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49 FR 46418
AB50-2
PDR

205/KSD/84/02/15

*See Packet I
for encl.*

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MAR 02 1984

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MEMORANDUM FOR: Chairman Palladino
Commissioner Gilinsky
Commissioner Roberts
Commissioner Asselstine
Commissioner Bernthal

FROM: William J. Dircks
Executive Director for Operations

SUBJECT: PROPOSED AMENDMENTS TO URANIUM MILL TAILINGS REGULATIONS
(SECY-83-523 AND 523A)

The purpose of this memorandum is to address issues raised by Martin G. Malsch, Deputy General Counsel, in SECY-83-523A and to offer staff recommendations for modifying the proposed rule changes in response.

The first step deals with the Part I items beginning on page 4 of SECY-83-523A where OGC agrees with staff or the modifications are minor. The second step deals with the areas of disagreement and offers two solutions as Enclosures A-1 and A-2. Both enclosures contain the changes covered in the following discussion for Criterion 1 and are in a comparative text format.

Step 1

Point 1 under OGC Part I suggests that the longevity goal was totally deleted from the rule. We added the EPA requirement to Criterion 6 and thought that we had done as point 1 suggests. We consider the placement editorial and have modified Criterion 1 as suggested by OGC.

Point 2 agrees with staff recommendations to reflect EPA's requirements to protect all ground water and this was done. No modifications are necessary.

Point 3 agrees with proposed modifications of Criterion 5 on liners and no modifications are necessary in response.

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Point 4 agrees with the change from 2 to 20 pCi/m²/s in Criterion 6 and no modifications are necessary in response.

Points 5 and 6 agree with proposed changes to Criteria 6 and 8 on radon releases and no modifications are necessary.

Point 7 agrees with listing references to 40 CFR Parts 190 and 440 in Criterion 8 and no modifications are necessary.

Step 2

The areas of disagreement cover the "no maintenance" language in Criteria 1 and 12, the below grade prime option in Criterion 3, all the siting and design changes in Criterion 4, and the prescriptive requirements on covers in Criterion 6.

Enclosure A-1 is a proposed revised Federal Register Notice which reflects the basic technical staff position that the proposed changes to Criterion 1 and 12 on maintenance, Criterion 3 on below grade disposal, Criterion 4 on siting and design, and Criterion 6 on cover specifications represent changes to the collective prescriptive requirements that defined the standard of Appendix A of 10 CFR Part 40 for radon emanation and cover stability. Enclosure A-1 reaffirms the point that the technical evaluation of what is necessary to comply with the EPA standard is not a legal issue. The Staff still believes that on a technical basis most of the originally prepared changes are not discretionary and that the changes are justified. However, some accommodation of the OGC views has been made in additional explanatory text, and in restoring language on earthen covers in Criterion 6.

Publication of Enclosure A-1 for comment has practical value in addition to the technical issues. A proposed rule is not binding. Enclosure A-1 should solicit more considered comments and a specific request for comments on the issues raised by OGC is included in new text. If warranted by public comments and Commission consideration, a final rule as outlined in Enclosure A-2 could be adopted. If the public is not even aware we are considering the changes outlined in Enclosure A-1, how can they respond? The notice for the final rule could include an advance notice of proposed rulemaking on the prescriptive requirements as outlined by OGC for Part II.

Enclosure A-2 contains comparative text to implement OGC views.
Enclosure A-2 basically restores the original requirements of Appendix A

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with the changes noted in Part I of the OGC memorandum and a few other clarifying changes.

The staff has also included an explicit provision for alternatives to the specific requirements in Appendix A. The provision would allow flexibility for alternatives to both the pre-existing Appendix A requirements and the new EPA requirements added to Appendix A. The alternative provision would paraphrase the language in Section 84c of the Atomic Energy Act of 1954 and be inserted in the Introduction to Appendix A. Section 84c, which was added by the Nuclear Regulatory Commission Authorization Act for fiscal years 1982 and 1983, contemplates flexibility in applying the EPA and NRC standards and rules. The changes the staff originally proposed were intended to provide flexibility which could then be supplemented by exemptions to Part 40, if needed. The changes covered those areas where licensee initiated alternatives were most likely to occur. The proposed addition to the Introduction would build in the opportunity to handle alternatives as a routine licensing matter where the applicant could provide supporting rationale on a case-by-case basis.

The OGC memorandum cites Motor Vehicle Manufacturers Association of the United States Inc. vs. State Farm Mutual Automobile Insurance Company, U.S. (decided June 24, 1983) as bearing significantly on the course of action that NRC should take in its procedure for conforming amendments. The staff does not see this case as remarkable. It involved a review of revocation of an auto safety standard under a special statute that applied APA procedures to revocation of standards as well as their promulgation. The Court held that the agency action in revoking the passive restraint standards for auto safety was subject to judicial review under an "arbitrary and capricious" standard, and that the agency was arbitrary and capricious in revoking the passive restraint standard because it threw out both passive seat belts and air bags on the basis of unsubstantiated problems with seat belts. The agency had failed to make the rational connection between the facts found (i.e., problems with seat belts) and the choice made (elimination of both passive seat belts and air bags). The alternative that the agency failed to consider was the air bag itself, which had been included in the revoked passive restraint standard. Agencies are not required, however, to consider all policy alternatives in reaching a decision (slip opinion p. 20).

It goes without saying that judicial review of this rulemaking proceeding is subject to the "arbitrary and capricious" standard of review and that

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NRC must show a rational connection between the facts found and the choice made. The facts include a statutory directive to conform to EPA standards that establish the ground rules for technical implementing requirements and the technical evaluation of the need for retention of prescriptive requirements that were promulgated to achieve a different standard (i.e., 2 picocuries/m²/s and thousands of years of stability).

The choice recommended by the staff is to propose modification of those prescriptive criteria that are not technically justifiable in terms of the EPA standard of 20 picocuries/m²/s emanation rate for radon and one thousand year longevity for cover. If the former NRC standards of 2 picocuries/m²/s and thousands of years of cover stability are changed, it is rational to modify the other prescriptive technical requirements promulgated to achieve the primary standards. It could be considered arbitrary and capricious not to make such changes. To do as OGC suggests, that is, simply change thousands of years to one thousand and 2 picocuries to 20 picocuries, without modification of closely allied prescriptive requirements can be seen to ignore the relationship between the prescriptive requirements and the primary standard. For example, the retention of the 3 meter cover requirement is a de facto 2 picocurie emanation rate at 9% soil moisture (see GEIS p. 11-12, figure 11.1). We do not understand OGC to be saying that the prescriptive requirements in criteria 3, 4, and 6 are needed to achieve the EPA standard, but only that for procedural reasons they be retained at present.

The course of action outlined in the OGC memorandum, which reduces conforming changes to the barest minimum, and characterizes all others as "discretionary," has to be understood as a demanding effort that may take several years to complete. It will demand substantial commitment of manpower and contractual effort since it will require reevaluation of all existing environmental work performed by NRC on mill tailings. The extensive environmental work performed by EPA is relegated to secondary status as supportive only of the minimal changes.

In this case the staff believes that the Commission is faced with a more difficult decision than appears on the face of SECY-83-523 and 523A. That decision is to decide for mill tailings regulation the acceptable cost to the Agency, in terms of manpower and resource commitment, of minimizing litigation risks by building the substantially revised rulemaking record implicit in the OGC recommendation. In the long run the approach in Enclosure A-2 based on the OGC recommendation will be more costly in terms of agency resources, but could reduce litigation

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risks from environmental groups. Whether it will reduce litigative risk from the uranium milling industry is problematical.

Two final points in response to the OGC comments in SECY-83-523A are necessary. OGC places a great deal of emphasis on limits on EPA authority. OGC's position is that standards that include implementation matters are outside EPA authority. See Comment 1 of the attachment to SECY-83-523A. EPA promulgated its standards under Section 275b of the Atomic Energy Act. Section 275b says "the Administrator...shall, by rule, promulgate standards of general application for the protection of the public health, safety and the environment from radiological and nonradiological hazards..." "General application" can be properly interpreted as applicable to all licensees in the same situation rather than interpreted to mean that EPA standards cannot force specific implementation measures. Further, under Section 275b the scope of EPA authority is identical for both radiological and nonradiological standards since both are referred to as standards of general application. For tailings, the implementation reference in Section 275d is not exclusive and does not have to be interpreted as precluding the EPA standards from including implementation aspects. This situation is legally different from the authority that EPA exercises under Reorganization Plan No. 3 of 1970. Under Reorganization Plan No. 3 of 1970, EPA is limited to establishing only environmental protection standards that apply outside the boundary of the licensed facility, thus providing a legal basis to argue that EPA cannot deal in onsite implementation matters. If OGC believes that the scope of EPA's authority under Section 275b of the Atomic Energy Act is equally limited, then the inevitable conclusion is that 40 CFR 192 is not a lawful regulation because it contains highly prescriptive implementing provisions for groundwater protection.

In the paper, OGC also questioned whether recent studies on the health effects associated with exposure to radon invalidated GEIS findings. The Uranium Mill Tailings Task Force addressed three recent studies on pages 9 and 10 of its report entitled, "Radiological Analysis of Mill Tailings Control Requirements (Enclosure 3 of SECY-83-195 dated May 20, 1983). The Task Force concluded that the final combination of factors from these recent studies would "...result in risk estimates similar to those previously published by the NRC (GEIS)."

Staff recommends the publication of Enclosure A-1 but would be willing to accept Enclosure A-2 so that a proposed rule can be published before the statutory deadline of April 1, 1984 for final conforming changes to be in

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place. The approach suggested in Part II of the OGC comments cannot be done in time to be published as part of a proposed rule before the deadline.

~~William J. Dircks~~

William J. Dircks
Executive Director for Operations

Enclosures:

1. Proposed FRN A-1
2. Proposed FRN A-2

NOTE: Approach and memorandum
coordinated with DNussbaumer, SP;
RDSmith, URFO; DCool, FC.

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WM	KDragonette	84/02/13
WM	DEMartin	84/02/22
WM	IHigginbotham	84/02/23
WM	MJBell	84/02/
WM	REBrowning	84/02/23
ED	WJDircks	84/02/01

No legal objection per telecon A Fenner to KDragonette 2/24/84 K&D

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*Encl. to memo
to Commissioner
for Dir. [7590-01]
3/2/84*

NUCLEAR REGULATORY COMMISSION

10 CFR PART 40

Uranium Mill Tailing Regulations: Conforming NRC
Requirements to EPA Standards

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations governing the disposal of uranium mill tailings. The proposed rule changes are intended to conform existing NRC regulations to the regulations recently published by the Environmental Protection Agency for the protection of the environment from these wastes. This action is necessary to comply with the legislative mandate set out in the Uranium Mill Tailings Radiation Control Act and the NRC Authorization Act for FY 1983.

DATE: The comment period expires on (30 days after publication).
Comments received by the Commission after that date will not be considered.

ADDRESSES: Mail comments to Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Deliver comments to Room 1121, 1717 H Street NW, Washington, DC between 8:15 a.m. and 5:00 p.m. weekdays.

FOR FURTHER INFORMATION CONTACT: Robert Fonner, Office of the Executive Legal Director, telephone (301) 492-8692, or Dan E. Martin, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 427-4642.

SUPPLEMENTARY INFORMATION: The Nuclear Regulatory Commission (NRC or Commission) is proposing modifications to its regulations for the purpose of conforming them to generally applicable requirements recently promulgated by the Environmental Protection Agency (EPA). These new EPA requirements are contained in Subparts D and E of 40 CFR Part 192 (48 FR 45926; October 7, 1983), are applicable to the management of uranium and thorium byproduct material, and became effective for NRC and Agreement State licensees and license applicants on December 6, 1983. The action proposed herein would modify previously existing regulations of the Commission to conform them to the new EPA requirements, and would incorporate certain of the new EPA requirements into the Commission's regulations. The affected Commission regulations are contained in Appendix A to 10 CFR Part 40, which was promulgated in final form on October 3, 1980 (45 FR 65521).

The modifications to Commission regulations proposed herein will incorporate within NRC regulations some of the new EPA requirements. The action that the Commission will take with respect to the remainder of these new EPA requirements is the subject of an Advanced Notice of Proposed Rulemaking (ANPRM), which requests comment on that subject, also issued this day. These new EPA requirements were developed and issued by EPA pursuant to section 275b. of the Atomic Energy Act (42 U.S.C. 2022), as added by Section 206 of Pub. L. 95-604, the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). Under Section 18(a) of Pub. L. 97-415, the Nuclear Regulatory Commission Authorization Act for fiscal years 1982 and 1983, the Commission is required to conform its regulations to EPA's by no later than March 31, 1984, with notice and opportunity for public comment. Today's proposal furthers fulfillment of that responsibility.

