

## Attachment B

### **Summary of EPA Radiation Standards**

Historically, EPA has employed cleanup standards that keep resulting risks of cancer incidence within a range of one in a million ( $1 \times 10^{-6}$ ) to one in ten thousand ( $1 \times 10^{-4}$ ). In non-cleanup settings, it has generally not permitted doses greater than 15 millirem/year.<sup>1</sup> It has consistently opposed proposed radiation limits that exceed these risk and dose ranges. The “benchmark” cleanup recommendations contemplated in the Department of Homeland Security dirty bomb cleanup guidance, from 100 mrem/year to 10,000 mrem/year, significantly exceed doses and risks EPA considers protective of public health.

### **Background and Explanation**

EPA’s Superfund (CERCLA) site cleanup program sets a goal of one-in-a-million ( $1 \times 10^{-6}$ ) excess risk of cancer as the point of departure; if that goal cannot be met, after consideration of nine balancing criteria, one can fall back to cancer incidence risk levels of no more than about one in ten thousand ( $1 \times 10^{-4}$ ). See 40 CFR 300.430(e)(2)(i)(A)(2). As noted below, EPA uses risk rather than dose for such cleanup standards, set for individual radionuclides; as a rough approximation, the  $1 \times 10^{-4}$  risk level corresponds to about 5 mrem/year over 30 years of exposure.)

EPA states that dose levels above 15 mrem/yr and drinking water levels over the maximum contaminant levels (MCLs, pegged for most radionuclides at 4 mrem/year) would not be considered protective for Superfund. In a letter to the Nuclear Regulatory Commission from its then Administrator Carol Browner, EPA opposed several changes NRC was considering in a final decommissioning rule from its proposed rule, stating that it considered

“...increasing the proposed dose limit from 15 mrem/yr to as much as 30 mrem/yr and eliminating a separate requirement for protecting ground water that could be used as drinking water to the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act, to be disturbing... EPA would also consider NRC’s rule to not be protective under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and not consistent with this and previous Administration’s Ground Water Policy... If NRC were to promulgate its rule with the above-referenced changes, EPA would be forced to reconsider its policy exempting NRC sites from the NPL. This change in

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<sup>1</sup> EPA has determined that its older radiation standards, set at doses of (a) 25 mrem/year whole body, 75 mrem/year to the thyroid, or 25 mrem/year to any critical organ other than the thyroid, or (b) 25 mrem/year whole body, 75 mrem/year to any critical organ, are equivalent to approximately 10 or 15 mrem/year ede respectively. See “Establishment of Cleanup Levels for CDERCLA Sites with Radioactive Contamination,” August 22, 1997 EPA Memorandum from Stephen Luftig, Director, Office of Emergency and Remedial Response, and Larry Weinstock, Acting Director, Office of Radiation and Indoor Air, pp. 16, 17.

EPA listing policy for the NPL would reflect the EPA view that NRC regulation would not be adequately protective of human health and the environment under CERCLA...<sup>2</sup>

EPA does not use dose limits for its own standards for site cleanup, but rather the same cancer risk range that it uses for chemicals and that was used during cleanup efforts after the attack on the World Trade Center (e.g., the WTC cleanup was to  $10^{-4}$  risk levels). In a policy statement to its regional offices that perform Superfund cleanups, EPA's Headquarters stated that "...site decision-makers should not use dose-based guidance rather than the CERCLA risk range in developing cleanup levels. This is because for several reasons, using dose-based guidance would result in unnecessary inconsistency regarding how radiological and non-radiological (chemical) contaminants are addressed at CERCLA sites."<sup>3</sup>

Under other environmental laws, EPA has at times used dose limits to protect the public from exposures to radionuclides. However, even under these non-Superfund laws, EPA has used the same  $10^{-4}$  to  $10^{-6}$  cancer risk range as its measure of acceptable exposure when developing dose limits.

