

2507

**OPERABLE UNIT 4 - APPLICABLE OR  
RELEVANT AND APPROPRIATE REQUIREMENTS  
(ARARS)**

11-18-91

**DOE/EPA  
DOE-333-92  
3  
LETTER**

stabilization and containment requirements of 40 CFR 192 are insufficient to address the magnitude and the duration of the hazard associated with the disposal of the residues. U.S. EPA further considered the provisions of 40 CFR 192 to be inadequate to provide proper protection to the future inadvertent intruder into the disposed waste materials.

DOE has evaluated the technical basis of the U.S. EPA position, as provided by Reference 1, and continues to maintain that the provisions of 40 CFR 191 should not be applied to the selection or implementation of a remedy for the K-65 residues. Studies performed to support the promulgation of 40 CFR 191 clearly did not contemplate the application of these requirements to uranium byproduct materials, such as the K-65 residues. The provisions of 40 CFR 191 establish performance-based requirements for the disposal of high level and transuranic waste. These performance based requirements were developed as a consequence of studies examining the singular application of one disposal technology, deep geologic repositories to these specific waste materials. It is the position of DOE that the physical, chemical and radiological characteristics of the waste material must be recognized in the site-specific evaluation of a range of disposal technologies. DOE contends that the application of the provisions of 40 CFR 191 to the remedial process for the silo residues may unnecessarily limit or preclude DOE's and U.S. EPA's ability to evaluate and otherwise select viable on-site remedial alternatives.

The enclosure to this correspondence presents a brief summary of the principal technical points of contention identified by U.S. EPA in Reference 1. While DOE agrees with U.S. EPA that the singular application of 40 CFR 192 requirements to the disposal of residues is not sufficiently protective, DOE contends that the collective application of 40 CFR 192 with the other ARARs/To Be Considered (TBCs) proposed in Reference 2, provides a level of protectiveness commensurate with the hazard of the material involved.

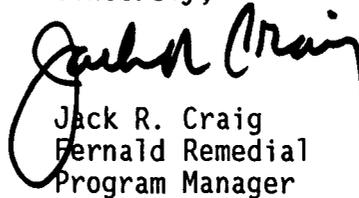
As identified in the U.S. EPA approved Initial Screening of Alternatives (ISA) Report for Operable Unit 4, DOE is evaluating a range of viable on-site and off-site remedial alternatives for the permanent disposition of the K-65 residues. Consistent with the requirements of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and Section 121 of CERCLA, DOE is evaluating these alternatives to ensure that the selected remedy achieves overall protection of human health and the environment and meets all identified ARARs. To ensure compliance with the applicable, relevant and appropriate requirements and TBC requirements identified in Reference 2, DOE is evaluating on-site disposal alternatives which include state-of-the-art waste treatment, stabilization, and disposal technologies. Consistent with U.S. EPA guidance and policy, the detailed analysis of viable off-site alternatives will be limited to consider only those requirements identified as being applicable. In the event 40 CFR 191 was considered an ARAR or TBC to on-site remedial alternatives, it is conceivable that the guidelines of 40 CFR 191 could be contemplated as an acceptance criteria for the wastes at a viable off-site disposal facility. This extension of the provisions of 40 CFR 191 as an acceptance criteria by the disposal facility could preclude the ability of DOE to implement a selected off-site remedial alternative.

DOE contends that the provisions of 40 CFR 191 should not be considered as an ARAR or TBC to the remedial process for the K-65 silo residues. DOE proposes to continue the detailed evaluation of alternatives process for the remedial alternatives contained in the approved ISA Report in full consideration of the ARARs/TBCs identified in Reference 2. It is the contention of the DOE that this proposal represents the most prudent course of action which will provide DOE, U.S. EPA and the State of Ohio with the most technically-sound basis for final remedy selection.

DOE requests your prompt consideration and concurrence with this proposal. We would like to discuss this issue at your earliest convenience.

If you or your staff have any questions, please contact Randi Allen at FTS 774-6158 or (513) 738-6158.

Sincerely,



Jack R. Craig  
Fernald Remedial  
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FO:Allen

Enclosures: As Stated

cc w/encls:

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Evaluation of Key Points From U.S. EPA January 21, 1991 Letter**U.S. EPA Point**

U.S. EPA considers that the stabilization and containment requirements for the period of control specified in 40 CFR 192 are not sufficiently protective to address the magnitude and duration of the hazard associated with the permanent disposal of the K-65 residues.