Previous Actions

In keeping with Section 18(a) of the NRC Authorization Act, the Commission suspended portions of its October 3, 1980 mill tailings regulations after notice and opportunity for public comment (48 FR 35350; August 4, 1983). This suspension terminates automatically upon the earlier of (1) the conclusion of this conforming rulemaking, or (2) April 1, 1984.

Those portions of the Commission's regulations which are now suspended are those that were determined to be in conflict or inconsistent with EPA's proposed requirements. More specifically, the suspended portions are those that would require a major commitment or major action by licensees which would be unnecessary if (1) the EPA proposed standards were promulgated in final form without modification, and (2) the Commission's regulations were modified to conform to the EPA standards. The objective of the suspension was to avoid a situation where a licensee or applicant might make a major commitment or take a major action which would be unnecessary or ill-advised after this subsequent rulemaking to permanently modify the existing regulations on the basis of EPA's final standards.

The final EPA standards are very similar to those that were proposed. There is, for that reason, a good deal of similarity between the changes to Commission regulations effected temporarily by suspension and those proposed today to be made permanent. Nevertheless, the Commission has reconsidered the appropriateness of the entirety of Appendix A to 10 CFR Part 40 in light of the new EPA standards, and the changes proposed today are not fully consistent with the previous suspension. Differences, except for additions, are explicitly identified. All additions are differences since nothing was added to Appendix A in the suspension.

Scope of This Proposal

In addition to conforming its existing regulations to new EPA standards, under the provisions of the UMTRCA, the Commission has a further legislated responsibility; it must establish general requirements, for the management of byproduct material, with EPA concurrence, which are, to the maximum extent practicable, at least comparable to requirements applicable to the management of similar hazardous material regulated by the EPA under the Solid Waste Disposal Act (SWDA), as amended. The Commission deliberated as to how best to deal with these related rule-making needs and decided on the course of action resulting in this proposal and the accompanying ANPRM. This proposal addresses all the changes considered appropriate to the existing Commission regulations in Appendix A to 10 CFR Part 40. Other changes to the Commission's regula-

tions for mill tailings management resulting from the EPA standard are the subject of the accompanying ANPRM.

The content of these two rulemakings also may be characterized in terms of the need for EPA concurrence, although that was not the deciding factor. This proposal consists of modifications not requiring EPA concurrence, including conforming changes to existing NRC rules and incorporation of EPA requirements not deriving from the SWDA. Those modifications that are the subject of the ANPRM accompanying this proposal require EPA concurrence pursuant to section 84 of the Atomic Energy Act. Modifications addressed in the ANPRM include (1) incorporation into NRC regulations of SWDA requirements already imposed by the EPA, and (2) any further modifications to NRC regulations necessary to establish SWDA-comparable requirements as called for by the UMTRCA. This course of action was chosen to allow the Commission to both conform its regulations to EPA's and incorporate non-SWDA provisions in a prompt and orderly manner, in accordance with the schedule set by Congress, and deal with the complex of SWDA requirements and issues in a separate, comprehensive and unified rulemaking.

Content of This Proposal

The new EPA requirements in 40 CFR Part 192, (48 FR 45926) included by reference several sections from 40 CFR Part 264, promulgated by the EPA pursuant to authority provided by the Resource Conservation and Recovery Act (RCRA), which modified the SWDA. These SWDA (or RCRA) requirements imposed under 40 CFR Part 192 are addressed in the ANPRM accompanying this proposal. The few conforming changes to NRC's existing Appendix A regulations made necessary by these newly imposed SWDA requirements are addressed in this document, as are conforming changes and other changes necessary to reflect and incorporate the non-SWDA elements of EPA's new requirements. These non-SWDA provisions include requirements to--

- (1) Adhere to applicable requirements in 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations" for uranium byproduct material, and essentially the same requirements for thorium byproduct material;

(2) Adhere to applicable requirements in 40 CFR Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory."

(3) Maintain releases of radon to the atmosphere during operations as low as is practicable;

(4) Close disposal areas so as to provide reasonable assurance of effective control for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years;

(5) Limit average post-closure releases of radioactive radon gas to no more than 20 picocuries per square meter per second (pCi/m²-s); and

(6) Set limits for residual concentrations of radioactive radium left in soil, above background, in onsite areas not subject to the closure requirements for longevity and radon release control.

The Commission is proposing many revisions to Appendix A which are considered necessary to conform it to the physical stability aspects of the EPA standard, which requires that the final cover design provide reasonable assurance of effective control "for one thousand years, to the extent reasonably achievable, and in any case, for at least 200 years." The EPA's numerical longevity standard takes an entirely different approach to stability than do the NRC requirements. In Appendix A, the NRC established numerous prescriptive requirements for specific design features in order to assure stability without active maintenance for an indefinite period of time following closure. The EPA rule sets a performance standard for a limited time period. In addition, the preamble to the EPA standard and the supporting environmental evaluation, indicate that the EPA consciously considered the acceptability of relying on active maintenance to provide stability following closure, and did not prohibit it. Rather, the EPA standard requires that, for nonradiological hazards the need for active maintenance only be minimized. In its present form, the NRC's Appendix A flatly prohibits any planned reliance on active maintenance. These are profound differences that of necessity appear to compel a complete set of changes to NRC's prescriptive requirements.

Accordingly, the changes to Appendix A proposed herein are based on the Commission's view that to properly conform its regulations to the EPA standard, it should delete or modify the prescriptive requirements for specific design features which are not necessary to meet the EPA standard and which, indeed, may be contrary to the function of a performance standard to set the goal but not dictate the precise methods for achieving it. The prescriptive requirements in question include those for minimizing upstream drainage area, siting where there is good wind protection, providing a 3-meter minimum thickness of cover material, relatively flat slopes, rock armoring, etc. The Commission is also proposing to delete the prohibition on reliance on active maintenance. The Commission considers these changes appropriate to allow operators the greatest degree of flexibility in meeting the EPA standards, and to avoid the situation wherein NRC requirements go beyond EPA's, in areas which EPA specifically addressed in its standard setting process. Also, in order to assure that NRC requirements do not fall short of EPA's, the exact language from the EPA standard is proposed for incorporation into Commission regulations.

The Commission recognizes that there may be differing views on this approach and specifically invites comments on this subject. Comments are also invited on all of the individual changes proposed herein, particularly with respect to the consistency of those changes with the approach outlined above, and on the need for any further changes to Appendix A for the purpose of conforming to the EPA standard. Commenters are requested to distinguish between comments on this proposal and comments on the underlying EPA standards.

Proposed Modifications and Rationale

In accordance with the above, the Commission proposes the following modifications to Appendix A to 10 CFR Part 40:

1. Introduction.

(a) In the second sentence of the third paragraph, change "amendability" to "amenability."

Reason: This change corrects a typographical error.

(b) Delete the fourth paragraph in its entirety.

Reason: This change deletes an information submittal requirement which was established in connection with implementation of the original Appendix A criteria. The due date originally set for submittals is past. A new due date for revised submittals is not considered necessary.

2. Criterion 1.

(a) In the first paragraph delete the phrase[s]"...for thousands of years..." and insert "...for 1,000 years..." and delete the phrase "...without ongoing active maintenance..."

Reason: The thousands of years language conflicts with the 40 CFR 192.32(b) standard of design of control measures to be effective for 1,000 years. [~~Further; although~~] 40 CFR 264.111[~~;-which~~] is included by reference in the EPA standard in 40 CFR 192.32(b)[;]. It requires that for nonradiological hazards the need for maintenance be minimized, and although the EPA standard itself is silent on maintenance for radiological hazard control measures, the preamble accompanying the EPA standard [~~and-could-thus~~] allows [~~some-limited~~] secondary reliance on active maintenance for limited periods of time. [~~The-1,000-year-period-in-the preferred-alternative-for-the-100-year-period-the-EPA-views-as-reasonable to-rely-on-institutional-controls-to-provide-active-maintenance-~~] As the physical and chemical properties of tailings are such that separation of the chemical and radiological hazards is not feasible the requirements pertaining to maintenance must be applied uniformly in any case. On this basis, the Commission would not flatly prohibit, in all cases, planned reliance on active maintenance.

(b) In the second listed item of the first paragraph, delete the word "usable."

Reason: Both 40 CFR 264.221 and 40 CFR 264.92, which are included by reference in 40 CFR 192.32(a), require isolation of contaminants from all qualities of groundwater, not just usable groundwater sources.

(c) Modify the last paragraph reading, "Tailings shall be disposed of in a manner that no active maintenance is required to preserve conditions of the site," to read "Tailings shall be disposed of in a manner that minimizes the degree to which active maintenance is required to preserve conditions of the site."

Reason: The EPA standards in 40 CFR Part 192 do not prohibit all reliance on maintenance. For nonradiological hazards, 40 CFR 264.111 requires that the need for maintenance after closure be minimized. The change would reduce the stringency of the NRC requirement so as to be consistent with 40 CFR Part 192 as discussed under (a) above.

Note: In the third listed item of the first paragraph, the phrase "...over the long-term..." was previously suspended and the last of Criterion 1 was previously suspended in full.

3. Criterion 3.

(a) Delete in its entirety the first sentence which reads "The 'prime option' for disposal of tailings is placement below grade, either in mines or specially excavated pits (that is, where the need for any specially constructed retention structure is eliminated)."

Reason: The sentence has no effect other than to label below-grade disposal as the 'prime option.' This is misleading and confusing in that it gives the impression that above-grade disposal could not be approved. Under the longevity standard of 40 CFR Part 192, it is durability rather than disposal mode which determines acceptability.

(b) Modify the second sentence where it reads "...consideration of this disposal mode," to read "...consideration of the below-grade disposal mode."

Reason: The change is of an editorial nature to replace the pronoun 'this' with 'the below-grade.' Although the requirement to consider below-grade disposal was previously suspended along with the rest of Criterion 3, a requirement for consideration only is not inconsistent with EPA's 40 CFR Part 192 and the Commission believes it should remain.

(c) Delete the third and fourth sentences in their entirety, beginning with "In some instances, ..." and ending with "...are not available."

Reason: The sentences are explanatory in nature, and do not properly reflect consideration of EPA's new requirements, especially for ground-water protection. For this reason they are potentially misleading and confusing.

(d) Delete the last sentence beginning with "In these cases, ..." and ending with "...erosional forces."

Reason: The sentence places a generic burden-of-proof requirement on above-grade disposal which is at odds with the acceptability standards established by EPA's requirement for durability and longevity of control in 40 CFR 192.32(b).

Note: The entirety of Criterion 3 was previously suspended.

4. Criterion 4.

(a) Revise the first sentence, in its entirety, to read "To the extent necessary to meet the closure requirements in Criterion 6, the applicant or licensee shall adhere to the following site and design criteria:"

Reason: The revision clarifies that the remainder of Criterion 4 applies only to the extent necessary to adhere to the Criterion 6 closure standards, which are proposed herein to reflect the new EPA standards for longevity of control and radon release limitations. The elements of unmodified Criterion 4 set prescriptive requirements designed, when taken in combination, to assure stability for substantially longer than is required by the EPA standard. The limitation of their applicability in accordance with this change, and modifications to the individual criteria as described below, are considered necessary to avoid having a generally applicable requirement more stringent than the EPA durability and longevity standard.

(b) Revise paragraph (a) by replacing "minimized" with "sufficiently small," deleting "maximum possible," and adding at the end "...so as to provide reasonable assurance of meeting the longevity standard in Criterion 6."

Reason: The changes revise and clarify the restrictions placed on upstream catchment area so as to be consistent with the EPA durability and longevity standard now reflected in proposed Criterion 6. Unmodified, the language requires flatly that upstream drainage area be minimized. This may not be necessary to meet the numerical EPA durability and longevity standard.

For example, additional rock armoring and riprap can compensate for a larger upstream drainage area.

Note: Paragraph (a) was previously suspended in its entirety.

(c) Delete paragraph (b) in its entirety.

Reason: It may not be necessary for topographic features to provide good wind protection in order to meet the EPA longevity and durability standard for example, engineering methods (e.g., rock armoring) should be able to provide sufficient wind protection to meet the EPA design standard of 1,000 years of effective control.

(d) In the first sentence of paragraph (c), delete the phrase "...be relatively flat after final stabilization to minimize erosion potential and to..."

Reason: The 1,000-year design lifetime in the EPA longevity standard might be met by engineering or other methods rather than "relatively flat" features, and it may not be necessary to "minimize" erosion potential. It may be acceptable under the EPA standard, and more practicable, to apply a relatively more erosive but thicker cover.

