UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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EPA-SAB-RAC-COM-92-003

OFFICE OF
THE ADMINISTRATOR

Honorable William K. Reilly
Administrator
U. S. Environmental Protection Agency

401 M Street, S. W.
Washington, D. C. 20460

Subject: Reducing Risks from Radon; Drinking Water Criteria Documents

Dear Mr. Reilly:

The Radiation Advisory Committee of the Science Advisory Board has reviewed several radon-related issues brought to it by the Agency during the past year-and-a-half. [1] The Committee has also commented extensively on the criteria documents supporting the proposed regulations for radionuclides in drinking water.[2] As a result of these reviews and the proposed National Primary Drinking Water Regulations for Radionuclides [3], the Committee is writing to convey its concern about the inconsistent approach within the Agency regarding reducing risks from radon exposures in homes. This issue illustrates a larger concern that the Agency is not effectively applying the recommendations set forth in the Science Advisory Board report *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (subsequently referred to as *Reducing Risk*).

The purpose of this letter is two-fold: (a) to address the fragmented and inconsistent approach regarding reduction of radon risk and (b) to provide our closing comments on the revised drinking water criteria documents that support the proposed regulations.

[1] Relationship Between Short- and Long-term Correlations for Radon Tests (EPA-SAB--RAC-92-008); Revised Radon Risk Estimates and Associated Uncertainties (EPA-SAB-RAC-LTR--92-003); Draft Citizen's Guide to Radon (EPA-SAB-RAC-LTR-92-005).

[2] Report to the Administrator on a Review of the Office of Drinking Water assessment of Radionuclides in Drinking Water and four Draft Criteria Documents (SAB-RAC-87-035); Review of the Office of Drinking Water's Criteria Documents and Related Reports for Uranium, Radium, Radon, and Manmade Beta-gamma Emitters (EPA-SAB-RAC-92-009).

[3] National Primary Drinking Water Regulations: Radionuclides: Proposed rule. Federal Register, 56:33050-33127, 18 July 1991.

The Proposed Drinking Water Regulation in Relation to the Reducing Risk Report

The Committee realizes that the technical aspects are only one of many factors that must be considered in making policy determinations and that the Agency has already given significant thought to these issues in preparing the proposed regulation for radon in drinking water. However, the Radiation Advisory Committee would like to express its views on the relative risks addressed by the proposed regulation *vis a vis* other radon risks reviewed by the Committee and offer its views as well on what its technical observations mean for matters of policy.

Technical Observations

The Agency has recognized that there is a serious question about the regulation of radon in drinking water. After considerable deliberation, the Office of Drinking Water has proposed to regulate it in the manner adopted for other contaminants under the Safe Drinking Water Act; that is, at an approximate lifetime risk level of 10^{-4}. The chief risk due to radon in water is its release into the air and subsequent inhalation, as opposed to ingestion of waterborne radon. Thus a 10^{-4} risk level (averaged over smokers and non-smokers) translates into about 0.03 pCi/L in air, or approximately 300 Pci/L in water. That air concentration is more than 100 times smaller than the Agency's voluntary guideline of 4 Pci/L for indoor radon concentrations. It also well within the natural year-to-year variation in indoor radon concentrations in average houses. As part of the Indoor Radon Abatement Act (Public Law 100-551) the Congress defined the goal of achieving an indoor radon level equal to the natural outdoor level, which is 0.1-0.5 Pci/L depending on the area of the country (NCRP Report No. 94). This goal is a factor of 8-40 below the indoor radon action level, but about a factor of 10 higher than the indoor radon level corresponding to the proposed regulation for radon in drinking water.

The Agency estimates that about 5% of the total indoor radon in homes served by ground water is due to radon released from household water use. (In homes served by surface water supplies, only a fraction of a percent of the indoor radon will be due to water use.) Data in the radon criteria document indicate that approximately 10-30% of the population that relies on ground water sources is exposed to water with radon concentrations above the proposed maximum contaminant level of 300 Pci/L. Overall, about 1% of the total indoor radon in areas with ground water supplies would be addressed by adopting the current proposal.

Although some point estimates of parameters have been employed here, the Committee is well aware of, and wishes to bring to your attention again, the uncertainties in parameters and models employed in the Agency's assessments. Full consideration of uncertainties is called for in the *Reducing Risk* report and is an essential part of the evaluations that the Committee recommends below. The Committee urges appropriate action to assure that the risk assessment fully considers the uncertainties.

Policy Considerations and Recommendations

The radon exposure situation reflects the fragmentation of environmental policy identified in *Reducing Risk*. The tactics and goals of different laws designed to address radon exposures are not consistent. Efforts within the Agency to reduce radon risks, while not uncoordinated, are rooted in programmatic areas that respond to different laws.

The field of radiation protection relies on the principle of optimization, which the Committee believes is in harmony with *Reducing Risk*, particularly with Recommendation 4:

> EPA should reflect risk-based priorities in its strategic planning processes. *The Agency's long range plans should be driven not so much by past risk reduction efforts or by existing programmatic structures, but by ongoing assessments of remaining environmental risks, the explicit comparison of those risks, and the analysis of opportunities available for reducing risks* (italics ours).