For example in its recent rulemaking for the proposed Yucca Mountain nuclear waste repository, EPA picked a 15 mrem/yr standard with a separate groundwater standard of MCLs. EPA specifically rejected comments asking for dose levels of 25 and 70 mrem/yr. The Agency wrote that "EPA disagrees that the standard should be set at 25 mrem."<sup>4</sup> As part of its rationale EPA further wrote that 25 mrem/yr would be "...outside the preferred EPA lifetime risk range. In general, the Agency does not regulate above a risk of  $1 \times 10^{-4}$ ...."<sup>5</sup>

The Agency stated that "EPA disagrees particularly strongly with the commenter who recommended a 70 mrem standard as adequately protective."<sup>6</sup> EPA wrote that a 70 mrem/yr standard "would result in a risk level at Yucca Mountain that is significantly higher than at any facility that falls under 40 CFR part 191, such as WIPP and future radioactive waste disposal facilities."<sup>7</sup>

In EPA's original rulemaking for the disposal of high level radioactive waste which was the source of its 15 mrem/yr standard for the Waste Isolation Pilot Project (WIPP), EPA cautioned that it considered this dose level to be so high that it was acceptable because "it involves only a small number of potential sites and would result in

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<sup>2</sup> Letter from Carol Browner to NRC Chairman Shirley Ann Jackson. February 7, 1997.

<sup>3</sup> Letter from Stephen Luftig, Director of EPA's Office of Emergency and Remediation Response and Stephen Page, Director of EPA's Office of Radiation and Indoor Air, to EPA's regional Superfund and radiation managers, December 17, 1999.

<sup>4</sup> Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada (40 CFR Part 197)—Final Rule; Response to Comments Document. June 2001. See page 4-5.

<sup>5</sup> *ibid.* In nuclear cleanup matters, EPA generally sets acceptable risk based on cancer incidence, not deaths. In the Yucca rulemaking, however, it relied upon cancer mortality risks.

<sup>6</sup> *ibid.*

<sup>7</sup> *ibid.*

only a small number of potential sites and would result in only a small number of people potentially being exposed to the maximum allowed individual risk.”<sup>8</sup>

When developing standards that may result in large numbers of people being exposed to radionuclides, EPA has issued a dose limit of 10 mrem/yr. In a rulemaking for limiting exposure to radionuclides under the Clean Air Act, the Agency stated “the EPA will generally presume that if the risk to that individual is no higher than approximately 1 in 10 thousand, that risk level is considered acceptable and EPA, then considers the other health and risk factors to complete an overall judgment on acceptability. The presumptive level provides a benchmark for judging the acceptability of maximum individual risk, but does not constitute a rigid line for making that determination.”<sup>9</sup> EPA issued a 10 mrem/yr standard (a cancer risk of approximately  $2 \times 10^{-4}$ ) for DOE facilities, non-DOE facilities, NRC licensees, and uranium fuel cycle facilities.

In rejecting a comment calling for a 25 mrem/yr standard, EPA stated that “regarding the maximum lifetime risk limit, the EPA has considered the recommendation of the NCRP, ICRP, and other expert advisory committees and in the context of the source categories herein considered, has concluded that individual dose levels greater than 10 mrem/yr are inconsistent with the requirements of section 112”<sup>10</sup> of the Clean Air Act.

For protecting the public from beta particle and photon radioactivity in drinking water, EPA has a standard of 4 mrem/yr.

The Department of Homeland Security (DHS) proposed limit for drinking water of 500 mrem/yr (this is 125 times greater than the EPA standard). However, it is probably significantly worse. This is because the EPA standard is based on an older dose methodology of 4 mrem/yr to the total body or any internal organ. EPA considered changing this standard to 4 mrem/yr using a newer dose methodology (effective dose equivalent or ede) that most federal agencies are using, including presumably DHS with its 500 mrem/yr limit for drinking water. Using the latest risk estimates in Federal Guidance Report 13, EPA found that “FGR-13 demonstrates that the current MCL of 4 mrem/year results in concentration limits that are within the  $10^{-6}$  to  $10^{-4}$  range.” EPA rejected the idea of changing to the newer 4 mrem-ede MCL since Federal Guidance Report 13 demonstrates that the “proposed MCL of 4 mrem-ede/year results in concentration limits that are outside the  $10^{-6}$  to  $10^{-4}$  range.” It is impossible to say how much worse the DHS limit might be without seeing a list of concentrations in drinking water that correspond to its 500 mrem/yr level and comparing these concentrations to the MCL federal drinking water limits.

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<sup>8</sup> Environmental Radiation Protection Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes; Final Rule (December 20, 1993) see Volume 58 Federal Register, page 66402

<sup>9</sup> National Emission Standards for Hazardous Air Pollutants; Radionuclides. December 15, 1989. see Volume 54 Federal Register, page 51658

<sup>10</sup> *ibid.*, page 51686