(e) Delete the remainder of paragraph (c) beginning with "The broad objective..." and ending with "...identified."

Reason: The deleted language is misleading [~~and-at-odds-with~~] as it contains prescriptive elements which may not be necessary to meet the EPA durability and longevity standard. Under the EPA requirement, acceptability is a function of overall durability rather than specific design features, and it may not be necessary to have final cover slopes as characterized in the deleted language. Also, the language is unnecessary in view of the proposed retainment of elements of Criterion 3 requiring that steepness of slopes be minimized to the maximum extent reasonably achievable.

(f) Relabel paragraph (c) as paragraph (b).

Reason: For editorial consistency.

(g) Delete the first sentence of paragraph (d), beginning "A full self-sustaining vegetative..." and ending "...to negligible levels."

Reason: The first sentence mandates a rock or vegetative cover to reduce erosion. Further language outlines possible exceptions but the standard is established by the first sentence. While a rock cover or

vegetative cover is a very effective way to meet the EPA standard, it may not be the only way to meet the 1000-year effective design [objective] requirement. As explained in (d) above, it may not be necessary to reduce erosion to negligible levels to meet the EPA longevity standard. The Commission believes that this and similar language should be deleted so as to provide [maximum] flexibility to mill operators in devising plans to meet the EPA longevity standard, and to avoid the imposition of a potentially more stringent standard through application of prescriptive requirements for specific design features.

(h) Delete the second and third sentences of paragraph (d) beginning with "Where a full..." and ending with "...pile."

Reason: See (d) and (g) above.

(i) In the fourth sentence of paragraph (d) beginning "The following factors..." replace the words "the final" in the phrase "...in establishing the final rock cover..." with "any."

Reason: See (g) above. Rock covering is not flatly required. The words "the final" are modified to clarify this situation.

(j) In the first listed item in paragraph (d), delete the parenthetical phrase "(excepting bedding material average particles size shall be at least cobble size or greater)."

Reason: The phrase specifies technical requirements on rock size that may not be necessary to meet the EPA design objective. This change will allow flexibility to use whatever size rock meets the EPA standard.

(k) Delete in its entirety the fourth paragraph of paragraph (d) beginning with "Individual rock fragments shall..." and ending with "...shall not be used."

Reason: The fourth paragraph specifies technical requirements on rock properties that may not be necessary to meet the EPA design objective. The change retains flexibility to accept greater quantities of lesser quality rock, or other designs in keeping with the EPA longevity standard.

(l) Delete the fifth paragraph of paragraph (d) in its entirety, beginning with "Rock covering..." and ending with "...of this criterion."

Reason: The listing of requirements needed to support a justification for not using a rock cover is [at-odds-with] inappropriate in view

of the form of the numerical EPA longevity standard. This change is made to be consistent with (g) above.

Note: In the fifth paragraph of paragraph (d), the first phrase "Rock covering of slopes may not be required..." was not previously suspended.

(m) Delete the first sentence of the last paragraph of paragraph (d) beginning "Furthermore, all impoundments..." and ending "...slope gradient."

Reason: While contouring to minimize concentrated surface runoff or sharp changes in flow will enhance long-term stability, such contouring to totally avoid problem areas may not be required in all cases by the EPA design lifetime standard of 1,000 years to the extent practicable and 200 years in any case.

(n) In the second sentence of the last paragraph of paragraph (d) delete "In addition to rock cover on slopes..." and "...with substantial rock cover (rip rap)." Replace "areas toward" with "Areas toward."

Reason: See (g) above.

(o) Relabel paragraphs (d), (e), and (f), as (c), (d), and (e), respectively.

Reason: For editorial consistency.

(5) Criterion 5.

(a) In the first paragraph, delete the first two sentences beginning "Steps shall be taken..." and ending "...potential uses." and the phrase "...in order to accomplish this objective." in the third sentence.

Reason: The EPA groundwater protection standards referenced in 40 CFR 192.32(a) do not permit any seepage to groundwater.

(b) In the first listed item under the first paragraph beginning with "Installation of..." delete the words "low permeability" as a characteristic of bottom liners.

Reason: The EPA groundwater protection standard referenced in 40 CFR 192.32(a) requires a liner that prevents migration of wastes out of the impoundment into the adjacent soil and groundwater. Low permeability implies that some migration is allowed.

Note: In the first listed item under the first paragraph, the last two full sentences, beginning with "Where clay liners..." and ending with "...months of exposure))," were previously suspended.

(c) In the second paragraph beginning "Where groundwater impacts..." delete the phrase "to its potential use before milling operations began to the maximum extent practicable."

Reason: The EPA standard in 40 CFR 192.33, by referencing 40 CFR 264.100, requires a corrective action program to restore groundwater to standards established under 40 CFR 264.92-94. This standard is essentially a nondegradation standard. Restoration of groundwater quality only to the extent necessary to restore its potential use is inconsistent with the EPA standard.

(d) Delete in its entirety the third paragraph beginning "While the primary method of protecting ground water shall be isolation..." and ending "...from current or potential uses."

Reason: The EPA standards for groundwater protection in 40 CFR 192.32(a) protect groundwater primarily on the basis of background-level concentration limits for hazardous constituents, and not in terms of current or potential uses. The deleted sentence allowed consideration of tailings in contact with groundwater. The EPA standard permits no seepage to groundwater.

(e) In the first sentence of the fifth paragraph beginning "This information shall be gathered..." delete the word "usable" where it modifies "groundwater."

Reason: The EPA standard in 10 CFR 192.32(a) does not distinguish between "usable" and nonusable aquifers. The groundwater protection standard applies universally to aquifers of any quality or potential use.

6. Criterion 6.

(a) Delete the first sentence in entirety, beginning with "Sufficient earth cover..." and ending with "...meter per second.", and in its place insert "In cases where waste byproduct material is to be permanently disposed, the waste disposal area shall be closed in accordance with a design¹ for an earthen cover which shall provide reasonable assurance of control of radiological hazards to (i) be effective for one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years,

and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as to not exceed an average² release rate of 20 picocuries per square meter per second (pCi/m²s)."

Reason: The change replaces previous Commission requirements for minimum cover thickness and post-closure radon control with the EPA standards for durability and longevity and radon control. The EPA standard in 40 CFR 192.32(b) for environmental protection after closure does not stipulate a minimum cover, but rather a longevity requirement for whatever control is applied. The control method must also provide reasonable assurance that releases of radon-222 do not exceed 20 picocuries per square meter per second, rather than 2 picocuries. Under the EPA standard the thickness of cover will be a function of design longevity and control of radon releases with no set minimum thickness. As the 3-meter minimum thickness requirement may not be necessary to meet the EPA longevity and radon control requirements, it is proposed for deletion.

(b) Add to Criterion 6 the following two footnotes which accompany the revised first sentence: footnote (1) "The standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required," and footnote (2) "This average shall apply to the entire surface of each disposal area over periods of at least one year, but short compared to 100 years. Radon will come from both uranium byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from byproduct materials to the atmosphere."

Reason: This change is necessary to fully incorporate the EPA radon control standard, as it is identically footnoted in 40 CFR 192.32(b).

Note: In the first sentence in Criterion 6, only the words "but not less than three meters" and "to less than two picocuries per square meter per second" were previously suspended.

(c) In the fifth sentence of the first paragraph, replace "non-soiled" with "non-soil," and delete the words "to reduce tailings covers to less than three meters."

Reason: The changes correct a typographical error, and delete a reference to the three-meter minimum cover thickness requirement which is no longer appropriate.

Note: In the fifth sentence of the first paragraph, the words "...crack or..." were previously suspended.

(d) Delete the second to last and last sentences, beginning with "Near surface cover materials..." and ending with "...cover material itself."

Reason: The EPA standards for post-closure environmental protection do not provide for, or characterize, the cover material in terms of radioactivity, but only in terms of durability and capacity to reduce radon release from the tailings. However, the EPA standard does indicate in a footnote that the characteristics of the cover material should be considered on a site-specific basis. The purpose of the NRC requirement was, in the presence of the requirement that radon from the tailings be less than 2 pCi/m²-s, to "...ensure that surface radon exhalation is not significantly above background because of the cover material itself." Under the EPA standard, radon escaping from the tailings alone is likely to be significantly above background, thus nullifying the basis for the NRC requirement for cover materials free from elevated levels of radium.

(e) At the end of Criterion 6, add a new paragraph to read: "The design requirements in this Criterion for longevity and control of radon releases shall apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface."

Reason: This change incorporates the EPA requirements for site cleanup outside the actual disposal area, in areas where the longevity and radon control closure standards are not applicable (see 40 CFR 192.32(b)(2) and 192.41).

7. Criterion 8.

(a) At the end of the first full paragraph, add a new sentence to read "During operations and prior to closure, radiation doses from radon emissions from surface impoundments shall be kept as low as is practicable."

Reason: This change incorporates the EPA requirement imposed under 40 CFR 192.32(a)(4).

(b) Following the third full paragraph of Criterion 8, just before Criterion 8A, insert the following two new paragraphs:

"Milling operations producing or involving thorium byproduct material shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment."

"Uranium and thorium byproduct materials shall be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983."

Reason: These new paragraphs incorporate EPA requirements imposed under 40 CFR 192.41(d) and 40 CFR 192.32(a)(3), respectively.

8. Criterion 10.

In the second sentence of the second paragraph, add the words "and control" immediately after the word "surveillance" in both places the word "surveillance" appears.

Reason: This change clarifies the need to establish financial arrangements consistent with any requirement for maintenance to maintain isolation of tailings after closure. This change is necessary and consistent with the absence of a prohibition on reliance on maintenance to provide long-term isolation in 40 CFR 192.32(b).

9. Criterion 12.

Delete the first sentence which states that final disposition of tailings should be such that ongoing active maintenance is not necessary to preserve isolation.

Reason: The standard referenced in 40 CFR 192.32(b) for control of nonradiological hazards, 40 CFR 264.111, requires only that the need for maintenance be minimized; it does not exclude the possibility of limited reliance on maintenance following closure of a disposal site.

10. Criteria 2, 7, 9, and 11 are not affected by the new EPA standards and no modification is proposed for any portion of those criteria.

Impact of the Proposed Amendments

Compliance with Subparts D and E to 40 CFR Part 192 of EPA's regulations is an established requirement. Under Section 275d. of the Atomic Energy Act of 1954, as amended, the Commission is obligated to implement and enforce the new EPA standards as of December 6, 1983, the date they became effective. This Commission responsibility is being carried out on an ad hoc, case-by-case basis in individual licensing actions.

The Commission's action in proposing these modifications to its regulations in Appendix A to 10 CFR Part 40 is to conform them to the new EPA standards. These changes are for the purpose of avoiding conflicts and inconsistencies, and for clarifying previously existing language so as to be compatible with the new requirements. In most instances, the changes revise previous NRC requirements by deleting them or reducing their stringency or effect so as to make NRC's requirements compatible with EPA's. The action proposed here by the Commission is a consequence of previous actions taken by the Congress and the EPA, and is legally mandated in Section 275b(3) of the Atomic Energy Act of 1954, as amended.

Commission action in this case is essentially nondiscretionary in nature, and for purposes of environmental analysis, rests upon existing environmental and other impact evaluations in the following documents: (1) "Final Environmental Impact Statement for Standards for the Control of Byproduct Materials from Uranium Ore Processing (40 CFR Part 192)," Volumes 1 and 2, EPA 520/1-83-008-1 and 2, September 1983, and (2) "Regulatory Impact Analysis of Final Environmental Standards for Uranium Mill Tailings at Active Sites," EPA 520/1-83-010, September 1983, both prepared in support of Subparts D and E of 40 CFR Part 192, and (3) "Final Generic Environmental Impact Statement on Uranium Milling," NUREG-0706, September 1980, prepared in support of Appendix A of 10 CFR Part 40. The Commission believes that these supporting analyses for the new EPA standards and the

existing Commission regulations provide a more than adequate environmental review for the standards addressed herein, and that no additional impact analysis is warranted by the conforming actions proposed herein. The EPA engaged in and completed a reasoned decisionmaking process with full consideration of environmental concerns, and for the purposes of this rule-making action, can be viewed as the lead agency.

PAPERWORK REDUCTION ACT STATEMENT

This proposed rule does not contain a new or amended information collection requirement subject to the requirements of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget approval number 3150-0020.