**DOE Technical Evaluation**

The requirements of 40 CFR 192 were promulgated to ensure the proper management and disposition of uranium mill tailings. The physical, chemical and radiological characteristics of uranium mill tailings are similar to the uranium byproduct materials present within the K-65 silos. DOE recognizes, however, that the mill tailings typically addressed by 40 CFR 192 are of lower activity concentrations than the K-65 residues. However, and perhaps more importantly, the sites within the uranium mill tailings cleanup program commonly involve tailings piles covering several hundred acres with the total inventory of radionuclides being comparable to that present within the K-65 residues. While the potential direct exposure to the inadvertent intruder from the untreated waste form is higher for the silo residues, the total radionuclide source terms present within the waste materials, which are available for radon production and contaminant migration, are comparable.

DOE acknowledges that the exposure hazard associated with the K-65 residues will last long after the stabilization and containment control period as defined in 40 CFR 192. With the noted exception concerning direct exposure to intruders, the established periods of control within 40 CFR 191 were promulgated in full consideration of waste material with similar durations of potential exposure. DOE considers that the application of the 200 to 1000 year control period contemplated by 40 CFR 192 to the on-site remedial alternatives under consideration, coupled with the additional intruder protection measures discussed below, represents a reasonable and potentially achievable design objective for the permanent disposal of the residues. Design considerations for longer periods of control cannot be reasonably demonstrated with current technology. The application of longer control periods to the remedy selection and/or remedial design processes would unnecessarily limit the range of on-site alternatives being considered for the residues, and may necessitate the application of deep geologic repository technology.

**U.S. EPA Point**

U.S. EPA considers that the disposal methods required to implement 40 CFR 192 do not provide sufficient protection to the potential inadvertent intruder to the disposed residues.

**DOE Technical Evaluation**

DOE agrees with the U.S. EPA position that additional engineering measures are required over and above those contemplated by 40 CFR 192 to ensure that the potential exposures to the inadvertent intruder are addressed in a responsible manner. To ensure these exposures are appropriately minimized, DOE proposes to supplement 40 CFR 192 with the application of the requirements of 10 CFR 61.52(a)(2) for Class C waste intrusion protection, 10 CFR 20.301(a)(1) and DOE Order 5820.2A Chapter 3 regarding the use of intruder barriers that will be designed to protect against an inadvertent intrusion. DOE contends that the application of these additional requirements to the remedy selection process provides a level of protectiveness commensurate with the hazard of the materials involved.

U.S. EPA should also recognize that the remaining on-site remedial alternatives for the residues all consider some type of waste form modification, including contaminant extraction, stabilization or vitrification, prior to placement into an engineered disposal facility. The waste form modifications contemplated by the remaining remedial alternatives for the residues provide additional assurance that potential exposures to future inadvertent intruders are reduced below the levels of the untreated residues regulated by 40 CFR 192.

**U.S. EPA Point**

U.S. EPA considers that the groundwater and radon emission requirements provided by 40 CFR 192 are health based requirements which should be considered relevant and appropriate to the disposal of the K-65 residues.

**DOE Technical Evaluation**

DOE agrees with the U.S. EPA position that the groundwater protection and radon emission requirements provided by 40 CFR 192 should be considered relevant and appropriate to the on-site disposal of the K-65 residues.

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**U.S. EPA Point**

U.S. EPA considers that 40 CFR 191 Subpart A is relevant and appropriate to any on-site interim storage remedial option.

**DOE Technical Evaluation**

DOE disagrees with the U.S. EPA position that 40 CFR 191 Subpart A should be considered relevant and appropriate to any on-site interim storage system. Studies supporting the promulgation of 40 CFR 191 did not contemplate the application of these requirements to uranium byproduct material such as the K-65 residues. 40 CFR 191, Subpart A excludes from consideration the potential exposures to radon when establishing the 25 millirem exposure standard. Exposure to radon was not considered in the 40 CFR 191 rule making because of the insignificant or non-existent potential for high-level radioactive waste, spent nuclear fuel and transuranic waste to emit radon. DOE proposes, in lieu of the applications of the requirements of 40 CFR 191, Subpart A, to consider the requirements governing storage activities within 10 CFR 61.41 and 40 CFR 192.41 as relevant and appropriate requirements to the interim on-site storage of the residues. DOE also proposes to apply the provisions of DOE Order 5820.2A Chapter 3 as a To Be Considered (TBC) requirement to on-site storage alternatives. Additionally, DOE is committed to meeting the requirements of 40 CFR 61, Subpart Q, which exclusively deals with radon. These alternate requirements provide a level of protectiveness which is similar or more restrictive than 40 CFR 191 Subpart A and are more appropriate for application to the waste materials.

