps:

- 1) Discuss with the US National Academy of Science the very serious consequences caused by the NAS adoption in 1956 of the [LNT hypothesis](#) for assessing the risk of excess cancer incidence following an exposure to nuclear radiation. Determine the scientific evidence now existing that the NAS should include for testing the [LNT hypothesis](#) to ascertain if such data demonstrate a contradiction between this hypothesis and biological data. If such a contradiction can be demonstrated by accredited and peer reviewed research and analyses, the NAS should then be in a position to discard the [LNT hypothesis](#).
- 2) Collect adequate data that appear to contradict the [LNT hypothesis](#) and deliver them to the NAS. Should a new review by the NAS conclude that its 1956 adoption of this hypothesis should now be revoked, it should then acknowledge this publicly and proceed to recommend to all the world regulatory authorities that they stop using the [LNT hypothesis](#) to predict the increased risk of cancer deaths.
- 3) Encourage scientists to continue experiments that determine the threshold dose level for the onset of various types of harmful health effects due to an acute radiation dose, and the threshold dose-rate for harmful effects due to a chronic radiation level.
- 4) Create simplified explanations of the health effects of radiation for the public and news media.
- 5) Assist in organizing public meetings to present and discuss relevant data.

The results of the above approach are needed by the nation, the medical profession, the nuclear industry, and the public as a whole, to set accurate health standards and scientific criteria for avoiding harmful exposures, while enabling nuclear energy to provide electricity and other social benefits, and while also accepting the many medical benefits of radiation to diagnose and cure illnesses.

The LNT model has been long-embedded into our thinking about radiation risk and nuclear energy to the point of near unquestioned acceptance. Because of strict adherence to this hypothesis, untold psychological damage has resulted from the Fukushima accident—a situation in which no person has received a sufficient radiation dose to cause a significant health issue—yet thousands have had their lives unnecessarily and intolerably uprooted. The proposed actions will spark controversy because it could very well dislodge long-held beliefs. But as a community of science-minded professionals, it is our responsibility to provide leadership. We ask that our Society serve in this capacity.