REGULATORY FLEXIBILITY CERTIFICATION

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule will not, if promulgated, have a significant economic impact upon a substantial number of small entities. Therefore, we have not performed a Regulatory Flexibility Analysis. The basis for this finding is that of the licensed uranium mills, only one qualifies as a small entity. Almost all the mills are owned by large corporations. Three of the mills are partly-owned by companies that could qualify as small businesses, according to the Small Business Administration generic small entity definition of 500 employees. However, under the Regulatory Flexibility Act, a small business is one that is independently owned and operated. Since these three mills are not independently owned they do not qualify as small entities.

LIST OF SUBJECTS IN 10 CFR PART 40

Government contracts, Hazardous materials-transportation, Nuclear materials, Penalty, Reporting and recordkeeping requirements, Source material, and Uranium.

Under the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, 5 U.S.C. 553, and the Uranium Mill Tailings Radiation Control Act of 1978, as amended, the NRC is proposing the following amendments to 10 CFR Part 40.

PART 40 DOMESTIC LICENSING OF SOURCE MATERIAL

1. The authority citation for Part 40 is revised to read as follows:

AUTHORITY: Secs. 62, 63, 64, 65, 81, 161, 182, 183, 186, 68 Stat. 932, 933, 935, 948, 953, 954, 955, as amended, secs. 11e(2), 83, 84, Pub. L. 95-604, 92 Stat. 3033, as amended, 3039, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2014(e)(2), 2092, 2093, 2094, 2095, 2111, 2113, 2114, 2201, 2232, 2233, 2236, 2282); secs. 274, Pub. L. 86-373, 73 Stat. 688 (42 U.S.C. 2021); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846). Section 275, 92 Stat. 3021, as amended by Pub. L. 97-415, 96 Stat. 2067 (42 U.S.C. 2022).

Section 40.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Section 40.31(g) also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Section 40.46 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Section 40.71 also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §§ 40.3, 40.25(d)(1)-(3), 40.35(a)-(d), 40.41(b) and (c), 40.46, 40.51(a) and (c), and 40.63 are issued under sec. 161b, 68 Stat. 948, as amended, (42 U.S.C. 2201(b)); and §§ 40.25(c) and (d)(3) and (4), 40.26(c)(2), 40.35(e), 40.42, 40.61, 40.62, 40.64 and 40.65 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. Appendix A to Part 40 is revised to read as follows:

Appendix A to Part 40 - Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content.

Introduction. Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required

by the provisions of § 40.31(h) to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling activities. This appendix establishes technical, financial, ownership, and long-term site surveillance criteria relating to the siting, operation, decontamination, decommissioning, and reclamation of mills and tailings or waste systems and sites at which such mills and systems are located. As used in this appendix, the term "as low as is reasonably achievable" has the same meaning as in § 20.1(c) of 10 CFR Part 20 of this chapter.

In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis. However, in such cases the objectives, technical alternatives and concerns which must be taken into account in developing a tailings program are identified. As provided by the provisions of § 40.31(h) applications for licenses must clearly demonstrate how the criteria have been addressed.

The specifications shall be developed considering the expected full capacity of tailings or waste systems and the lifetime of mill operations. Where later expansions of systems or operations may be likely (for example, where large quantities of ore now marginally uneconomical may be stock-piled), the amenability of the disposal system to accommodate increased capacities without degradation in long-term stability and other performance factors shall be evaluated.

I. Technical Criteria

Criterion 1--In selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites, the following site features, which will determine the extent to which a program meets the broad objective of isolating the tailings and associated contaminants from man and the environment during operations and for 1,000 years thereafter, shall be considered:

- Remoteness from populated areas;
- Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from groundwater sources; and
- Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long term.

The site selection process shall be an optimization to the maximum extent reasonably achievable in terms of these features.

In the selection of disposal sites, primary emphasis shall be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration shall be given to siting features given the long-term nature of the tailings hazards.

Tailings shall be disposed of in a manner that minimizes the degree to which active maintenance is required to preserve conditions of the site.

Criterion 2--To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations shall be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.

Criterion 3--The evaluation of alternative sites and disposal methods performed by mill operators in support of their proposed tailings disposal program (provided in applicants' environmental reports) shall reflect serious consideration of the below-grade disposal mode. Where full below-grade burial is not practicable, the size of retention structures, and size and steepness of slopes of associated exposed embankments shall be minimized by excavation to the maximum extent reasonably achievable or appropriate given the geologic and hydrologic conditions at a site.

Criterion 4--To the extent necessary to meet the closure requirements in Criterion 6, the applicant or licensee shall adhere to the following site and design criteria:

(a) Upstream rainfall catchment areas must be sufficiently small to decrease erosion potential and the size of the flood which could erode

or wash out sections of the tailings disposal area so as to provide reasonable assurance of meeting the longevity standard in Criterion 6.

(b) Embankment and cover slopes shall provide conservative factors of safety assuring long-term stability.

(c) The following factors shall be considered in establishing any rock cover design to avoid displacement of rock particles by human and animal traffic or by natural processes, and to preclude undercutting and piping:

- Shape, size, composition, and gradation of rock particles;
- Rock cover thickness and zoning of particles by size; and
- Steepness of underlying slopes.

Areas toward which surface runoff might be directed shall be well protected. In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain shall be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.

(d) The impoundment shall not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand. As used in this criterion, the term "capable fault" has the same meaning as defined in § III(g) of Appendix A of 10 CFR Part 100. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.

(e) The impoundment, where feasible, should be designed to incorporate features which will promote deposition. For example, design features which promote deposition of sediment suspended in any runoff which flows into the impoundment area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.

Criterion 5--The following shall be considered:

- Installation of bottom liners (Where synthetic liners are used, a leakage detection system shall be installed immediately below the liner

to ensure major failures are detected if they occur. This is in addition to the groundwater monitoring program conducted as provided in Criterion 7. Where clay liners are proposed or relatively thin, in-situ clay soils are to be relied upon for seepage control, tests shall be conducted with representative tailings solutions and clay materials to confirm that no significant deterioration of permeability or stability properties will occur with continuous exposure of clay to tailings solutions. Tests shall be run for a sufficient period of time to reveal any effects if they are going to occur (in some cases deterioration has been observed to occur rather rapidly after about nine months of exposure)).

- Mill process designs which provide the maximum practicable recycle of solutions and conservation of water to reduce the net input of liquid to the tailings impoundment.

- Dewatering of tailings by process devices and/or in-situ drainage systems (At new sites, tailings shall be dewatered by a drainage system installed at the bottom of the impoundment to lower the phreatic surface and reduce the driving head for seepage, unless tests show tailings are not amenable to such a system. Where in-situ dewatering is to be conducted, the impoundment bottom shall be graded to assure that the drains are at a low point. The drains shall be protected by suitable filter materials to assure that drains remain free running. The drainage system shall also be adequately sized to assure good drainage).

- Neutralization to promote immobilization of toxic substances.

Where groundwater impacts are occurring at an existing site due to seepage, action shall be taken to alleviate conditions that lead to excessive seepage impacts and restore groundwater quality. The specific seepage control and groundwater protection method, or combination of methods, to be used must be worked out on a site-specific basis. Technical specifications shall be prepared to control installation of seepage control systems. A quality assurance, testing, and inspection program, which includes supervision by a qualified engineer or scientist, shall be established to assure the specifications are met.

In support of a tailings disposal system proposal, the applicant/operator shall supply information concerning the following:

- The chemical and radioactive characteristics of the waste solutions.

- The characteristics of the underlying soil and geologic formations particularly as they will control transport of contaminants and solutions. This shall include detailed information concerning extent, thickness, uniformity, shape, and orientation of underlying strata. Hydraulic gradients and conductivities of the various formations shall be determined.

This information shall be gathered from borings and field survey methods taken within the proposed impoundment area and in surrounding areas where contaminants might migrate to groundwater. The information gathered on boreholes shall include both geologic and geophysical logs in sufficient number and degree of sophistication to allow determining significant discontinuities, fractures, and channeled deposits of high hydraulic conductivity. If field survey methods are used, they should be in addition to and calibrated with borehole logging. Hydrologic parameters such as permeability shall not be determined on the basis of laboratory analysis of samples alone; a sufficient amount of field testing (e.g., pump tests) shall be conducted to assure actual field properties are adequately understood. Testing shall be conducted to allow estimating chemi-sorption attenuation properties of underlying soil and rock.

- Location, extent, quality, capacity and current uses of any groundwater at and near the site.

Furthermore, steps shall be taken during stockpiling of ore to minimize penetration of radionuclides into underlying soils; suitable methods include lining and/or compaction of ore storage areas.

Criterion 6--In cases where waste byproduct material is to be permanently disposed, the waste disposal area shall be closed in accordance with a design¹ for an earthen cover which shall provide reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years,

¹The standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required.

to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as to not exceed an average² release rate of 20 picocuries per square meter per second (pCi/m²s). In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances shall not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer shall not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed, it must be demonstrated that such materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term time intervals.

The design requirements in this criterion for longevity and control of radon releases shall apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface.

Criterion 7--At least one full year prior to any major site construction, a preoperational monitoring program shall be conducted to provide complete baseline data on a milling site and its environs. Throughout the construction and operating phases of the mill, an operational monitoring program shall be conducted to measure or evaluate compliance with

²This average shall apply to the entire surface of each disposal area over periods of at least 1 year, but short compared to 100 years. Radon will come from both uranium byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from uranium byproduct materials to the atmosphere.

applicable standards and regulations; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects.

Criterion 8--Milling operations shall be conducted so that all airborne effluent releases are reduced to levels as low as is reasonably achievable. The primary means of accomplishing this shall be by means of emission controls. Institutional controls, such as extending the site boundary and exclusion area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid site contamination. The greatest potential sources of offsite radiation exposure (aside from radon exposure) are dusting from dry surfaces of the tailings disposal area not covered by tailings solution and emissions from yellowcake drying and packaging operations. During operations and prior to closure, radiation doses from radon emissions from surface impoundments of uranium or thorium byproduct materials shall be kept as low as is practicable.

Checks shall be made and logged hourly of all parameters (e.g., differential pressures and scrubber water flow rates) which determine the efficiency of yellowcake stack emission control equipment operation. It shall be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency; corrective action shall be taken when performance is outside of prescribed ranges. Effluent control devices shall be operative at all times during drying and packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging operations shall terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions shall be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging operations shall cease as soon as practicable. Operations may not be re-started after cessation due to off-normal performance until needed corrective actions have been identified and implemented. All such cessations, corrective actions, and re-starts shall be reported to the

appropriate NRC regional office as indicated in Criterion 8A, in writing, within 10 days of the subsequent restart.

To control dusting from tailings, that portion not covered by standing liquids shall be wetted or chemically stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where they are disposed of below grade and the tailings surface is not exposed to wind. Consideration shall be given in planning tailings disposal programs to methods which would allow phased covering and reclamation of tailings impoundments since this will help in controlling particulate and radon emissions during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic controls do not apply, operators shall develop written operating procedures specifying the methods of control which will be utilized.

Milling operations producing or involving thorium byproduct material shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment.

Uranium and thorium byproduct materials shall be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983.

Criterion 8A--Daily inspections of tailings or waste retention systems shall be conducted by a qualified engineer or scientist and documented. The appropriate NRC regional office as indicated in Appendix D of 10 CFR Part 20, or the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555, shall be immediately notified of any failure in a tailings or waste retention system which results in a release of tailings or waste into unrestricted areas, and/or of any unusual conditions (conditions not contemplated in the design of

the retention system) which if not corrected could indicate the potential or lead to failure of the system and result in a release of tailings or waste into unrestricted areas.