**U.S. EPA Point**

U.S. EPA considers that 40 CFR 191 Subpart B is a TBC criteria for permanent disposal alternatives. One exception noted by U.S. EPA was the possible exclusion of the quantitative release limits specified on Table 1 of 40 CFR 191 Subpart B.

**DOE Technical Evaluation**

DOE disagrees with the U.S. EPA position that 40 CFR 191 should be a "To Be Considered" criteria for permanent disposal alternatives. Studies conducted by U.S. EPA to support the promulgation of 40 CFR 191 considered a different waste form from those in the silos and further considered geologic repositories as the specific disposal method. It is DOE's contention that the physical and chemical characteristics of the waste must be the principal consideration in determining the most appropriate disposal method. The application of 40 CFR 191 Subpart B to the permanent disposal of the materials will unnecessarily limit the range of viable on-site remedial alternatives available to address the specific hazards presented by the K-65 residues.

The basis for DOE's objection to the use of 40 CFR 191 as a TBC for these waste is based upon the following considerations:

- NRDC vs. EPA, 824F.2d 1258, (1st Cir. 1987) - 40 CFR 191, Subpart B, has been vacated and remanded by the U. S. Court of Appeals. TBC's are intended to consist of guidance or similar non-promulgated advisories that assist in evaluating health effects or in implementing a regulation. Regulations nullified by court ruling should not be imposed as TBC's. The requirements of the repromulgated rule have not been determined.
- NCP: 40 CFR 300.400(g)(2)(iii) - The substances regulated by the requirement and the substances found at the CERCLA Site: 40 CFR 191 was developed for an entirely different type of waste with different physical and chemical properties and for different radionuclides, characteristics that are critical to the appropriateness of the technical standards.
- NCP 40 CFR 300.400(g)(2)(iv) - The actions or activities regulated by the requirements: Studies conducted to support the promulgation of 40 CFR 191 considered a particular type of disposal method that is not appropriate for the K-65 wastes. Disposal of K-65 wastes at planned deep geologic repositories is precluded. An additional deep geologic repository for such wastes would be difficult to site.

DOE proposes, in lieu of these requirements, to consider the requirements of 10 CFR 61 for Class C wastes, 40 CFR 192, 40 CFR 264 and DOE Order 5820.2A Chapter 3 as ARARs/TBCs for remedial alternatives involving the on-site disposal of the waste materials. These alternate requirements provide a level of protectiveness which is similar or more restrictive than 40 CFR 191 Subpart B and are more appropriate for application to the waste materials. The enclosed table presents a summary comparison of the principal requirements of 40 CFR 191 Subpart B with the proposed alternate ARARs/TBCs.

Specifically, regarding the application of the quantitative release limits specified on Table 1 of 40 CFR 191 Subpart B, DOE supports U.S. EPA's position that these requirements should not be applied to the disposal of the waste materials. These performance based requirements were developed on the basis of a significantly different waste type than the K-65 residues and considered the application of a singular disposal technology, deep geologic repositories. The application of such performance requirements to the comparative analysis of a range of different on-site alternatives would be inappropriate. It is the contention of DOE that the application of the proposed ARARs/TBC, provided in Reference 2 coupled with the application of NCP protectiveness criteria, provide equivalent or more restrictive criteria for the evaluation of on-site remedial options. DOE further contends that these criteria are more appropriately applied to the residues and will help ensure the selection of a remedial alternative which is protective of human health and the environment and best achieve the objectives of the CERCLA statute.

