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United States Government

Department of Energy

memorandum

AUG 29 2 30 PM '94

DATE: AUG 2 5 1994

REPLY TO ATTN OF: EM-421 (W. A. Williams, 427-1719)

SUBJECT: Uranium Guidelines for the Schnoor Site, Springdale, Pennsylvania

TO: L. Price, OR

This is in response to the request for approval of uranium guidelines for the Schnoor Site of the Formerly Utilized Sites Remedial Action Program, pursuant to Department of Energy (DOE) Order 5400.5. The site, located in western Pennsylvania, was used for uranium machining to support the Manhattan Engineer District during the 1940s. Your staff requested approval of a residual uranium guideline for 100 picoCuries per gram of total uranium, based on a draft supporting analysis by Argonne National Laboratory (ANL). Further, your staff provided a brief analysis that this level achieves the DOE goal of keeping radiation exposures as low as reasonably achievable (ALARA).

Basic Dose Requirement:

The present land use of the Schnoor Site is industrial. Several residences are immediately adjacent to the site. For the cleanup of the site, it is necessary to determine a uranium soil guideline pursuant to DOE Order 5400.5, Chapters II and IV. The first step in this process is to determine (using site-specific data) the level of uranium that would lead to an exposure of 100 millirem per year for all plausible land uses. A draft analysis was performed by ANL and was submitted with the request.

The ANL analysis calculated a maximum residual concentration of total uranium in soil of 710 picoCuries per gram (pCi/g) to 4800 pCi/g, depending on future land use. These concentrations are equivalent to 100 millirem per year for various land uses. The recommended 100 pCi/g is equivalent to 3 millirem per year for an industrial worker (Scenario A in the ANL Report). For recreational use, the exposure is less than 2 millirem pear year (Scenario B). For residential use with off-site water (Scenario C), the recommended guideline is 13 millirem per year. For subsistence farming use with an on-site water well (Scenario D), the exposure is approximately 14 millirem per year.

Based on the draft ANL analysis, the recommended value of 100 pCi/g of total uranium is within DOE dose guidelines of 100 millirem per year, which must be met under all worst case, plausible scenarios, including the assumed residential and agricultural usa.

As Low As Reasonably Achievable Analysis:

In addition to meeting the basic radiation protection guideline, any cleanup guideline must be analyzed to keep exposures ALARA. In the application of ALARA, practical considerations, costs, and benefits are also taken into account. For practical considerations, it is likely that

the contaminated areas will be cleaned up to a level below whatever guideline is established. This is likely for two reasons. First, in order to remove all material above the guideline, some soil contaminated below the guideline will be removed. This will have the practical effect of lowering the guideline as it is applied during cleanup operations. Second, during cleanup operations, it is difficult to precisely delineate the point at which contamination above the guideline ends. As a result, remedial personnel will remove all suspect materials to avoid repeated cleanup operations on the same property. For these reasons, it is likely that cleanup for uranium will be accomplished at some level lower than the approved cleanup guideline.

There are two practical considerations not considered in the ANL analysis. These are the use of clean fill material to replace excavated materials and the presence of a concrete floor in the building. These will both cause a shielding and covering effect on the remaining soils, reducing gamma ray and dust exposures. If the site were to be used for residential or agricultural use in the future, the clean fill would also reduce the projected doses by diluting the residual contamination. The ANL analysis does not assume that there is any clean fill or concrete floor placed over the site after cleanup. For this reason, the doses calculated in the ANL report are clearly a worst case scenario. In the actual application of a cleanup guideline, it is very likely that a cleanup level substantially below the established guideline will be achieved.

Selection of a uranium guideline significantly below 100 pCi/g would, as the request stated, negatively impact the project by reducing the utility of field measurements for confirming the cleanup of uranium. Although other measurement techniques could be used, the cost is much higher and involves extensive damage to the property by drilling holes in the concrete floor.

Summary and Approval:

Based on the above considerations, a guideline of 100 pCi/g for total uranium above background levels is approved for use in the cleanup of the Schnoor Site, pursuant to DOE Order 5400.5., Chapter IV, Section 5a.

In addition, please direct ANL to finalize the draft dose report for publication, subject to the comments which have been submitted to you separately.

We understand that your staff has discussed site activities and the draft ANL analysis with State personnel. We recommend that the approved guideline and the supporting documentation be discussed with State personnel as soon as convenient.

James W. Wagoner II
Director
Off-Site/Savannah River Program Division
Office of Eastern Area Programs
Office of Environmental Restoration

cc:
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