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**FURTHER CLARIFICATION RELATIVE TO  
DISPOSAL OF THE K-65 RESIDUES AT THE  
FMPC**

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MEMORANDUM**

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

JAN 10 1991

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**SUBJECT:** Further Clarification Relative to Disposal of the X-Residues at the Feed Materials Production Center, Fernald, Ohio

**FROM:** Richard J. Guilmond, Director  
Office of Radiation Programs (ANR-458)

**TO:** David Wilrich, Director  
Waste Management Division, Region 8

On October 3, 1990, Region 8 requested further clarification of guidance provided in the Office of Radiation Programs' (ORP August 10, 1990, memorandum regarding disposal requirements for X-68 residues that are currently being stored at the Feed Materials Production Center (FMPC), Fernald, Ohio. This material is a high assay radium and thorium-bearing waste. Specifically ORP was asked to elaborate on: (1) why use of the uranium mill tailings standards (40 CFR Part 192) as relevant and appropriate requirements for the CERCLA response action is not sufficiently protective of public health and the environment; and (2) which requirements of the standards for spent nuclear fuel, high-level and transuranic radioactive waste (40 CFR Part 191) should be considered in order to dispose of these high-assay radium and thorium-bearing wastes in a manner which is adequately protective of public health and the environment.

Current assay of these materials (approximately 113 nanocuries per gram of radium-226 and 30 nanocuries per gram of thorium-230) indicates that they are some three orders of magnitude more concentrated in these substances than are typical mill tailings, for which the standards at 40 CFR Part 192 were developed. These materials are capable of presenting a major exposure hazard (in excess of one thousand rem per year in an unshielded situation), and will continue to pose this level of hazard long after the 200 to 1000 year period of control which required by 40 CFR Part 192 standards. (The half-life of radium is 1600 years, and that of thorium is 77,000 years.) As a point of reference, the incremental chance of cancer death from one thousand rem is on the order of one in two. A much longer period of isolation is thus essential for adequate protection. Although

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mill tailings, as regulated by 40 CFR Part 192, also present a potential risk after a 1000-year control period, this hazard is many orders of magnitude smaller. Stabilization and containment for the period of control specified by 40 CFR Part 192 for uranium mill tailings is not sufficiently protective for the K-65 residues.

Further, the disposal methods required to implement the 40 CFR Part 192 standards do not offer sufficient protection against intrusion to be suitable for the K-65 materials. There is no direct requirement in 40 CFR Part 192 for protection against intrusion. In the case of mill tailings, sufficient protection against intrusion is provided by 40 CFR Part 192 only as an indirect result of the measures required to assure stabilization for 200-1000 years against erosion. This will not suffice for the K-65 residues, both because of their thousand-fold greater level of radioactivity, and because protection against erosion designed to last for 200-1000 years cannot be relied upon for longer terms needed for K-65 residues.

For the above reasons, the longevity and intrusion protection provided by Part 192 is insufficient for the K-65 residues. On the other hand, groundwater protection and radon emission requirements of Part 192 are general, health-based specifications that are relevant and appropriate requirements for protection of human health and the environment, but only if supplementary requirements to address the above-noted deficiencies regarding intrusion and longevity of control are applied to the K-65 residues.

The K-65 residues exhibit concentrations of long-lived alpha-emitting isotopes which present health hazards comparable to the alpha-emitting material commonly known as transuranic waste (TRU), and, although their physical and chemical properties are somewhat different, these differences are in the direction of even greater mobility, which makes stringent containment even more critical. The U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), and U.S. Nuclear Regulatory Commission (NRC) have previously recognized that, in some situations, alpha-contaminated waste not meeting the strict definition of transuranic waste may have to be managed as transuranic waste--see EPA's "CERCLA Compliance with Other Laws Manual: Part II" (EPA/540/G-89/009) p.8-4, n.3; DOE Order 5820.2A; and NRC regulations at 10 CFR Part 61 (84 FR 22578; May 25, 1989). EPA's standards for disposal of TRU are specified at 40 CFR Part 191, and would assure adequate protection of human health and the environment from the K-65 residues. These standards are divided into two parts: Part A, which applies to interim storage; and Part B, which applies to permanent disposal. These standards have been subjected to litigation and Part B was remanded to EPA for further rulemaking by the U.S. First Circuit.

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Court of Appeals on July 17, 1987. However, major portions of the Part B standards were not criticized by the Court, and our recommendations below take into account the Court's limited area of concern that led to the remand of Part B. It is also important to recognize that, because the form of disposal contemplated by 40 CFR Part 191 (a deep geologic repository) is difficult and expensive to implement, other disposal options might assure adequate protection for the K-65 residues at YKP should also be considered.

Based upon the preceding, management of these residues during any possible interim storage should be considered in accordance with the regulations at 40 CFR Part 191, Subpart A potential relevant and appropriate requirements, during the detailed analysis of alternatives for the K-65 silos remedial action. The application of Subpart A regulations does not depend on the interim storage alternative chosen.

In evaluating alternatives for permanent disposal, the regulations at 40 CFR Part 191, Subpart B, should be treated as criteria "to be considered" (TBC). In addition to relevant and appropriate requirements in the regulations at 40 CFR Part 191, as noted above. During the development of 40 CFR Part 191, the Subpart B objectives and requirements were derived independently of the choice of a specific disposal method. Therefore should be considered in the detailed analysis of alternatives for the K-65 silos remedial action. A single possible exception is the set of quantitative release limits specified in Table 1, which is based on the containment capability of an assumed deep geological repository and which not be achievable by other disposal methods. The National Contingency Plan (NCP) provides that part or all of a requirement may be an ARAR or TBC for an alternative, and this permits consideration of other forms of disposal that may not satisfy limits specified in Table 1. This is not to say, however, that deep geological disposal should not be evaluated as an alternative. It is premature to rule out or to require any specific disposal method now. A decision on final requirements for the unique circumstances presented by these wastes should await the objective assessment of alternative disposal methods through the detailed analysis using the nine evaluation criteria set forth in the NCP that encompasses statutory requirements and includes other gauges of overall feasibility and acceptability of remedial alternatives.