Optimization, like the philosophy espoused in *Reducing Risk*, means that we should apply our limited resources to the more important risks.

Frankly, radon in drinking water is a very small contributor to radon risk except in rare cases and the Committee suggests that the Agency focus its efforts on primary rather than secondary sources of risk. The Agency should conduct a full multi-media risk assessment of the various options for regulating radon in drinking water. Such an evaluation would include the risks posed by the treatment or disposal of any wastes produced by water treatment. It would also consider the effects of releases of other volatile compounds during treatment. (This is currently cited as an ancillary benefit of treatment without analysis of the overall result.)

The Committee understands that the Safe Drinking Water Act requires the Agency to develop regulations for radionuclides in drinking water. The Committee further realizes that a management structure based on media/pollutants may make recommendations that involve different perspectives difficult to implement. However, if the Agency, the Congress, and the country are going to grapple seriously with the concepts in *Reducing Risk*, then it is precisely this type of issue that must be confronted directly, openly, and creatively.

Closing Comments on the Revised Drinking Water Criteria Documents

The Committee would also like to comment on some aspects of the criteria documents prepared in support of the proposed regulations. Reviews of two earlier drafts of the associated criteria documents have been performed.[2] Following the Committee's review in the summer of 1990, the Office of Drinking Water, with the assistance of the Office of Radiation Programs, revised the criteria documents supporting the proposed regulation. The Committee does not wish to undertake a detailed formal review of the third set of criteria documents. The fundamental scientific questions were discussed in the previous reviews, cited above. The Committee stands by its original positions and believes that the Agency could further improve the scientific credibility of the criteria documents by adopting its recommendations.

The new set of documents is more complete and individual reports now include more explanation of the options considered, selection criteria, and possible alternative choices. The Agency was less successful in implementing the Committee's advice on uncertainty analysis. Although each criteria document now includes a chapter discussing uncertainty, the content of those chapters is very qualitative and is not the rigorous technical analysis envisioned by the Committee. Overall document quality and clarity are still inadequate for reports that are intended to be the technical bulwark for Agency decisions.

Broad scope assessments, of the type recommended above for radon, are also needed for other of the proposed regulations. The Agency's analyses should include the risks resulting from the concentration of radium, uranium, and other radionuclides in wastes resulting from water treatment. These include the risks to workers involved in disposal activities and the risks of disposal itself. A complete picture of the costs and benefits of implementing these regulations is needed. The importance of cost-effective treatment is stressed in Section V of the proposed regulations, but evaluation of the net benefit of the proposals is far from comprehensive.

The Committee appreciates the hard work of the Offices of Drinking Water and Radiation Programs. We thank them for briefings and presentations that have aided our reviews.

In closing, the Committee strongly encourages the Agency to review its proposed drinking water regulations in light of Recommendation 4 of the *Reducing Risk* report and to prepare comprehensive analyses of the complex questions that arise. We look forward to receiving a reply that delineates your planned response to these challenging issues.

Raymond C. Loehr, Chair
Executive Committee
Science Advisory Board

Oddvar F. Nygaard, Chair
Radiation Advisory Committee

Paul G. Voilleque, Chair
Drinking Water Subcommittee
Radiation Advisory Committee

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ABSTRACT

The Science Advisory Board's Radiation Advisory Committee registers its concern about the inconsistent approach within the Environmental Protection Agency regarding reducing risks from radon exposures in homes. This letter (a) addresses the fragmented and inconsistent approachs to reduce radon risk and (b) provides closing comments on the revised drinking water criteria documents that support the proposed regulations. This instance illustrates a larger concern that the Agency is not effectively applying the recommendations set forth in the Science Advisory Board report *Reducing Risk: Setting Priorities and Strategies for Environmental Protection.*

The Committee's conclusions result from reviews of several issues related to airborne radon [Relationship Between Short- and Long-term Correlations for Radon Tests (EPA-SAB-RAC-92-008); Revised Radon Risk Estimates and Associated Uncertainties (EPA-SAB-RAC-LTR-92-003); Draft Citizen's Guide to Radon (EPA-SAB-RAC-LTR-92-005)] brought to it by the Agency during the past year-and-a-half and of the criteria documents supporting the proposed regulations for radionuclides in drinking water [Report to the Administrator on a Review of the Office of Drinking Water assessment of Radionuclides in Drinking Water and four Draft Criteria Documents (SAB-RAC-87-035); Review of the Office of Drinking Water's Criteria Documents and Related Reports for Uranium, Radium, Radon, and Manmade Beta-gamma Emitters (EPA-SAB-RAC-92-009)]. In the context of these reviews, the proposed National Primary Drinking Water Regulations for Radionuclides [National Primary Drinking Water Regulations: Radionuclides: Proposed rule. Federal Register, 56:33050-33127, 18 July 1991] appears to regulate waterborne radon at a level that may be 1-2 orders of magnitude below the recommended action level for airborne radon in homes.

Keywords: radon, radionuclides, drinking water, risk reduction

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