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STATE OF WASHINGTON
DEPARTMENT OF HEALTH
DIVISION OF RADIATION PROTECTION

Airustrial Center, Bldg. 5 • P.O. Box 47827 • Olympia, Washington 98504-7827

April 11, 1995

Mr. Phillip R. Staats
Washington State Department of Ecology
1315 West 4th
Kennewick, Washington 99335-6018



Dear Mr. Staats:

The establishment of action levels for 100 area interim Records of Decision (ROD) prior to the promulgation of the State's radioactivity cleanup standards is an important and difficult task. The Department of Health's (the Department) effort to establish these new regulations will not be complete for at least six months, and the conclusion of the federal rulemaking efforts of the NRC and EPA appear to be at least as far away. In the interim, there are federal and state regulations and guidelines that can be used to support action levels for 100 area interim ROD's, while cleanup standards are developed for final ROD's.

The U.S. EPA has recently published the radiation protection guidance document: "Radiation Protection Guidance for Exposure of the General Public" (59 FR 66414). This document recommends that (non-medical) radiation doses to the public from all sources and pathways not exceed a primary 100 mrem/yr above background. Further, this document recommends that lower dose limits be applied to individual sources and pathways. One such individual source is residual environmental radiological contamination after the cleanup of a site. Lower dose limits for individual sources and pathways are referred to as secondary dose limits. This ensures that the 100 mrem/yr primary dose limit will not be exceeded. Most, if not all, of the principles of this guidance document have already been codified in state and federal regulations. The regulations of the NRC (10 CFR 20), the Department's WAC 246-221 and DOE's proposed 10 CFR 834, for example, all contain the primary dose limit to the public of 100 mrem/yr. Further, existing state and federal secondary dose limits for individual sources and pathways, such as drinking water and air emissions, are a small fraction of the 100 mrem/yr dose limit.

A number of dose limits for residual environmental radiological contamination have been proposed recently by federal agencies. These include DOE's informal proposal to "constrain" dose to 30 mrem/yr (ANL/EAD/LD-2, 1993, pg.2), EPA's staff-draft (40 CFR 196) 15 mrem/yr limit, and NRC's staff-draft (10 CFR 20) limit of 15 mrem/yr and "goal" of 3 mrem/yr. Each of these secondary "limits" is a relatively small fraction of the primary limit, and therefore consistent with EPA's guidance.

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While the Department cannot yet definitively recommend a dose limit, we expect that the final cleanup standard will fall in the above 3 to 30 mrem/yr dose range (above background). This expectation is tentative; however, since our analysis of all of the issues associated with the proposed regulation is not yet complete. Thus the Department recommends that the dose limit for 100 area interim ROD's should fall in the 3 to 30 mrem/yr range. One reasonable choice is the EPA/NRC dose limit of 15 mrem/yr.

The risk of 15 mrem/yr can be estimated with the National Council on Radiation Protection and Measurements (NCRP) "Risk Estimates for Radiation Protection" (NCRP report No. 115). This report incorporated the risk estimates contained in the National Academy of Science's BEIR V report, the International Commission on Radiological Protection's ICRP 60 report, and the United Nations Scientific Committee on the effects of Atomic Radiation's UNSCEAR 88 report. The NCRP's report estimates that the lifetime fatal-cancer risk from chronic radiation exposure is 5×10^{-7} per mrem. This includes a low dose-rate effectiveness factor of 2. Thus a one-year dose of 15 mrem corresponds to a lifetime fatal cancer risk of approximately 8×10^{-6} . If one were to receive 15 mrem annually for thirty years, the corresponding risk is approximately 2×10^{-4} . If, instead, one were to receive 15 mrem annually for 75 years the corresponding risk is approximately 6×10^{-4} . These risk estimates should be viewed with caution. The risks from doses this low are well below the level at which epidemiologists can observe them in a population. The BEIR V report, for example, states that at these low doses "it must be acknowledged that the lower limit of the range of uncertainty in the risk estimates extends to zero".

In conclusion, the Department recommends that the dose limit above background contained in the 100 Area interim ROD's should be in the 3 to 30 mrem/yr range. The 15 mrem/yr limit proposed by the EPA and NRC is one reasonable choice in this dose range. If I can provide any further assistance or information, please call me at 360-586-3306.

Sincerely,



John L. Erickson, Head
Environmental Radiation Section
Division of Radiation Protection

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cc: Joe Stohr
Steve Alexander
HAB Environmental Restoration Committee