**TABLE 1**  
**COMPARISON OF 40CFR191 SUBPART B WITH OTHER PROPOSED ARARs/TBCs**

40 CFR 191		Comparable Protection									
Citation	Requirements of Citation	Citation	Requirements of Citation								
191.13	<p>Disposal systems for transuranic wastes shall be designed to provide a reasonable expectation that the cumulative releases of radionuclide to the accessible environment for 10,000 years shall (based on 10<sup>6</sup> curies of alpha emitting nuclides):</p> <p>(1) Have a likelihood if less than ne chance in ten of exceeding:</p> <table style="margin-left: 40px;"> <tr> <td>Radium-226</td> <td>100Ci</td> </tr> <tr> <td>Thorium-230/232</td> <td>10Ci</td> </tr> <tr> <td>Uranium-234,5,8</td> <td>100 Ci</td> </tr> <tr> <td>Other alpha emitting nuclides with t<sub>1/2</sub> &gt; 20 yr.</td> <td>100 Ci</td> </tr> </table> <p>(2) Have a likelihood of less than one chance in 1,000 of exceeding ten times the values listed above.</p>	Radium-226	100Ci	Thorium-230/232	10Ci	Uranium-234,5,8	100 Ci	Other alpha emitting nuclides with t <sub>1/2</sub> > 20 yr.	100 Ci	40 CFR 300.430	Reasonable maximum exposure scenarios associated with proposed remedial alternatives must generally attain the risk range of 10 <sup>-4</sup> to 10 <sup>-6</sup> excess cancer fatalities.
Radium-226	100Ci										
Thorium-230/232	10Ci										
Uranium-234,5,8	100 Ci										
Other alpha emitting nuclides with t <sub>1/2</sub> > 20 yr.	100 Ci										
191.14(a)	Maintain active institutional controls over site as long as practical; however, not consider periods of institutional control for periods longer than 100 years in performance assessment.	<p>10 CFR 61.7(4)</p> <p>DOE 5820.2A Chapter 3</p>	<p>Institutional control of access to the site is required for up to 100 years. (Note: Use of a 100 year period for performance analysis is inferred in this section.)</p> <p>Disposal Systems must provide protection sufficient to limit chronic exposures to 100 mrem/yr and acute exposures to 500 mrem/yr committed effective dose to inadvertent intruders following active institutional controls (100 yr).</p>								
191.14(b)	Disposal systems shall be monitored after disposal to detect substantial and detrimental deviations from expected performance.	<p>10 CFR 61.53(d)</p> <p>40 CFR 264.100/.117/.310</p>	<p>After the disposal site is closed; the license shall maintain a monitoring systems capable of providing early warning of releases of radionuclides.</p> <p>Implementation of a groundwater monitoring program to demonstrate the effectiveness of a corrective-action/closure/post closure system.</p>								

**TABLE 1 (CONT'D)**  
**COMPARISON OF 40CFR191 SUBPART B WITH OTHER PROPOSED ARARs/TBCs**

40 CFR 191		Comparable Protection	
Citation	Requirements of Citation	Citation	Requirements of Citation
191.14(c)	Disposal site shall be designated by passive intruder barriers.	10 CFR 61.52(a)(2)  10 CFR 61.52(a)(7)	This regulation requires passive controls be employed to guard against inadvertent intrusion.  Disposal areas must be permanently marked as to the boundaries and location of each disposal unit.
191.14(d)	Disposal system shall use different types of barriers to isolate the wastes from the accessible environment. Both engineered and natural barriers shall be included.	10 CFR 40, App. A  10 CFR 61.51	Use of earthen covers and clay or synthetic liner is suggested.  The disposal site must be designed to complement and improve the ability of the site's natural characteristics to assure performance objectives are met. Use of "engineered barriers" required.
191.14(e)	Places where there has been mining for resources, or where there is a reasonable expectation of exploration for resources should be avoided in site selection.	10 CFR 61.50	Areas must be avoided having known natural resources which, if exploited, would result in failure to meet site performance objectives.
191.14(f)	Retrievability of waste not precluded by disposal system for a reasonable period of time.		
191.15	Disposal systems for transuranic waste shall be designed to provide a reasonable expectation that, for 1000 years after disposal, undisturbed performance of the disposal system shall not cause an annual dose equivalent to the public in excess of 25 millirem whole body or 75 millirem to critical organs.	10 CFR 61.41 40 CFR 192.31	See 191.03 Disposal areas shall be designed to provide reasonable assurance of control of radiological hazards to be effective for 1000 years...while not specific to the dose limits it is reasonable to expect that compliance with control measure required would achieve the dose limits of 40 CFR 191.15.
191.16	Disposal systems for TRU waste shall be designed to provide a reasonable expectation that, for 1000-years after disposal undisturbed performance shall not cause radionuclide concentrations averaged over a year in water withdrawn from any portion of a special source of groundwater to exceed: <ul style="list-style-type: none"> <li>1) 5pCi/l of radium 226/228</li> <li>2) 15 pCi/l of alpha emitting radionuclide (Including radium 226/228, but excluding radon); or</li> <li>3) combined beta or gamma emitting nuclides which would produce an annual dose of 4 mrem.</li> </ul>		Note: The aquifers in the area of the FEMP do not meet the defined requirements of a "special source of groundwater" listed in the regulation; however, the requirements of 40 CFR 192.31 which further reference 40 CFR 264.11 essentially provide comparable protection.