EDO Principal Correspondence Control

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FINAL REPLY:

Thomas B. Cochran
Matthew G. McKinzie
NRDC (Natural Resources Defense Council)

TO:

Commission

FOR SIGNATURE OF : ** GRN ** CRC NO: 08-0200

DESC:

Recommendations for Addressing Latent Cancer Risk in SOARCA (State-of-the-Art Reactor Consequence Analysis) (EDATS: SECY-2008-0198)

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ASSIGNED TO: CONTACT:

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ADDRESSEE:	Dale Klein		
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NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

April 4, 2008

The Honorable Dale E. Klein, Chairman
The Honorable Gregory B. Jaczko
The Honorable Peter B. Lyons
The Honorable Kristine L. Svinicki
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: SECY-08-0029 – **Estimating Latent Cancer Risk in SOARCA**

Dear Commissioners:

In SECY-08-0029 the NRC Staff has presented six options for addressing latent cancer fatalities, and proposed that the Commission adopt option (6). The Staff's recommendation is badly flawed for reasons set forth below. We recommend an alternative that we believe is preferred over any of the six options presented by the Staff.

The Staff's option (6) states:

> Calculate the average individual likelihood of an early fatality and LCF that is expressed as the average probability of a population-weighted, average individual (age and gender averaged) dying from cancer conditional to the occurrence of a severe reactor accident. The calculation would include both LNT [linear, no threshold] and 100 μSv (10 mrem) dose response models, with results presented for three distances: (1) 0 to 16.1 km (10 miles); (2) 0 to 80.5 km (50 miles); and (3) 0 to 161 km (100 miles).
>
> SECY-08-0029, at 8 (text in brackets added).

Option (6) has serious flaws:

- The "100 μSv (10 mrem) dose response" model makes no sense technically, because the dose (or dose rate) from the postulated reactor accident is always in addition to the dose (or dose rate) from radiation from natural background and man-made sources, such as medical exposures, which also vary significantly from

person to person. Near the 10 mrem "threshold" the annual background and medical radiation exposures together would be some 20 to 30 times higher than the 10 mrem exposure from the postulated accident. The minimum exposure anyone gets is the sum from all these exposures. We don't believe a safe threshold exists, but even if one did exist, a calculation that truncates the contribution from one source (the reactor) while ignoring the other larger sources (background and medical), will give erroneous results regardless of whether a safe threshold exists or not. It is truly bad science.

- By averaging risks within a circle around the reactor, the NRC staff could misrepresent individual risks by a significant margin. For example, in cases where there is a prevailing wind in the direction of lower than average population density, the risks to these higher exposed individuals will be averaged with a potentially larger group of less exposed individuals. By contrast, in cases where there is a prevailing wind in the direction of higher than average population density, the risks to lower exposed individuals will be averaged with a potentially larger group of more highly exposed individuals. Averaging risks in this manner may misinform relevant parties into thinking one individual's risk is much lower (or higher) than is the case. Also, averaging loses important information, like knowing one's dose and the potential consequences if the wind is blowing in one's direction.
- For some accident scenarios, the early exposure will be dominated by iodine isotopes, which will be of much greater risk to children than to adults. Averaging the children's risk with that of adults is misleading.
- Limiting the population to 100 miles fail to capture the cancer insult beyond the 100 mile radius. In the case of the Chernobyl accident the impact beyond 100 miles was substantial.
- *Collective dose should be reported.* Individual risk is important for decisions affecting individuals, but collective dose (or cumulative impacts) are important in making judgments related to the implementation of safety procedures and technologies, e.g., cost-benefit assessments related improving safety systems, including ALARA (as low as reasonably achievable) determinations, and decisions about whether to release noble gases captured by the secondary containment (as occurred at TMI II). Under Option (6) it is unclear to us whether, or how, the collective dose estimates, truncated at the three arbitrary distances, will be reported. Is the reader required to multiply the average risk by the population to get an average collective dose for each of the three areas? If the collective dose to individuals living beyond 100 miles is on the order of 1000 person-rems, or larger, it should be reported as well.

We propose a better approach.

Calculate the cancer incidence and cancer fatality risks to exposed individuals using the models recommended by the National Academies BEIR VII committee as reported in BEIR VII, Phase 2 (2006). We do not object to reporting results separately for the three proposed distances. However, in each case the results should be presented as a figure plotting the number of individuals exceeding a cancer fatality risk as functions of the risk.

In this manner those who believe a threshold exists can select from the curve the cutoff risk that they believe is appropriate without the Commission prejudging the risk threshold. Since it would be easy to do we also recommend that each figure also plot the results for cancer incidence in addition to cancer fatalities. This is particularly important because the cancer incidence risk is typically a factor of two higher.

We also recommend that a probability distribution of collective dose (person-rem) be reported for each of the three areas (defined by the distance from the reactor), and for the case where distance from the reactor is not truncated.

Where appropriate we also recommend that separate sets of estimates be reported for whole-body equivalent and thyroid (or other organ) exposure.

We would be pleased to discuss these matters with you in more detail if that would be helpful.

Sincerely,

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Sandy Joosten

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Cc:	Cochran, Tom; McKinzie, Matthew
Subject:	NRDC Recommendations for SOARCA
Attachments:	NRDC ltr to NRC re SEC-8-0029 SOARCA.PDF

<<NRDC ltr to NRC re SEC-8-0029 SOARCA.PDF>> Hello,

Attached to this email please find the Natural Resources Defense Council's comments and recommendations on the Nuclear Regulatory Commission's State-Of-The-Art Reactor Consequence Analyses Project. Please let me know if you have any trouble opening the file.

A hard copy of our letter is also being sent via First Class Mail.

Thank you for your time,

Alyssa Go

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