II. Financial Criteria

Criterion 9--Financial surety arrangements shall be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements shall be based on Commission-approved cost estimates in a Commission-approved plan for (1) decontamination and decommissioning of mill buildings and the milling site to levels which would allow unrestricted use of these areas upon decommissioning, and (2) the reclamation of tailings and/or waste disposal areas in accordance with technical criteria delineated in Section I of this Appendix. The licensee shall submit this plan in conjunction with an environmental report that addresses the expected environmental impacts of the milling operation, decommissioning and tailings reclamation, and evaluates alternatives for mitigating these impacts. The surety shall also cover the payment of the charge for long-term surveillance and control required by Criterion 10. In establishing specific surety arrangements, the licensee's cost estimates shall take into account total costs that would be incurred if an independent contractor were hired to perform the decommissioning and reclamation work. In order to avoid unnecessary duplication and expense, the Commission may accept financial sureties that have been consolidated with financial or surety arrangements established to meet requirements of other Federal or state agencies and/or local governing bodies for such decommissioning, decontamination, reclamation, and long-term site surveillance and control, provided such arrangements are considered adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning and reclamation of the mill, mill tailings site and associated areas, and the long-term funding charge is clearly identified and committed for use in accomplishing these activities. The licensee's surety mechanism will be reviewed annually by the Commission to assure that sufficient funds would be available for completion of the reclamation plan if

the work had to be performed by an independent contractor. The amount of surety liability should be adjusted to recognize any increases or decreases resulting from inflation, changes in engineering plans, activities performed, and any other conditions affecting costs. Regardless of whether reclamation is phased through the life of the operation or takes place at the end of operations, an appropriate portion of surety liability shall be retained until final compliance with the reclamation plan is determined. This will yield a surety that is at least sufficient at all times to cover the costs of decommissioning and reclamation of the areas that are expected to be disturbed before the next license renewal. The term of the surety mechanism must be open ended, unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance could be provided with a surety instrument which is written for a specified period of time (e.g., 5 years) yet which must be automatically renewed unless the surety notifies the beneficiary (the Commission or the State regulatory agency) and the principal (the licensee) some reasonable time (e.g., 90 days) prior to the renewal date of their intention not to renew. In such a situation the surety requirement still exists and the licensee would be required to submit an acceptable replacement surety within a brief period of time to allow at least 60 days for the regulatory agency to collect.

Proof of forfeiture must not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open-ended, and must be agreed to by all parties. Financial surety arrangements generally acceptable to the Commission are:

- (a) Surety bonds;
- (b) Cash deposits;
- (c) Certificates of deposit;
- (d) Deposits of government securities;
- (e) Irrevocable letters or lines of credit; and
- (f) Combinations of the above or such other types of arrangements as may be approved by the Commission. However, self insurance, or any

arrangement which essentially constitutes self insurance (e.g., a contract with a state or Federal agency), will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements.

Criterion 10--A minimum charge of \$250,000 (1978 dollars) to cover the costs of long-term surveillance shall be paid by each mill operator to the general treasury of the United States or to an appropriate State agency prior to the termination of a uranium or thorium mill license.

If site surveillance or control requirements at a particular site are determined, on the basis of a site-specific evaluation, to be significantly greater than those specified in Criterion 12 (e.g., if fencing is determined to be necessary), variance in funding requirements may be specified by the Commission. In any case, the total charge to cover the costs of long-term surveillance and control shall be such that, with an assumed 1 percent annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of site surveillance and control. The total charge will be adjusted annually prior to actual payment to recognize inflation. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

III. Site and Byproduct Material Ownership

Criterion 11--A. These criteria relating to ownership of tailings and their disposal sites become effective on November 8, 1981, and apply to all licenses terminated, issued, or renewed after that date.

B. Any uranium or thorium milling license or tailings license shall contain such terms and conditions as the Commission determines necessary to assure that prior to termination of the license, the licensee will comply with ownership requirements of this criterion for sites used for tailings disposal.

C. Title to the byproduct material licensed under this Part and land, including any interests therein (other than land owned by the United States or by a State) which is used for the disposal of any such byproduct material, or is essential to ensure the long term stability of such disposal site, shall be transferred to the United States or the State in which such land is located, at the option of such State. In

view of the fact that physical isolation must be the primary means of long-term control, and Government land ownership is a desirable supplementary measure, ownership of certain severable subsurface interests (for example, mineral rights) may be determined to be unnecessary to protect the public health and safety and the environment. In any case, however, the applicant/operator must demonstrate a serious effort to obtain such subsurface rights, and must, in the event that certain rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and is subject to either an NRC general or specific license prohibiting the disruption and disturbance of the tailings. In some rare cases, such as may occur with deep burial where no ongoing site surveillance will be required, surface land ownership transfer requirements may be waived. For licenses issued before November 8, 1981, the Commission may take into account the status of the ownership of such land, and interests therein, and the ability of a licensee to transfer title and custody thereof to the United States or a State.

D. If the Commission subsequent to title transfer determines that use of the surface or subsurface estates, or both, of the land transferred to the United States or to a State will not endanger the public health, safety, welfare, or environment, the Commission may permit the use of the surface or subsurface estates, or both, of such land in a manner consistent with the provisions provided in these criteria. If the Commission permits such use of such land, it will provide the person who transferred such land with the right of first refusal with respect to such use of such land.

E. Material and land transferred to the United States or a State in accordance with this Criterion shall be transferred without cost to the United States or a State other than administrative and legal costs incurred in carrying out such transfer.

F. The provisions of this Part respecting transfer of title and custody to land and tailings and wastes shall not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used

for the disposal of byproduct material, as defined in this Part, the licensee shall enter into arrangements with the Commission as may be appropriate to assure the long-term surveillance of such lands by the United States.

IV. Long-Term Site Surveillance

Criterion 12--As a minimum, annual site inspections shall be conducted by the government agency retaining ultimate custody of the site where tailings, or wastes are stored to confirm the integrity of the stabilized tailings or waste systems and to determine the need, if any, for maintenance and/or monitoring. Results of the inspection shall be reported to the Commission within 60 days following each inspection. The Commission may require more frequent site inspections if, on the basis of a site-specific evaluation, such a need appears necessary due to the features of a particular tailings or waste disposal system.

Dated at Washington, DC, this ____ day of _____, 1984.

For The Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.

NUCLEAR REGULATORY COMMISSION

10 CFR PART 40

Uranium Mill Tailing Regulations: Conforming NRC
Requirements to EPA Standards

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations governing the disposal of uranium mill tailings. The proposed rule changes are intended to conform existing NRC regulations to the regulations recently published by the Environmental Protection Agency for the protection of the environment from these wastes. This action is necessary to comply with the legislative mandate set out in the Uranium Mill Tailings Radiation Control Act and the NRC Authorization Act for FY 1983.

DATE: The comment period expires on (30 days after publication). Comments received by the Commission after that date will not be considered.

ADDRESSES: Mail comments to Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Deliver comments to Room 1121, 1717 H Street NW, Washington, DC between 8:15 a.m. and 5:00 p.m. weekdays.

FOR FURTHER INFORMATION CONTACT: Robert Fonner, Office of the Executive Legal Director, telephone (301) 492-8692, or Dan E. Martin, Division of Waste Management, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 427-4642.

SUPPLEMENTARY INFORMATION: The Nuclear Regulatory Commission (NRC or Commission) is proposing modifications to its regulations for the purpose of conforming them to generally applicable requirements recently promulgated by the Environmental Protection Agency (EPA). These new EPA requirements are contained in Subparts D and E of 40 CFR Part 192 (48 FR 45926; October 7, 1983), are applicable to the management of uranium and thorium byproduct material, and became effective for NRC and Agreement State licensees and license applicants on December 6, 1983. The action proposed herein would modify previously existing regulations of the Commission to conform them to the new EPA requirements, and would incorporate certain of the new EPA requirements into the Commission's regulations. The affected Commission regulations are contained in Appendix A to 10 CFR Part 40, which was promulgated in final form on October 3, 1980 (45 FR 65521).

The modifications to Commission regulations proposed herein will incorporate within NRC regulations some of the new EPA requirements. The action that the Commission will take with respect to the remainder of these new EPA requirements is the subject of an Advanced Notice of Proposed Rulemaking (ANPRM), which requests comment on that subject, also issued this day. These new EPA requirements were developed and issued by EPA pursuant to section 275b. of the Atomic Energy Act (42 U.S.C. 2022), as added by Section 206 of Pub. L. 95-604, the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). Under Section 18(a) of Pub. L. 97-415, the Nuclear Regulatory Commission Authorization Act for fiscal years 1982 and 1983, the Commission is required to conform its regulations to EPA's by no later than March 31, 1984, with notice and opportunity for public comment. Today's proposal furthers fulfillment of that responsibility.

Previous Actions

In keeping with Section 18(a) of the NRC Authorization Act, the Commission suspended portions of its October 3, 1980 mill tailings regulations after notice and opportunity for public comment (48 FR 35350; August 4, 1983). This suspension terminates automatically upon the earlier of (1) the conclusion of this conforming rulemaking, or (2) April 1, 1984.

Those portions of the Commission's regulations which are now suspended are those that were determined to be in conflict or inconsistent with EPA's proposed requirements. More specifically, the suspended portions are those that would require a major commitment or major action by licensees which would be unnecessary if (1) the EPA proposed standards were promulgated in final form without modification, and (2) the Commission's regulations were modified to conform to the EPA standards. The objective of the suspension was to avoid a situation where a licensee or applicant might make a major commitment or take a major action which would be unnecessary or ill-advised after this subsequent rulemaking to permanently modify the existing regulations on the basis of EPA's final standards.

The final EPA standards are very similar to those that were proposed. ~~[There is; for that reason; a good deal of similarity between the changes to Commission regulations effected temporarily by suspension and those proposed today to be made permanent:]~~ Nevertheless, the Commission has reconsidered the appropriateness of ~~[the entirety of]~~ changes to Appendix A to 10 CFR Part 40 in light of the new EPA standards, and the need for additional supporting documentation. ~~[and]~~ The changes proposed today are much more modest than ~~[are not fully consistent with]~~ the previous suspension. ~~[Differences; except for additions; are explicitly identified: All additions are differences since nothing was added to Appendix A in the suspension:]~~

Scope of This Proposal

In addition to conforming its existing regulations to new EPA standards, under the provisions of the UMTRCA, the Commission has a further legislated responsibility; it must establish general requirements, for the management of byproduct material, with EPA concurrence, which are, to the maximum extent practicable, at least comparable to requirements applicable to the management of similar hazardous material regulated by the EPA under the Solid Waste Disposal Act (SWDA), as amended. The Commission deliberated as to how best to deal with these related rule-making needs and decided on the course of action resulting in this proposal and the accompanying ANPRM. This proposal addresses all the changes ~~[considered appropriate]~~ to the existing Commission regulations in

Appendix A to 10 CFR Part 40 that can be legally promulgated without additional supporting documentation. Other changes to the Commission's regulations for mill tailings management resulting from the EPA standard are the subject of the accompanying ANPRM.

The content of these two rulemakings also may be characterized in terms of the need for EPA concurrence, although that was not the deciding factor. This proposal consists of modifications not requiring EPA concurrence, including conforming changes to existing NRC rules and incorporation of EPA requirements not deriving from the SWDA. Those modifications that are the subject of the ANPRM accompanying this proposal require EPA concurrence pursuant to section 84 of the Atomic Energy Act. Modifications addressed in the ANPRM include (1) incorporation into NRC regulations of SWDA requirements already imposed by the EPA, and (2) any further modifications to NRC regulations necessary to establish SWDA-comparable requirements as called for by the UMTRCA. This course of action was chosen to allow the Commission to both conform its regulations to EPA's and incorporate non-SWDA provisions in a prompt and orderly manner, in accordance with the schedule set by Congress, and deal with the complex of SWDA requirements and issues in a separate, comprehensive and unified rulemaking.

Content of This Proposal

The new EPA requirements in 40 CFR Part 192, (48 FR 45926) included by reference several sections from 40 CFR Part 264, promulgated by the EPA pursuant to authority provided by the Resource Conservation and Recovery Act (RCRA), which modified the SWDA. These SWDA (or RCRA) requirements imposed under 40 CFR Part 192 are addressed in the ANPRM accompanying this proposal. The few conforming changes to NRC's existing Appendix A regulations made necessary by these newly imposed SWDA requirements are addressed in this document, as are conforming changes and other changes necessary to reflect and incorporate the non-SWDA elements of EPA's new requirements. These non-SWDA provisions include requirements to--

(1) Adhere to applicable requirements in 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations" for

uranium byproduct material, and essentially the same requirements for thorium byproduct material;

(2) Adhere to applicable requirements in 40 CFR Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory."

(3) Maintain releases of radon to the atmosphere during operations as low as is practicable;

(4) Close disposal areas so as to provide reasonable assurance of effective control for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years;

(5) Limit average post-closure releases of radioactive radon gas to no more than 20 picocuries per square meter per second (pCi/m²-s); and

(6) Set limits for residual concentrations of radioactive radium left in soil, above background, in onsite areas not subject to the closure requirements for longevity and radon release control.

Proposed Modifications and Rationale

In accordance with the above, the Commission proposes the following modifications to Appendix A to 10 CFR Part 40:

1. Introduction.

(a) In the second sentence of the third paragraph, change "amendability" to "amenability."

Reason: This change corrects a typographical error.

(b) Delete the fourth paragraph in its entirety.

Reason: This change deletes an information submittal requirement which was established in connection with implementation of the original Appendix A criteria. The due date originally set for submittals is past. A new due date for revised submittals is not considered necessary.

