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Linear No-Threshold Model and Standards for Protection Against Radiation

Comment On: NRC-2015-0057-0086

Linear No-Threshold Model and Standards for Protection Against Radiation; Extension of Comment Period

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Comment on FR Doc # 2015-20722

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General Comment

I support these petitions to base radiation protection on science, not on the assumed linear relationship between harm and dose.

There are very few biological systems that have linear responses between levels of dose. For example, selenium is both a dreadful poison and an element necessary for life and reproduction. The effect depends on the dose. It is not a linear straight-line relationship in which selenium is always harmful but gets more harmful as the dose gets higher. At low levels selenium is beneficial. At high doses, it is harmful.

Similarly, the effect of radiation on biological systems is not straightforward. People living in the mountains, or on granite bedrock, have no more cancer or birth defects than people living with less background radiation. There is some evidence that radiation is beneficial at low doses: for example, recent experiments in which low doses of radiation extend the life of fruit flies.

(Fruit flies are often used for experiments on genetics. Example of recent work:
<http://medicalxpress.com/news/2015-08-weak-doses-prolong-life-female.html>)

Whether or not this type of effect (hormesis) is present for humans is still unclear, in my opinion. But it is clear that, at normal background levels at least, a little more radiation does no harm. The linear-no-threshold hypothesis is unproven, useless, and unreasonable.

What the linear non-threshold assumption (for that is all that it is) has done is simply add to expense and anxiety. It leads to ALARA, which is very bad rule-making.

Imagine that all regulations were based on ALARA. Let's say my town water supply meets all the criteria for purity that such water supplies must meet. I could go to my select board and insist that they lower the concentration of a certain contaminant by 50%. They would say that the town supply met all the requirements for water purity. I would respond that they are being unREASONABLE. With an ALARA-regulated water supply, if they CAN lower the concentration REASONABLY (and I get to decide what is reasonable), they are required to do so! It doesn't matter that the water is already safe to drink. If they were just willing to spend more money, it could be even...well, not safer, but certainly more expensive water!

In short, ALARA must be rescinded. The very word "reasonable" is unreasonable. "Reasonable" according to whom? How much money is it "reasonable" to spend to achieve yet-lower results? And whose money gets spent this way?

Society has many problems and limited resources to address these problems. I recently read an article showing that NO_x (nitrogen oxides produced in combustion processes, and a precursor of ozone and smog) can hide out in soot deposits and re-emerge later, in a more virulently active form. Perhaps cleaning the soot from city buildings might make city air more wholesome! <http://www.bbc.com/news/science-environment-33970233>

We have many real gains in public health available, if we can spend the money.

Spending money on radiation ALARA (make it lower and lower and lower) is completely unreasonable. Unless you are prepared to decide to evacuate Denver for its high background radiation, I hope the NRC will no longer base rules on LNT and ALARA.