PUBLIC SUBMISSION

As of: 11/20/15 2:52 PM
Received: November 19, 2015
Status: Pending_Post
Tracking No. 1jz-8mcm-f15n
Comments Due: November 20, 2015
Submission Type: Web

Docket: NRC-2015-0051
Department of Energy; Yucca Mountain, Nye County, Nevada; Supplemental Environmental Impact Statement

Comment On: NRC-2015-0051-0004
Department of Energy; Yucca Mountain, Nye County, Nevada; Correction and Extension of Comment Period

Document: NRC-2015-0051-DRAFT-0064
Comment on FR Doc # 2015-23510

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8/21/2015
80FR50875

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General Comment

There is no empirical evidence for a "safe" dose of radiation and growing evidence to support the finding that any exposure to ionizing radiation carries risk of harm.
US radiation 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 has some risk.
There are two very large data-sets, the Japanese Hibakusha, A-Bomb survivors (~90,000) and an international group of atomic workers (~250,000), both tracked for decades from which many papers have been published. The size of these data-sets allow statistical models to be applied and compared. The findings are narrow, due to limitations in both studies, but the large size of the study populations improves that "signal to noise" ratio and findings made by qualified researchers show that the LNT model fits the real-world data better than a "safe threshold" model.
The National Academy of Sciences Biological Effects of Ionizing Radiation VII Phase 2 Report or BEIR VII (2006,) is the most comprehensive publication of the A-Bomb Survivor Life Span Study data and findings. The authors of BEIR VII state:
The committee judged that the linear no-threshold model (LNT) 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 lead by Richardson of UNC Chapel Hill published findings in BMJ on the international workers data-set in October of 2015. The research question addressed in the paper is:

Is protracted exposure to low doses of ionizing radiation associated with an increased risk of solid cancer?

The discussion of Findings states:

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

There is no level of radiation exposure that produces direct health benefit, and 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 effects of natural variation in background radioactivity on humans, animals and other organisms" a meta-analyses of 46 papers in the literature, collectively reporting 373 different findings of impact from radiation exposure. The paper looked solely at exposure from background radiation away from industrially contaminated zones.

From the Discussion section of the paper (page 2425):
Hormesis is defined as a beneficial effect of normal background radiation on life-history traits such as fecundity and longevity compared to levels achieved in the complete absence of radiation (reviews in Kondo, 1993; Luckey, 1991).If hormetic effects of radiation on fitness exist, we should expect that the optimal level of radiation should increase with background radiation level. If hormesis has evolved as a consequence of local adaptation to specific levels of radiation, we might even find that all populations should perform best at some local level of radiation; exceeding their performance in the absence of radiation. The latter scenario would suggest that fitness should be independent of level of natural background radiation. In either case, we should not expect to find increased mutation rates, impaired immune function, increased incidence of disease and increased mortality in areas with higher levels of normal background radiation. Our findings are clearly inconsistent with a general role for hormesis in adaptation to elevated levels of natural background radiation. We note that some effect sizes reported herein were negative, thereby deviating from this expectation. However, these effects were of a level that would be expected by chance, inconsistent with expectations for a hormesis hypothesis.

This is empirical evidence-based conclusions. The authors of the Petitions 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 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, I urge the NRC to deny the petition.