(c) Licensees or applicants may propose alternatives to the specific requirements in this Appendix. Such alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Commission may find that the proposed alternatives meet the Commission's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned,

and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with such sites, which is equivalent to, the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR 192, Subparts D and E.

Reason: The flexibility to propose alternatives to the Commission's and EPA standards was included in Pub. L. 97-415 changes to the AEA. The added paragraph paraphrases the language in Section 84c. The added paragraph explicitly acknowledges the legislative intent and provides licensees and applicants the opportunity to propose alternatives as a routine licensing matter. Licensees would have to provide site specific rational to enable the required Commission finding. This generic approach was taken instead of modifying individual criteria to provide flexibility. A generic approach avoids the chance of not identifying all areas where flexibility may be needed and preserves the existing support for Appendix A. Administratively, alternatives are easier to process under an explicit provision than exceptions to rules.

2. Criterion 1.

(a) In the first paragraph delete the phrase[s] "...for thousands of years..." and [~~without ongoing active maintenance~~] insert "...for 1,000 years...."

Reason: The thousands of years language conflicts with the 40 CFR 192.32(b) standard of design of control measures to be effective for 1,000 years. [~~Further, although 40 CFR 264.111, which is included by reference in 40 CFR 192.32(b), that for nonradiological hazards the need for maintenance be minimized; the EPA standard itself is silent on maintenance for radiological hazard control measures and could thus allow some limited reliance on active maintenance for limited periods of time. The 1,000-year period in the preferred alternative far exceeds the 100-year period the EPA views as reasonable to rely on institutional controls to provide active maintenance. On this basis, the Commission would not flatly prohibit, in all cases, planned reliance on active maintenance.~~]

(b) In the second listed item of the first paragraph, delete the word "usable."

Reason: Both 40 CFR 264.221 and 40 CFR 264.92, which are included by reference in 40 CFR 192.32(a), require isolation of contaminants from all qualities of groundwater, not just usable groundwater sources.

~~[(c) Modify the last paragraph reading; "Tailings shall be disposed of in a manner that no active maintenance is required to preserve conditions of the site;" to read "Tailings shall be disposed of in a manner that minimizes the degree to which active maintenance is required to preserve conditions of the site;"~~

Reason:--The EPA standards in 40 CFR Part 192 do not prohibit all reliance on maintenance. For nonradiological hazards, 40 CFR 264.111 requires that the need for maintenance after closure be minimized. The change would reduce the stringency of the HRC requirement so as to be consistent with 40 CFR Part 192.

Note:--The last paragraph of Criterion 1 was previously suspended in full.]

3. Criterion 3.

~~[(a) Delete in its entirety the first sentence which reads "The prime option for disposal of tailings is placement below grade; either in mines or specially excavated pits (that is, where the need for any specially constructed retention structure is eliminated);"~~

Reason:--The sentence has no effect other than to label below grade disposal as the prime option. This is misleading and confusing in that it gives the impression that above grade disposal could not be approved. Under the longevity standard of 40 CFR Part 192, it is durability rather than disposal mode which determines acceptability.

~~(b) Modify the second sentence where it reads "Consideration of this disposal mode;" to read "Consideration of the below grade disposal mode;"~~

Reason:--The change is of an editorial nature to replace the pronoun "this" with "the below grade." Although the requirement to consider below grade disposal was previously suspended along with the rest of Criterion 3, a requirement for consideration only is not inconsistent with EPA's 40 CFR Part 192 and the Commission believes it should remain.

(c) Delete the third and fourth sentences in their entirety, beginning with "In some instances, ..." and ending with "...are not available."

Reason: The sentences are explanatory in nature, and do not properly reflect consideration of EPA's new requirements, especially for ground-water protection. For this reason they are potentially misleading and confusing.

(d) Delete the last sentence beginning with "In these cases, ..." and ending with "...erosional forces."

Reason: The sentence places a generic burden of proof requirement on above-grade disposal which is at odds with the acceptability standards established by EPA's requirement for longevity of control in 40 CFR 192.32(b).

(a) Delete the modifiers "high quality" for groundwater in the second sentence of the second paragraph.

Reason: The EPA standards require protection of all qualities of groundwater, not just high quality sources.

[Note: The entirety of Criterion 3 was previously suspended.

4. Criterion 4.

(a) Revise the first sentence, in its entirety, to read "To the extent necessary to meet the closure requirements in Criterion 6, the applicant or licensee shall adhere to the following site and design criteria:"

Reason: The revision clarifies that the remainder of Criterion 4 applies only to the extent necessary to adhere to the Criterion 6 closure standards, which are proposed herein to reflect the new EPA standards for longevity of control and radon release limitations.]

(b)(a) Revise paragraph (a) by [replacing "minimized" with "sufficiently small," deleting "maximum possible flood," and adding at the end "...so as to provide reasonable assurance of meeting the longevity standard in Criterion 6,"] inserting "Probable Maximum Flood."

Reason: Probable Maximum Flood reflects the appropriate hydrologic terms for a design basin and the original intent of the provision when Appendix A was promulgated.

[Reason:--The changes revise and clarify the restrictions placed on upstream catchment area so as to be consistent with the EPA longevity standard now reflected in proposed Criterion 6:

Note:--Paragraph (a) was previously suspended in its entirety:

(c) -- Delete paragraph (b) in its entirety:

Reason:--It may not be necessary for topographic features to provide good wind protection in order to meet the EPA longevity standard:--For example, engineering methods (e.g., rock armoring) should be able to provide sufficient wind protection to meet the EPA design standard of 1,000 years of effective control:

(d) -- In the first sentence of paragraph (c), delete the phrase "be relatively flat after final stabilization to minimize erosion potential and to:"

Reason:--The 1,000-year design lifetime in the EPA longevity standard might be met by engineering or other methods rather than "relatively flat" features, and it may not be necessary to "minimize" erosion potential:--It may be acceptable under the EPA standard, and more practicable, to apply a relatively more erosive but thicker cover:

(e) -- Delete the remainder of paragraph (c) beginning with "The broad objective:" and ending with "identified:"

Reason:--The deleted language is misleading and at odds with the EPA longevity standard:--Under the EPA requirement, acceptability is a function of overall durability rather than specific design features: Also, the language is unnecessary in view of the proposed retainment of elements of Criterion 3 requiring that steepness of slopes be minimized to the maximum extent reasonably achievable:

(f) -- Relabel paragraph (c) as paragraph (b):

Reason:--For editorial consistency:

(g) -- Delete the first sentence of paragraph (d), beginning "A full self-sustaining vegetative:" and ending "to negligible levels:"

Reason:--The first sentence mandates a rock or vegetative cover to reduce erosion:--Further language outlines possible exceptions but the standard is established by the first sentence:--While a rock cover or vegetative cover is a very effective way to meet the EPA standard, it may not be the only way to meet the 1000-year effective design objective:

The Commission believes that this and similar language should be deleted so as to provide maximum flexibility to MIT operators in devising plans to meet the EPA longevity standard:

(h)--Delete the second and third sentences of paragraph (d) beginning with "Where a fall..." and ending with "...pile."

Reason:--See (d) and (g) above:

(i)--In the fourth sentence of paragraph (d) beginning "The following factors..." replace the words "the final" in the phrase "...in establishing the final rock cover..." with "any."

Reason:--See (g) above:--Rock covering is not flatly required:--The words "the final" are modified to clarify this situation:

(j)--In the first listed item in paragraph (d); delete the parenthetical phrase "(excepting bedding material average particles size shall be at least cobble size or greater)."

Reason:--The phrase specifies technical requirements on rock size that may not be necessary to meet the EPA design objective:--This change will allow flexibility to use whatever size rock meets the EPA standard:

(k)--Delete in its entirety the fourth paragraph of paragraph (d) beginning with "Individual rock fragments shall..." and ending with "...shall not be used."

Reason:--The fourth paragraph specifies technical requirements on rock properties that may not be necessary to meet the EPA design objective:--The change retains flexibility to accept greater quantities of lesser quality rock; or other designs in keeping with the EPA longevity standard:

(l)--Delete the fifth paragraph of paragraph (d) in its entirety; beginning with "Rock covering..." and ending with "...of this Criterion."

Reason:--The listing of requirements needed to support a justification for not using a rock cover is at odds with the form of the EPA longevity standard:

Note:--In the fifth paragraph of paragraph (d); the first phrase "Rock covering of slopes may not be required..." was not previously suspended:

(m)--Delete the first sentence of the last paragraph of paragraph (d) beginning "Furthermore; all impoundments::" and ending "slope gradient:"

Reason:--While contouring to minimize concentrated surface runoff or sharp changes in flow will enhance long-term stability; such contouring to totally avoid problem areas may not be required in all cases by the EPA design lifetime standard of 1,000 years to the extent practicable and 200 years in any case.

(n)--in the second sentence of the last paragraph of paragraph (d) delete "in addition to rock cover on slopes::" and "with substantial rock cover (rip rap):" Replace "areas toward" with "Areas toward:"

Reason:--See (g) above.

(o)--Relabel paragraphs (d); (e); and (f); as (c); (d); and (e); respectively:

Reason:--For editorial consistency:]

5. Criterion 5.

(a) In the first paragraph, delete the first two sentences beginning "Steps shall be taken..." and ending "...potential uses." and the phrase "...in order to accomplish this objective." in the third sentence.

Reason: The EPA groundwater protection standards referenced in 40 CFR 192.32(a) do not permit any seepage to groundwater.

(b) In the first listed item under the first paragraph beginning with "Installation of..." delete the words "low permeability" as a characteristic of bottom liners.

Reason: The EPA groundwater protection standard referenced in 40 CFR 192.32(a) requires a liner that prevents migration of wastes out of the impoundment into the adjacent soil and groundwater. Low permeability implies that some migration is allowed.

[Note:--in the first listed item under the first paragraph; the last two full sentences; beginning with "Where clay liners::" and ending with "months of exposure));" were previously suspended:]

(c) In the second paragraph beginning "Where groundwater impacts..." delete the phrase "to its potential use before milling operations began to the maximum extent practicable."

Reason: The EPA standard in 40 CFR 192.33, by referencing 40 CFR 264.100, requires a corrective action program to restore groundwater to standards established under 40 CFR 264.92-94. This standard is essentially a nondegradation standard. Restoration of groundwater quality only to the extent necessary to restore its potential use is inconsistent with the EPA standard.

(d) Delete in its entirety the third paragraph beginning "While the primary method of protecting ground water shall be isolation..." and ending "...from current or potential uses."

Reason: The EPA standards for groundwater protection in 40 CFR 192.32(a) protect groundwater primarily on the basis of background-level concentration limits for hazardous constituents, and not in terms of current or potential uses. The deleted sentence allowed consideration of tailings in contact with groundwater. The EPA standard permits no seepage to groundwater.

(e) In the first sentence of the fifth paragraph beginning "This information shall be gathered..." delete the word "usable" where it modifies "groundwater."

Reason: The EPA standard in 10 CFR 192.32(a) does not distinguish between "usable" and nonusable aquifers. The groundwater protection standard applies universally to aquifers of any quality or potential use.

6. Criterion 6.

(a) Delete the first sentence in entirety, beginning with "Sufficient earth cover..." and ending with "...meter per second.", and in its place insert "In cases where waste byproduct material is to be permanently disposed, at least three meters of earth cover shall be placed over tailings or wastes at the end of milling operations and the waste disposal area shall be closed in accordance with a design¹ which shall provide reasonable assurance of control of radiological hazards to (i) be effective for one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct

materials, to the atmosphere so as to not exceed an average² release rate of 20 picocuries per square meter per second (pCi/m²s)."

Reason: The change replaces previous Commission requirements for ~~[minimum-cover-thickness-and]~~ post-closure radon control with the EPA standards for longevity and radon control. ~~[The-EPA-standard-in-40-CFR 192-32(b)-for-environmental-protection-after-closure-does-not-stipulate-a minimum-cover;-but-rather-a-longevity-requirement-for-whatever-control-is applied:]~~ The control method must ~~[also]~~ provide reasonable assurance that releases of radon-222 do not exceed 20 picocuries per square meter per second, rather than 2 picocuries. ~~[Under-the-EPA-standard-the-thickness of-cover-will-be-a-function-of-longevity-and-radon-release-with-no-set minimum-thickness:]~~

(b) Add to Criterion 6 the following two footnotes which accompany the revised first sentence: footnote (1) "The standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required," and footnote (2) "This average shall apply to the entire surface of each disposal area over periods of at least one year, but short compared to 100 years. Radon will come from both uranium byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from byproduct materials to the atmosphere."

Reason: This change fully incorporates the EPA radon control standard.

