

WM'99 CONFERENCE, FEBRUARY 28 – MARCH 4, 1999

EPA DEVELOPMENT OF REVISED DRINKING WATER STANDARDS FOR RADIONUCLIDES AND POTENTIAL IMPACTS ON NUCLEAR WASTE FACILITIES

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Pursuant to the Safe Drinking Water Act (SDWA), 42 U.S.C. §§300f *et seq.*, the U.S. Environmental Protection Agency (EPA) has established standards that limit the amount of certain contaminants in public drinking water systems. These standards, known as Maximum Contaminant Levels (MCLs), are to be established at a level that adequately protects human health, taking into account economic and technological feasibility. A public water system has the responsibility to make sure the water it supplies to its customers complies with the MCLs. In 1976, EPA promulgated its MCLs for man-made radionuclides at 40 C.F.R. §141.16. That MCL requires that the "average annual concentration of beta and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year."

During the past two decades, MCLs have evolved from what were essentially tap water standards into over-arching standards that are imposed in a wide variety of regulatory contexts. For example, MCLs (or their numerical equivalents) have been used as groundwater cleanup standards or goals in RCRA corrective actions, CERCLA response actions, and cleanups under analogous state laws. Regulatory agencies have also incorporated MCLs into their facility permitting, licensing, and compliance criteria and standards. DOE has incorporated the MCLs into Department environmental orders. Given regulators' reliance on the MCLs in a wide variety of environmental and public health programs, one would expect that the MCLs accurately reflect current science. Unfortunately, the MCLs for man-made radionuclides are based on what EPA admits are outdated, "obsolescent" scientific data.

ICRP-2, published by the International Commission on Radiological Protection (ICRP)¹ in 1959, included biokinetic data, metabolic models, and other information available at that time regarding the intake, retention, and effects of radionuclides in the body. In 1976, in promulgating its man-made beta-gamma emitter maximum contaminant level (MCL), EPA utilized ICRP-2. EPA acknowledged that the information in ICRP-2 was "obsolescent," but noted that "the ICRP is developing new dose models." (Background Document for National Interim Primary Drinking Water Regulations, EPA Document No. EPA-570/9-76-003, Appendix B, pp. 137-138, 152). EPA committed in that MCL rulemaking that, when ICRP published the newer data and recommendations, "the Agency will revise the [MCL] to permit the use of [those]

¹ The ICRP is an international organization that draws upon a broad spectrum of expertise within the international scientific community to reach a reasonable consensus about the outcomes of exposures to radiation and develop recommendations for radiation protection. Those recommendations provide a consistent technical basis for regulatory standards world-wide.

WM'99 CONFERENCE, FEBRUARY 28 – MARCH 4, 1999

newer data." Id. at 137-138. Those newer data and dose models were published in 1979 as ICRP-30.

In ICRP-30, the ICRP declared that because "New information on the effects of radiation on the body, on the uptake and retention of radioactive materials in body tissues and better data on radioactive decay schemes have accumulated in the intervening period [since ICRP-2 was issued in 1959] . . . those factors have made it necessary . . . to publish [ICRP-30]." (ICRP-30, Part 1, p.1). In ICRP-30, ICRP specifically stated that "This report supercedes ICRP publication 2." (ICRP-30, Part 1, cover page). Since its original publication in 1979, ICRP-30 has been periodically supplemented and updated (see Supplement to Part 1 in 1979; Part 2 in 1980; Supplement to Part 2 in 1981; Part 3 and Addendum to Parts 1 and 2 in 1981; Supplement A to Part 3 in 1981; and Part 4 in 1988).

