

## Rulemaking1CEm Resource

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**SECY-067**

**PR#:** PRM-20-28, PRM-20-29, and PRM-20-30

**FRN#:** 80FR35870

**NRC DOCKET#:** NRC-2015-0057

**SECY DOCKET DATE:** 11/19/15

**TITLE:** Linear No-Threshold Model and Standards for Protection Against Radiation

**COMMENT#:** 551

**From:** Marie Inserra [mailto:minsjsul@gmail.com]  
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These comments are in response to three petitions sent to the NRC in February 2015, NRC Docket number as noted above. These petitions are closely related and ask the NRC to amend regulation 10 CFR 20, which limits how much ionizing radiation the general public can get, in addition to background radiation (not including medical exposures); and also details the limits of radiation to workers at NRC regulated facilities.

The petitions for rulemaking were filed by D. Carol Marcus (PRM-28), Mark Miller (PRM-29) and Mohan Doss (PRM-30).

I will limit my comments to three particular topics.

1) There is no empirical evidence that there is a "safe" dose of radiation. Growing evidence supports the finding that any exposure to ionizing radiation carries the risk of harm. US regulation of exposure to ionizing radiation is based on the linear no threshold (LNT) model for risk of cancer which assumes a constant rate of risk per unit of radiation exposure. More radiation is more risk, but every level of exposure above zero carries some risk. Two very large data sets (the Hibakusha A-Bomb survivor group and an international group of atomic workers) which tracked subjects for decades, have been the source of many published papers. Findings derived from these large population data sets by qualified researchers show that the LNT model fits the real world data better than a "safe threshold" model. Authors of the National Academy of Sciences Biological Effects of Ionizing Radiation VII Phase 2 Report, the most comprehensive publication of the A-Bomb Survivor Life Span Study data and findings state:

"The committee judged that the LNT model provided the most reasonable description of the relation between low dose exposure to ionizing radiation and the incidence of solid cancers that are induced by ionizing radiation" (introduction p. 5 of BEIR VII).

A team of researchers led by Richardson of UNC Chapel Hill published findings in BMJ on the international workers data-set in October 2015. The researchers' discussion of findings states:

"This study provides evidence of a linear increase in the excess relative rate of cancer mortality with increasing exposure to ionizing radiation at the low dose rates typically encountered in the nuclear industries of France, the UK and the USA."

2) There is no level of radiation exposure that produces direct health benefit. There is sufficient evidence to end any debate and declare it a fact: radiation exposure never directly improves health. Claims of hormesis are false. In 2012 Moeller and Mousseau published "The effect of natural variation in background radioactivity on humans, animals and other organisms" a meta analysis of 46 papers in the literature, collectively reporting 373 different findings of impact from radiation exposure. Their findings were "...clearly inconsistent with a general role for hormesis in adaptation to elevated levels of natural background radiation". This is empirical evidence-based information. The authors of the petitions in question do not offer similar data to support the assertion that hormesis exists.

The US EPA concludes its comment on the current proposal:

"Given the continuing wide consensus on the use of the LNT for regulatory purposes as well as the increasing scientific confirmation of the LNT model, it would be unacceptable to the EPA to ignore the recommendations of the NAS and other authoritative sources on this issue. The EPA cannot endorse basing radiation protection on poorly supported and highly speculative proposals for dose thresholds or doubtful notions concerning protective effects from low level ionizing radiation. Accordingly we would urge the NRC to deny the petition."

3) Low dose cumulative radiation is not less harmful than the same dose delivered all at once.

Richardson et al, in examining data from more than 250,000 exposed workers, find:

"...the risk per unit of radiation dose for cancer among radiation workers was similar to estimates derived from studies of Japanese atomic bomb survivors.....Follow up of large cohorts of nuclear industry workers has been ongoing for over 30 years; our data now yield sufficient statistical information to permit relatively precise estimates of cancer mortality risk in a population for whom average cumulative doses are about 20 mGy."

For these and many other reasons I urge the NRC Staff to reject these petitions. Thank you for this opportunity to comment.

Sincerely yours,

Marie Inserra, MS, NP

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