~~[Note:--in-the-first-sentence-in-Criterion-6;-only-the-words-"but not-less-than-three-meters"-and-"to-less-than-two-picocuries-per-square meter-per-second"-were-previously-suspended:]~~

(c) In the fifth sentence of the first paragraph, replace "non-soiled" with "non-soil," ~~[and-delete-the-words-"to-reduce-tailings covers-to-less-than-three-meters:"]~~

Reason: The change[s] corrects a typographical error. ~~[and-delete-a reference-to-the-three-meter-minimum-cover-thickness-requirement-which is-no-longer-appropriate:]~~

~~Note:--in-the-fifth-sentence-of-the-first-paragraph;-the-words ":-:crack-or:-:"-were-previously-suspended:]~~

~~[(d)-Delete the second-to-last and last sentences, beginning with "Near-surface cover materials::" and ending with "::cover material itself;"]~~

~~Reason:--The EPA standards for post-closure environmental protection do not provide for, or characterize, the cover material in terms of radioactivity, but only in terms of durability and capacity to reduce radon release from the tailings.--However, the EPA standard does indicate in a footnote that the characteristics of the cover material should be considered on a site-specific basis.]~~

~~[(e)]~~ (d) At the end of Criterion 6, add a new paragraph to read: "The design requirements in this Criterion for longevity and control of radon releases shall apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface."

Reason: This change incorporates the EPA requirements for site cleanup outside the actual disposal area, in areas where the longevity and radon control closure standards are not applicable (see 40 CFR 192.32(b)(2) and 192.41).

7. Criterion 8.

(a) At the end of the first full paragraph, add a new sentence to read "During operations and prior to closure, radiation doses from radon emissions from surface impoundments shall be kept as low as is practicable."

Reason: This change incorporates the EPA requirement imposed under 40 CFR 192.32(a)(4).

(b) Following the third full paragraph of Criterion 8, just before Criterion 8A, insert the following two new paragraphs:

"Milling operations producing or involving thorium byproduct material shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the

whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment."

"Uranium and thorium byproduct materials shall be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983."

Reason: These new paragraphs incorporate EPA requirements imposed under 40 CFR 192.41(d) and 40 CFR 192.32(a)(3), respectively.

[8:--Criterion-10:

in-the-second-sentence-of-the-second-paragraph;-add-the-words-"and control"-immediately-after-the-word-"surveillance"-in-both-places-the word-"surveillance"-appears:

Reason:--This-change-clarifies-the-need-to-establish-financial arrangements-consistent-with-any-requirement-for-maintenance-to-maintain-isolation-of-tailings-after-closure:--This-change-is-necessary-and consistent-with-the-absence-of-a-prohibition-on-reliance-on-maintenance to-provide-long-term-isolation-in-40-CFR-192-32(b):

9:--Criterion-12:

Delete-the-first-sentence-which-states-that-final-disposition-of tailings-should-be-such-that-ongoing-active-maintenance-is-not-necessary to-preserve-isolation:

Reason:--The-standard-referenced-in-40-CFR-192-32(b)-for-control-of nonradiological-hazards;-40-CFR-264.111;-requires-only-that-the-need-for maintenance-be-minimized;-it-does-not-exclude-the-possibility-of-limited reliance-on-maintenance-following-closure-of-a-disposal-site:]

[10:] 8. Criteria 2, 7, 9, 10, [and] 11, and 12 are not affected by the new EPA standards or editorial changes and no modification is proposed for any portion of those criteria.

Impact of the Proposed Amendments

Compliance with Subparts D and E to 40 CFR Part 192 of EPA's regulations is an established requirement. Under Section 275d. of the Atomic Energy Act of 1954, as amended, the Commission is obligated to implement and enforce the new EPA standards as of December 6, 1983, the date they became effective. This Commission responsibility is being carried out on an ad hoc, case-by-case basis in individual licensing actions.

The Commission's action in proposing these modifications to its regulations in Appendix A to 10 CFR Part 40 is to conform them to the new EPA standards. These changes are for the purpose of avoiding conflicts and inconsistencies, and for clarifying previously existing language so as to be compatible with the new requirements. [In-most-instances;-the-changes-revise-previous-NRE-requirements-by-deleting-them-or-reducing-their-stringency-or-effect-so-as-to-make-NRE's-requirements-compatible-with-EPA's:] The action proposed here by the Commission is a consequence of previous actions taken by the Congress and the EPA, and is legally mandated in Section 275b(3) of the Atomic Energy Act of 1954, as amended.

Commission action in this case is essentially nondiscretionary in nature, and for purposes of environmental analysis, rests upon existing environmental and other impact evaluations in the following documents: (1) "Final Environmental Impact Statement for Standards for the Control of Byproduct Materials from Uranium Ore Processing (40 CFR Part 192)," Volumes 1 and 2, EPA 520/1-83-008-1 and 2, September 1983, and (2) "Regulatory Impact Analysis of Final Environmental Standards for Uranium Mill Tailings at Active Sites," EPA 520/1-83-010, September 1983, both prepared in support of Subparts D and E of 40 CFR Part 192, and (3) "Final Generic Environmental Impact Statement on Uranium Milling," NUREG-0706, September 1980, prepared in support of Appendix A of 10 CFR Part 40. The Commission believes that these supporting analyses for the new EPA standards and the existing Commission regulations provide a more than adequate environmental review for the standards addressed herein, and that no additional impact analysis is warranted by the conforming actions proposed herein. The EPA engaged in and completed a reasoned decisionmaking process with full consideration of environmental concerns, and for the purposes of this rule-making action, can be viewed as the lead agency.

PAPERWORK REDUCTION ACT STATEMENT

This proposed rule does not contain a new or amended information collection requirement subject to the requirements of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget approval number 3150-0020.

REGULATORY FLEXIBILITY CERTIFICATION

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule will not, if promulgated, have a significant economic impact upon a substantial number of small entities. Therefore, we have not performed a Regulatory Flexibility Analysis. The basis for this finding is that of the licensed uranium mills, only one qualifies as a small entity. Almost all the mills are owned by large corporations. Three of the mills are partly-owned by companies that could qualify as small businesses, according to the Small Business Administration generic small entity definition of 500 employees. However, under the Regulatory Flexibility Act, a small business is one that is independently owned and operated. Since these three mills are not independently owned they do not qualify as small entities.

LIST OF SUBJECTS IN 10 CFR PART 40

Government contracts, Hazardous materials-transportation, Nuclear materials, Penalty, Reporting and recordkeeping requirements, Source material, and Uranium.

Under the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, 5 U.S.C. 553, and the Uranium Mill Tailings Radiation Control Act of 1978, as amended, the NRC is proposing the following amendments to 10 CFR Part 40.

PART 40 DOMESTIC LICENSING OF SOURCE MATERIAL

1. The authority citation for Part 40 is revised to read as follows:

AUTHORITY: Secs. 62, 63, 64, 65, 81, 161, 182, 183, 186, 68 Stat. 932, 933, 935, 948, 953, 954, 955, as amended, secs. 11e(2), 83, 84, Pub. L. 95-604, 92 Stat. 3033, as amended, 3039, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2014(e)(2), 2092, 2093, 2094, 2095, 2111, 2113, 2114, 2201, 2232, 2233, 2236, 2282); secs. 274, Pub. L. 86-373, 73 Stat. 688 (42 U.S.C. 2021); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846). Section 275, 92 Stat. 3021, as amended by Pub. L. 97-415, 96 Stat. 2067 (42 U.S.C. 2022).

Section 40.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Section 40.31(g) also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Section 40.46 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Section 40.71 also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273); §§ 40.3, 40.25(d)(1)-(3), 40.35(a)-(d), 40.41(b) and (c), 40.46, 40.51(a) and (c), and 40.63 are issued under sec. 161b, 68 Stat. 948, as amended, (42 U.S.C. 2201(b)); and §§ 40.25(c) and (d)(3) and (4), 40.26(c)(2), 40.35(e), 40.42, 40.61, 40.62, 40.64 and 40.65 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. Appendix A to Part 40 is revised to read as follows:

Appendix A to Part 40 - Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material From Ores Processed Primarily for Their Source Material Content.

Introduction. Every applicant for a license to possess and use source material in conjunction with uranium or thorium milling, or byproduct material at sites formerly associated with such milling, is required by the provisions of § 40.31(h) to include in a license application proposed specifications relating to milling operations and the disposition of tailings or wastes resulting from such milling activities. This appendix establishes technical, financial, ownership, and long-term site

surveillance criteria relating to the siting, operation, decontamination, decommissioning, and reclamation of mills and tailings or waste systems and sites at which such mills and systems are located. As used in this appendix, the term "as low as is reasonably achievable" has the same meaning as in § 20.1(c) of 10 CFR Part 20 of this chapter.

In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis. However, in such cases the objectives, technical alternatives and concerns which must be taken into account in developing a tailings program are identified. As provided by the provisions of § 40.31(h) applications for licenses must clearly demonstrate how the criteria have been addressed.

The specifications shall be developed considering the expected full capacity of tailings or waste systems and the lifetime of mill operations. Where later expansions of systems or operations may be likely (for example, where large quantities of ore now marginally uneconomical may be stock-piled), the amenability of the disposal system to accommodate increased capacities without degradation in long-term stability and other performance factors shall be evaluated.

Licensees or applicants may propose alternatives to the specific requirements in this Appendix. Such alternative proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology. The Commission may find that the proposed alternatives meet the Commission's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with such sites, which is equivalent to, the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR 192, Subparts D and E.

I. Technical Criteria

Criterion 1--In selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites, the following site features, which will determine the extent to which a program meets the

broad objective of isolating the tailings and associated contaminants from man and the environment ~~[during operations and thereafter]~~ for 1,000 years, thereafter, without ongoing active maintenance shall be considered:

- Remoteness from populated areas;
- Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from groundwater sources; and
- Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long term.

The site selection process shall be an optimization to the maximum extent reasonably achievable in terms of these features.

In the selection of disposal sites, primary emphasis shall be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration shall be given to siting features given the long-term nature of the tailings hazards.

Tailings shall be disposed of in a manner that ~~[minimizes the degree to which]~~ no active maintenance is required to preserve conditions of the site.

Criterion 2--To avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote above ground extraction operations shall be disposed of at existing large mill tailings disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the costs and environmental impacts of transporting the wastes to a large disposal site, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.

Criterion 3--~~[The evaluation of alternative sites and disposal methods performed by mill operators in support of their proposed tailings disposal program (provided in applicants' environmental reports) shall reflect serious consideration of the below-grade disposal mode--where~~

~~full-below-grade-burial-is-not-practicable;-the-size-of-retention-struc-~~
~~tures;-and-size-and-steepness-of-slopes-of-associated-exposed-embankments~~
~~shall-be-minimized-by-excavation-to-the-maximum-extent-reasonably-achiev-~~
~~able-or-appropriate-given-the-geologic-and-hydrologic-conditions-at-a-site.]~~
The "prime option" for disposal of tailings is placement below grade,
either in mines or specially excavated pits (that is, where the need for
any specially constructed retention structure is eliminated).

The evaluation of alternative sites and disposal methods performed
by mill operators in support of their proposed tailings disposal program
(provided in applicants' environmental reports) shall reflect serious
consideration of this disposal mode. In some instances, below grade dis
posal may not be the most environmentally sound approach, such as might
be the case if a groundwater formation is relatively close to the surface
or not very well isolated by overlying soils and rock. Also, geologic
and topographic conditions might make full below grade burial impractic
able: for example, bedrock may be sufficiently near the surface that
blasting would be required to excavate a disposal pit at excessive cost,
and more suitable alternative sites are not available. Where full below
grade burial is not practicable, the size of retention structures, and
size and steepness of slopes of associated exposed embankments shall be
minimized by excavation to the maximum extent reasonably achievable or
appropriate given the geologic and hydrologic conditions at a site. In
these cases, it must be demonstrated that an above grade disposal program
will provide reasonably equivalent isolation of the tailings from natural
erosional forces.

~~Criterion 4-*~~~~To-the-extent-necessary-to-meet-the-closure-requirements~~
~~in-Criterion-6;-the-applicant-or-licensee-shall-adhere-to-the-following~~
~~site-and-design-criteria:~~

~~(a)--Upstream-rainfall-catchment-areas-must-be-sufficiently-small~~
~~to-decrease-erosion-potential-and-the-size-of-the-flood-which-could-erode~~
~~or-wash-out-sections-of-the-tailings-disposal-area-so-as-to-provide~~
~~reasonable-assurance-of-meeting-the-longevity-standard-in-Criterion-6:~~

~~(b)--Embankment-and-cover-slopes-shall-provide-conservative-factors~~
~~of-safety-assuring-long-term-stability:~~

* Note: Because of the complexity of Criterion 4 in comparative
 text, the new version was simply substituted.

