

**PRM-51-11
(71FR67072)**

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**US NRC
SECY@nrc.gov
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RE: Docket NO. PRM-51-11

Comments In Support Of PRM-51-11 -Petition for Rulemaking

PRM-51-11 requests that the NRC prepare a rulemaking that will require that the NRC reconcile its OLD generic environmental impact statement (GEIS) for nuclear power plant operating license renewal applications with the NEWLY RELEASED National Academy of Sciences Health Risks From Exposure to Low Levels of Ionizing Radiation: Biological Effects of Ionizing Radiation (BEIR VII) Phase 2 Report.

My Experience

As an expert witness at trial in numerous nuclear reactor litigations, I have witnessed NRC licensees that deliberately misstated their radiation source terms to minimize exposures, deliberately ignored accurate calibration of their effluent monitoring systems, deliberately modified their dose calculations to the public and therefore deliberately underestimated their exposures to the public. I have analyzed and presented evidence about two statistically meaningful cancer clusters associated with the operation of licensed nuclear reactors. These clusters are not "small" as defined by the OLD GEIS, but have been ignored by the licensees and the NRC under the OLD BEIR guidelines. What is needed is the incorporation of the NEW BEIR guidelines into a NEW GEIS and comparing that approach to the statistically meaningful clusters near licensed reactors. If done properly, these changes would indicate that the health issues are not "small" for

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those living near a licensed nuclear facility and those risks need to be properly factored into the overall cost of nuclear power.

Below is an excellent rationale which I have personally reviewed which further supports the conclusions in my “**Experience**” section above which I believe provides a scientifically accurate assessment of this important health issue. What follows was prepared by Mary Lambert, and was submitted to the NRC on January 29, 2007.

Background

The GEIS was issued in 1996 and found health impacts to be “small” relying upon an earlier NAS report, BEIR V released in 1990. BEIR VII updates the information contained in BEIR V and draws on new scientific data in both epidemiology and experimental research. The petitioner is correct and justified to request that the NRC View BEIR VII as new and significant information and recalculate conclusion set forth in the now outdated GEIS, including early fatalities, latent fatalities, and injury projections (cancer and other health impacts) based on this new and significant information.

Rationale:

1. BEIR VII – cancer mortality and incidence risk higher for general public and workers than previous BEIR V on which regulations are based

A. Cancer Mortality Risk: BEIR VII report reaffirmed the conclusion of the prior report that every exposure to radiation produces a corresponding increase in cancer risk. The proportionality of risk means that at low exposures the risks are small, as the NAS report points out. The average risks to the population are estimated to be 10 to 15 percent higher than the reference value now used for radiation protection of the general population (565 cancer fatalities per million rem exposure in BEIR VII compared to 500 typically cited in the literature on radiation protection). While this average risk is in the general range of uncertainties and values reported previously, it indicates an increase of mortality risk overall.

B. Cancer Incidence Risk: BEIR VII found cancer incidence risk is considerably greater – a point ignored by NRC. BEIR VII found cancer incidence risks to be about a third higher than previously presumed in the previous BEIR reports and by NRC. Federal Guidance Report 13, prepared with support from NRC, had previously set the cancer incidence risk at 8.76 cancers per 10,000 person-rem. BEIR VII sets it at 11.4.

C. Workers: NRC permits doses to workers of 5 rem/ per year, based on now-outdated NAS and other research. NRC's own risk figures say 1 in 8 workers so exposed would die from cancer induced by that dose. BEIR VII says ~twice that number -- ~1 in 4 -- would get a cancer, fatal or one they survive, from that exposure.

D. Risk Not Small: The BEIR VII risk numbers indicate that about [1 in 100] members of the public would get cancer if exposed to 100 millirads (1 milliGray) per year for a 70-year lifetime and [1 in 175] would die from cancer– the now allowable radiation dose for members of the public. In addition, [1 in about 5] workers would get cancer, an incidence risk, if exposed to the legally allowable occupational doses over their 50 years in the workforce. These risks are much higher than permitted for other carcinogens.

This is not a small risk. What is a "small" risk is in the eye of the beholder -- the powerful entity exposing the public, or the public exposed to the risk. NRC may think that is a small effect; the families of the cancer victims might think differently.

2. Current dose limits do not protect the most vulnerable – they need to be revised in order to do so.

Dose limits are estimated according to their effect on a mythical, average or “reference man.” The official definition of reference man is, “Reference man is defined as being between 20-30 years of age, weighing 70 kilograms [154 pounds], is 170 cm [5 foot 7 inches] in height, and lives in a climate with an average temperature of from 10-20 C. He is Caucasian and is a Western European or North American in habitat and custom.”

