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December 22, 2015

Ms. Cindy K. Bladey  
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U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

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**Union of Concerned Scientists Comments on Draft NUREG-1530, Revision 1,  
"Reassessment of NRC's Dollar Per Person-Rem Conversion Factor Policy," Docket ID  
NRC-2015-0063**

Dear Ms. Bladey,

I am pleased to submit the following comments on Draft NUREG-1530, Rev. 1, on behalf of the Union of Concerned Scientists (UCS). UCS apologizes for its late submittal and would greatly appreciate NRC consideration of these comments.

**Summary**

UCS strongly supports the proposal to update the badly outdated \$2000-per-person-rem conversion factor and to develop a process for periodic review. The NRC continues to rely on a parameter that has not been updated in 20 years and is based on a value of a statistical life (VSL) far lower than the values used by other federal agencies. Use of this dated and out-of-step parameter is simply bad regulatory practice and leads to flawed analyses that undermine the credibility of NRC decisions. It is essential that federal agencies strive to achieve consistency in their respective regulatory analyses to enable meaningful assessment of federal actions that may have cross-cutting environmental and public health impacts across different sectors.

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However, as a caveat, UCS does not support the use of regulatory cost-benefit analysis based on overly narrow definitions of costs and benefits and reductionist formulas to monetize the public health benefits of regulations. The federal government should undertake a comprehensive reform of these practices. However, as long as the NRC and other federal agencies continue to rely on

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such analyses, it is imperative that the methodology they use is rigorous and is based on technically sound quantitative data.

### **Derivation of conversion factor**

The proposed approach the NRC staff uses to choose an updated value of a statistical life appears generally reasonable. The best estimate value of \$9 million in 2014 dollars, as well as the low and high estimates for use in sensitivity analyses, was chosen to be consistent with the current VSL values used by other agencies.

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However, UCS has concerns about the NRC staff's choice of radiation risk coefficient, which is the other parameter that is used to derive the conversion factor. The underlying risk coefficient of  $5.7 \times 10^{-4}$  per rem, chosen to be consistent with International Commission on Radiological Protection (ICRP) publication 103, is supposed to represent the weighted risk associated with both fatal and nonfatal cancers, as well as heritable effects. However, the parameter is smaller than the risk coefficient for cancer *mortality* alone recommended by the National Academy of Sciences' Biologic Effects of Ionizing Radiation (BEIR) VII committee, which is approximately  $5.8 \times 10^{-4}$  per rem, and well below the BEIR VII recommendation for cancer *incidence*,  $1.16 \times 10^{-3}$  per rem. Moreover, the coefficient does not take into account the risks associated with other diseases now understood to be associated with ionizing radiation exposure, such as cardiovascular disease. NUREG-1530 Rev. 1 itself concedes that its choice of risk coefficient "may underestimate the U.S. population risk by as much as 30 percent," but does not explain why that is acceptable.

Consequently, UCS believes that the best estimate parameter for exposure to low-dose and low-dose-rate low-linear-energy-transfer (LET) radiation of \$5,100 per person-rem (2014 dollars) is not clearly justified and is likely too low.

UCS also strongly endorses the adjustment of the conversion factor to take into account high dose and high dose rate scenarios, as well as exposure to high-LET radiation, where appropriate, as outlined in Appendix B of NUREG-1530, Rev. 1. NRC currently does not take these important considerations into account in its regulatory analyses. In fact, the MACCS code used in the NRC analyses does not compute separate population dose values for those exposures where a dose and dose-rate effectiveness factor (DDREF) should not be used. Thus, these analyses generally underestimate the magnitude of cancer induction associated with a given population exposure.

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**Periodic updating of conversion factors**

UCS supports the approach outlined in NUREG-1530, Rev. 1, to systematically review and update the conversion factors to keep them current by considering both changing economic conditions and new scientific developments. To that end, UCS agrees that the conversion factor should be expressed to two significant figures. However, the NRC staff should make clear that this choice is needed to properly account for updated values but does not reflect a technical judgment that this highly approximate concept can be quantified to such precision.

Thank you for your consideration of these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Dr. Edwin S. Lyman". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Dr. Edwin S. Lyman

Senior Scientist

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