In fact, in its published proposed revisions to the radionuclide MCLs, EPA itself proposes to adopt the dosimetric methods and data in ICRP-30 into its revised MCLs (which EPA had committed to do in 1976). See Proposed Rule, 56 Fed. Reg. 33,050 (July 18, 1991). That proposed rulemaking is replete with statements of EPA's intent to use the updated science of ICRP-30. For example, EPA states that it intends to adopt, in large part, as "the bases for selecting models . . . the same as those given by the ICRP in their Publication ICRP 30." Id. at 33,054/1. EPA also indicates that it "has revised its risk assessment numbers to correspond to . . . its RADRISK model," id. at 33,056/2, which incorporates values "taken mostly from the tabulations in ICRP Publication 30." Id. at 33078/2.

In addition, EPA expressly utilizes ICRP-30 dosimetry methods in other Agency regulations. See, e.g., EPA's CERCLA reportable quantities rulemaking, codified at 40 CFR Part 302 ("the Agency relied heavily on the health data and human intake limits published by the . . . [ICRP], particularly as reflected in its Publication 30 . . ." 54 Fed. Reg. 22524, 22530/3 (May 24, 1989)); and its radionuclide NESHAP, 40 CFR Part 61 (in adopting the effective dose equivalent (EDE) dosimetry methods, originally used in ICRP-26 and thereafter incorporated into ICRP-30, for "use[] in all the dose standards promulgated by EPA in this notice," EPA acknowledged that the "specific organ doses and the 'whole body dose'" methodology are "no longer consistent with current practices of radiation protection." 54 Fed. Reg. 51654, 51662/2 (Dec. 15, 1989)).

Other agencies also utilize ICRP-30 dosimetry methods in their regulations. For example, NRC uses ICRP-30 in its radiation protection standards at 10 CFR Part 20, see 56 Fed. Reg. 23360, 23370 (May 21, 1991) ("The amendments to part 20 in this final rule employ the ICRP-30 dose parameters." (footnote omitted)), and its emergency preparedness rule at 10 CFR Part 30, see 54 Fed. Reg. 14051, 14052 (April 7, 1989). Likewise, DOE uses it in its radiation protection regulations (e.g., 10 CFR Part 835, Appendix A, n. 2; and Appendix C) and departmental orders (e.g., Order 5400.5).

EPA also has incorporated ICRP-30 dosimetry into the Agency's radiation protection guidance to other Federal agencies. For example, on January 20, 1987, the President

WM'99 CONFERENCE, FEBRUARY 28 – MARCH 4, 1999

approved EPA's recommendations for a new "Radiation Protection Guidance to Federal Agencies for Occupational Exposure," which EPA published as Federal Guidance Report No. 11, 52 Fed. Reg. 2822 (Jan. 27, 1987). EPA intended that the guidance would

be implemented by the various Federal agencies having regulatory responsibilities for workers . . . Federal agencies are encouraged to reference the tables in this and future editions of this Federal Guidance Report in their regulations so as to assure a uniform and continuing application of the 1987 Federal guidance.

Federal Guidance Report No. 11, Preface. In that Report, EPA stated that it was

present[ing] values for derived guides that make use of contemporary metabolic modeling and dosimetric methods . . . The Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) tabulated herein are numerically identical, in most cases, to those recommended by the ICRP in their Publication 30. Exceptions include values for plutonium and related elements, which are based upon information presented in ICRP Publication 48, and a few radionuclides not considered in Publication 30, for which nuclear decay data were presented in ICRP Publication 38.

Id. EPA has continued its use of ICRP-30 dosimetry methods in its Federal Guidance Report No. 12 (1993). See Federal Guidance Report No. 12, Preface, p. iii.

Indeed, EPA mandates use of Federal Guidance Report Nos. 11 and 12, and therefore ICRP-30 dosimetry methods, in a number of Agency regulations, including for example the WIPP individual protection standard in 40 CFR Part 191 (see, e.g., Background Information Document For Amendments to 40 CFR Part 191, EPA 402-R-93-073, pp. 5-7 (Nov. 1993)). DOE also references Federal Guidance Report No. 11 in its radiation protection regulations at 10 CFR Part 835 (see, e.g., 10 CFR §835.2(a) (definitions of "Annual Limit on Intake" and "Derived Air Concentration"))).