[Source International Commission on radiological Protection. *Report of the Task group*

on *Reference Man* (ICRP Publication) No. 23. Oxford: Pergamon Press, 1975. Adopted October 1974. Page 4.]

However as BEIR VII pointed out low dose radiation affects some population groups more – women, children, fetuses, the sick. It is time to readjust standards to protect those most at risk. For example, not to do so is contrary to Executive Order 13045, *Protection of Children From Environmental Health Risks and Safety Risks*, signed by President Clinton in 1997 and endorsed with amendments in 2003 by President Bush. Federal agencies and the nuclear industry can not be allowed to continue to ignore the rule.

A. Women and Children: BEIR VII's analysis of the effects on women and young children. In 1990, the NAS estimated that the risks of dying from cancer due to exposure to radiation were about five percent higher for women than for men. In BEIR VII, the cancer mortality risks for females are 37.5 percent higher. The risks for all solid tumors, like lung, breast, and kidney, liver, and other solid tumors added together are almost 50 percent greater for women than men, though there are a few specific cancers, including leukemia, for which the risk estimates for men are higher." (Summary estimates are in Table ES-1 on page 28 of the BEIR VII report prepublication copy, on the Web at <http://books.nap.edu/books/030909156X/html/28.html>.)

Unlike the 1990 NAS report, BEIR VII estimates risks for cancer incidence rates as well as mortality and also provides detailed risk figures according to age of exposure for males and females, by cancer type. This is a change and great advance over the previous report. Cancer risk incidence figures for solid tumors for women are also about double those for men.

The BEIR VII report estimates that the differential risk for children is even greater. For instance, the same radiation in the first year of life for boys produces three to four times the cancer risk as exposure between the ages of 20 and 50. Female infants have almost double the risk as male infants. (Table 12 D-1 and D-2, on pages 550-551 of the prepublication copy of the report, on the Web starting at <http://books.nap.edu/books/030909156X/html/550.html>).

B. While the report states there is no direct evidence of harm to human offspring from exposure of parents to radiation, the committee noted that such harm has been found in animal experiments and that there is "no reason to believe that humans would be immune to this sort of harm." (Page 20, prepublication copy, on the Web at <http://books.nap.edu/openbook/030909156X/html/20.html>)

3. Health Risks in addition to cancer

The embryo/fetus, which is in many ways, the most sensitive to radiation in terms of non-cancer health risks, is excluded from the regulatory scheme, except for protection of pregnant women in radiation-controlled work places after a voluntary declaration of pregnancy. Even there, the maximum allowable dose to an embryo/fetus, 500 millirem, is five times greater than best practices in Europe, for instance, in Germany. Also, unlike Germany, there is no U.S. requirement to protect breastfeeding women from contact with significant radioactive contamination in the workplace after she declares that she is breastfeeding.

BEIR VII also noted that relatively high levels of radiation exposure increase risk of heart disease and stroke, though it did not give specific risk estimates. The committee also noted children born to parents that have been exposed to radiation could be affected by those exposures and study was warranted.

4. NRC's regulations do not consider radiation damage from ingested or inhaled alpha and beta emitters – therefore they underestimate a whole area of significant risk.

5. Synergistic effects radiation and chemicals ignored

Estimation of health risk is confined to exposure radiation, alone; not how radiation interacts with chemical toxic exposure – each magnifying the effects on the other.

Conclusion

Bottom line cancer mortality and incidence risk have indeed gone up and there is greater recognition that health effects, other than cancer, must be considered. Therefore it is now up to the NRC and EPA to change the framework of it's regulation to BEIR VII's new and significant information.

Submitted by,

Arnold Gundersen

References:

Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2 (2006), Board on Radiation Effects Research, National Academies Press
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Science for the Vulnerable: Setting Radiation and Multiple Exposure Environmental Health Standards to Protect Those Most at Risk, Institute Energy and Environmental Research October 19, 2006 - <http://www.ieer.org/campaign/index.html>

Health Risks of Ionizing Radiation –an overview of epidemiology studies, Clark University's Marsh Institute, March 2006.
<http://www.clarku.edu/departments/marsh/projects/community/EpiOverviewFinal.pdf>

From: sailchamplain@gmail.com
To: <SECY@nrc.gov>
Date: Mon, Feb 5, 2007 4:40 PM
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ADJUDICATIONS STAFF

Please note attached my support for PRM-51 -11 Petition for Rulemaking

Sincerely

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CC: Sally Shaw <acer8sac@comcast.net>

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