The potential impact of using updated science in the revised MCLs could be substantial. Currently accepted data indicate that the risks posed by man-made radionuclides in drinking water may be less (at least on a whole body basis) than EPA has assumed when it developed its MCLs in 1976. Accordingly, the "average annual concentration of beta and photon radioactivity from man-made radionuclides in drinking water" that would "produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year" may be much greater than the concentrations currently associated with the 4 mrem/yr MCL. This raises the possibility that beta and photon radionuclide concentrations in cleanup standards, criteria, etc. should be revised to reflect the updated ICRP-30 dosimetry.

Despite the overwhelming body of recognition of the application of ICRP-30, and despite EPA's acknowledgment that ICRP-2 dosimetry is outdated, EPA continues to adhere to

WM'99 CONFERENCE, FEBRUARY 28 – MARCH 4, 1999

ICRP-2 in the MCLs. Even more problematic is EPA's publicly announced intent to continue to use that outdated science in its upcoming MCL revisions (scheduled to be promulgated in 1999-2000). EPA's rationale for adhering to ICRP-2 might be based, at least in part, on a potential policy concern that the Agency should maintain consistency with its past applications of the MCLs. However, there are a number of countervailing technical, legal, and policy considerations which weigh in favor of using updated science.

The MCLs were created in 1976 in response to the Safe Drinking Water Act. In the 1996 SDWA amendments, Congress directed EPA to use updated science when revising the MCLs. See 42 U.S.C. §300g-1(b)(3)(A). In the legislative history of those amendments, Congress strongly encouraged EPA to adopt new science, even if it is inconsistent with information currently relied upon by the Agency:

[T]he level necessary to maintain public health protection may change as new or additional information becomes available. Where the Agency makes a determination regarding human health effects that are inconsistent with determinations on which the Administrator has relied in establishing . . . [an MCL], the Administrator is encouraged to revise the standard to reflect the more recent information.

H.R. Rep. No. 104-632, p. 31.

Nor would use of ICRP-30 necessarily conflict with the SDWA backsliding prohibition, found in 42 U.S.C. §1412(b)(9). That section provides that "[E]ach revision [to an MCL] shall maintain, or provide for greater, protection of the health of persons." As noted above, the SDWA requires EPA to use updated science when it becomes available. Further, a good argument can be made that using ICRP-30 would not constitute a revision to an MCL. Rather, only the underlying calculational methods (dosimetry) would be updated. In any event, even if the SDWA were interpreted as prohibiting EPA from revising the MCLs to use ICRP-30, that prohibition would apply only in instances where the SDWA and MCLs are strictly applicable, *i.e.* to tap water in public water systems. The SDWA backsliding prohibition should not constrain EPA from using the updated science in instances where the SDWA and MCLs do not apply, *e.g.*, groundwater protection where there is no underground injection.

Further, there are strong policy reasons why, notwithstanding potential concern with perceived backsliding on tap water standards, EPA should not continue use of outdated science in the many non-tap water regulatory programs where the numerical equivalents of MCLs have been incorporated. Certainly, if updated information indicates that an agency has over-regulated as a result of relying on faulty methodologies and assumptions, that agency risks losing credibility within the regulated community if it avoids its responsibility to revise its standards to reflect current science.

Bringing MCLs in line with current, accepted scientific thinking could also

WM'99 CONFERENCE, FEBRUARY 28 – MARCH 4, 1999

facilitate the public's understanding of the potential risks posed by man-made radionuclides in a variety of regulatory contexts. For example, in a societal decision regarding siting or licensing of a radioactive material facility, or remediation and disposition of an existing facility, current science can enlighten the public as to the potential risks posed by the facility and, hopefully, lead to sound, rational decision making. Using the outdated, obsolescent science in ICRP-2 may mislead the public as to those potential risks and thereby result in an unsound, ill-informed decision.