(c)--The following factors shall be considered in establishing any rock cover design to avoid displacement of rock particles by human and animal traffic or by natural processes; and to preclude undercutting and piping:

- Shape; size; composition; and gradation of rock particles;
- Rock cover thickness and zoning of particles by size; and
- Steepness of underlying slopes:

Areas toward which surface runoff might be directed shall be well protected--in addition to providing for stability of the impoundment system itself; overall stability; erosion potential; and geomorphology of surrounding terrain shall be evaluated to assure that there are not ongoing or potential processes; such as gully erosion; which would lead to impoundment instability:

(d)--The impoundment shall not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand--As used in this criterion; the term "capable fault" has the same meaning as defined in S-III(g) of Appendix A of 10-CFR-Part-100--The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material:

(e)--The impoundment; where feasible; should be designed to incorporate features which will promote deposition--For example; design features which promote deposition of sediment suspended in any runoff which flows into the impoundment area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time:

The following site and design criteria shall be adhered to whether tailings or wastes are disposed of above or below grade.

(a) Upstream rainfall catchment areas must be minimized to decrease erosion potential and the size of the Probable Maximum Flood which could erode or wash out sections of the tailings disposal area.

(b) Topographic features should provide good wind protection.

(c) Embankment and cover slopes shall be relatively flat after final stabilization to minimize erosion potential and to provide conservative factors of safety assuring long-term stability. The broad objective should be to contour final slopes to grades which are as close as possible to those which would be provided if tailings were disposed of below grade; this could, for example, lead to slopes of about 10 horizontal to 1 vertical (10h:1v) or less steep. In general, slopes should not be steeper than about 5h:1v. Where steeper slopes are proposed, reasons why a slope less steep than 5h:1v would be impracticable should be provided, and compensating factors and conditions which make such slopes acceptable should be identified.

(d) A full self-sustaining vegetative cover shall be established or rock cover employed to reduce wind and water erosion to negligible levels.

Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover shall be employed on slopes of the impoundment system. The NRC will consider relaxing this requirement for extremely gentle slopes such as those which may exist on the top of the pile.

The following factors shall be considered in establishing the final rock cover design to avoid displacement of rock particles by human and animal traffic or by natural process, and to preclude undercutting and piping:

- shape, size, composition, and gradation of rock particles (excepting bedding material average particles size shall be at least cobble size or greater);
- rock cover thickness and zoning of particles by size; and
- steepness of underlying slopes.

Individual rock fragments shall be dense, sound, and resistant to abrasion, and shall be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions. Weak, friable, or laminated aggregate shall not be used.

Rock covering of slopes may not be required where top covers are very thick (on the order of 10m or greater); impoundment slopes are very gentle (on the order of 10 h:1v or less); bulk cover materials have inherently favorable erosion resistance characteristics; and, there is

negligible drainage catchment area upstream of the pile and good wind protection as described in points (a) and (b) of this Criterion.

Furthermore, all impoundment surfaces shall be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope gradient. In addition to rock cover on slopes, areas toward which surface runoff might be directed shall be well protected with substantial rock cover (rip rap). In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain shall be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.

(e) The impoundment shall not be located near a capable fault that could cause a maximum credible earthquake larger than that which the impoundment could reasonably be expected to withstand. As used in this criterion, the term "capable fault" has the same meaning as defined in § III(g) of Appendix A of 10 CFR 100. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.

(f) The impoundment, where feasible, should be designed to incorporate features which will promote deposition. For example, design features which promote deposition of sediment suspended in any runoff which flows into the impoundment area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.

Criterion 5--The following shall be considered:

- Installation of bottom liners (Where synthetic liners are used, a leakage detection system shall be installed immediately below the liner to ensure major failures are detected if they occur. This is in addition to the groundwater monitoring program conducted as provided in Criterion 7. Where clay liners are proposed or relatively thin, in-situ clay soils are to be relied upon for seepage control, tests shall be conducted with representative tailings solutions and clay materials to confirm that no significant deterioration of permeability or stability properties will occur with continuous exposure of clay to tailings solutions. Tests shall be run for a sufficient period of time to reveal any effects if

they are going to occur (in some cases deterioration has been observed to occur rather rapidly after about nine months of exposure)).

- Mill process designs which provide the maximum practicable recycle of solutions and conservation of water to reduce the net input of liquid to the tailings impoundment.

- Dewatering of tailings by process devices and/or in-situ drainage systems (At new sites, tailings shall be dewatered by a drainage system installed at the bottom of the impoundment to lower the phreatic surface and reduce the driving head for seepage, unless tests show tailings are not amenable to such a system. Where in-situ dewatering is to be conducted, the impoundment bottom shall be graded to assure that the drains are at a low point. The drains shall be protected by suitable filter materials to assure that drains remain free running. The drainage system shall also be adequately sized to assure good drainage).

- Neutralization to promote immobilization of toxic substances.

Where groundwater impacts are occurring at an existing site due to seepage, action shall be taken to alleviate conditions that lead to excessive seepage impacts and restore groundwater quality. The specific seepage control and groundwater protection method, or combination of methods, to be used must be worked out on a site-specific basis. Technical specifications shall be prepared to control installation of seepage control systems. A quality assurance, testing, and inspection program, which includes supervision by a qualified engineer or scientist, shall be established to assure the specifications are met.

In support of a tailings disposal system proposal, the applicant/operator shall supply information concerning the following:

- The chemical and radioactive characteristics of the waste solutions.

- The characteristics of the underlying soil and geologic formations particularly as they will control transport of contaminants and solutions. This shall include detailed information concerning extent, thickness, uniformity, shape, and orientation of underlying strata. Hydraulic gradients and conductivities of the various formations shall be determined.

This information shall be gathered from borings and field survey methods taken within the proposed impoundment area and in surrounding areas where contaminants might migrate to groundwater. The information gathered on boreholes shall include both geologic and geophysical logs in sufficient number and degree of sophistication to allow determining significant discontinuities, fractures, and channeled deposits of high hydraulic conductivity. If field survey methods are used, they should be in addition to and calibrated with borehole logging. Hydrologic parameters such as permeability shall not be determined on the basis of laboratory analysis of samples alone; a sufficient amount of field testing (e.g., pump tests) shall be conducted to assure actual field properties are adequately understood. Testing shall be conducted to allow estimating chemi-sorption attenuation properties of underlying soil and rock.

Location, extent, quality, capacity and current uses of any groundwater at and near the site.

Furthermore, steps shall be taken during stockpiling of ore to minimize penetration of radionuclides into underlying soils; suitable methods include lining and/or compaction of ore storage areas.

Criterion 6--In cases where waste byproduct material is to be permanently disposed at least three meters of earth cover shall be placed over tailings or wastes at the end of milling operations and, the waste disposal area shall be closed in accordance with a design¹ which shall provide reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as to not exceed an average² release rate of

¹The standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required.

²This average shall apply to the entire surface of each disposal area over periods of at least 1 year, but short compared to 100 years. Radon will come from both uranium byproduct materials and from covering materials. Radon emissions from covering materials should be estimated as part of developing a closure plan for each site. The standard, however, applies only to emissions from uranium byproduct materials to the atmosphere.

20 picocuries per square meter per second ($\text{pCi}/\text{m}^2\text{s}$). In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances shall not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer shall not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed to reduce tailings covers to less than three meters, it must be demonstrated that such materials will not degrade by differential settlement, weathering, or other mechanism, over long-term time intervals.

Near surface cover materials (i.e., within the top three meters) shall not include waste or rock that contains elevated levels of radium; soils used for near surface cover must be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils. This is to ensure that surface radon exhalation is not significantly above background because of the cover material itself.

The design requirements in this criterion for longevity and control of radon releases shall apply to any portion of a licensed and/or disposal site unless such portion contains a concentration of radium in land, averaged over areas of 100 square meters, which, as a result of byproduct material does not exceed the background level by more than: (i) 5 picocuries per gram (pCi/g) of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over the first 15 centimeters (cm) below the surface, and (ii) 15 pCi/g of radium-226, or, in the case of thorium byproduct material, radium-228, averaged over 15-cm thick layers more than 15 cm below the surface.

Criterion 7--At least one full year prior to any major site construction, a preoperational monitoring program shall be conducted to provide complete baseline data on a milling site and its environs. Throughout the construction and operating phases of the mill, an operational monitoring program shall be conducted to measure or evaluate compliance with applicable standards and regulations; to evaluate performance of control systems and procedures; to evaluate environmental impacts of operation; and to detect potential long-term effects.

Criterion 8--Milling operations shall be conducted so that all air-borne effluent releases are reduced to levels as low as is reasonably achievable. The primary means of accomplishing this shall be by means of emission controls. Institutional controls, such as extending the site boundary and exclusion area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid site contamination. The greatest potential sources of offsite radiation exposure (aside from radon exposure) are dusting from dry surfaces of the tailings disposal area not covered by tailings solution and emissions from yellowcake drying and packaging operations. During operations and prior to closure, radiation doses from radon emissions from surface impoundments of uranium or thorium byproduct materials shall be kept as low as is practicable.

Checks shall be made and logged hourly of all parameters (e.g., differential pressures and scrubber water flow rates) which determine the efficiency of yellowcake stack emission control equipment operation. It shall be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency; corrective action shall be taken when performance is outside of prescribed ranges. Effluent control devices shall be operative at all times during drying and packaging operations and whenever air is exhausting from the yellowcake stack. Drying and packaging operations shall terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions shall be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging operations shall cease as soon as practicable. Operations may not be re-started after cessation due to off-normal performance until needed corrective actions have been identified and implemented. All such cessations, corrective actions, and re-starts shall be reported to the appropriate NRC regional office as indicated in Criterion 8A, in writing, within 10 days of the subsequent restart.

To control dusting from tailings, that portion not covered by standing liquids shall be wetted or chemically stabilized to prevent or minimize blowing and dusting to the maximum extent reasonably achievable. This requirement may be relaxed if tailings are effectively sheltered from wind, such as may be the case where they are disposed of below grade and the tailings surface is not exposed to wind. Consideration shall be given in planning tailings disposal programs to methods which would allow phased covering and reclamation of tailings impoundments since this will help in controlling particulate and radon emissions during operation. To control dusting from diffuse sources, such as tailings and ore pads where automatic controls do not apply, operators shall develop written operating procedures specifying the methods of control which will be utilized.

Milling operations producing or involving thorium byproduct material shall be conducted in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as a result of exposures to the planned discharge of radioactive materials, radon-220 and its daughters excepted, to the general environment.

Uranium and thorium byproduct materials shall be managed so as to conform to the applicable provisions of Title 40 of the Code of Federal Regulations, Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983.

Criterion 8A--Daily inspections of tailings or waste retention systems shall be conducted by a qualified engineer or scientist and documented. The appropriate NRC regional office as indicated in Appendix D of 10 CFR Part 20, or the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555, shall be immediately notified of any failure in a tailings or waste retention system which results in a release of tailings or waste into unrestricted areas, and/or of any unusual conditions (conditions not contemplated in the design of the retention system) which if not corrected could indicate the poten-

tial or lead to failure of the system and result in a release of tailings or waste into unrestricted areas.

II. Financial Criteria

Criterion 9--Financial surety arrangements shall be established by each mill operator prior to the commencement of operations to assure that sufficient funds will be available to carry out the decontamination and decommissioning of the mill and site and for the reclamation of any tailings or waste disposal areas. The amount of funds to be ensured by such surety arrangements shall be based on Commission-approved cost estimates in a Commission-approved plan for (1) decontamination and decommissioning of mill buildings and the milling site to levels which would allow unrestricted use of these areas upon decommissioning, and (2) the reclamation of tailings and/or waste disposal areas in accordance with technical criteria delineated in Section I of this Appendix. The licensee shall submit this plan in conjunction with an environmental report that addresses the expected environmental impacts of the milling operation, decommissioning and tailings reclamation, and evaluates alternatives for mitigating these impacts. The surety shall also cover the payment of the charge for long-term surveillance and control required by Criterion 10. In establishing specific surety arrangements, the licensee's cost estimates shall take into account total costs that would be incurred if an independent contractor were hired to perform the decommissioning and reclamation work. In order to avoid unnecessary duplication and expense, the Commission may accept financial sureties that have been consolidated with financial or surety arrangements established to meet requirements of other Federal or state agencies and/or local governing bodies for such decommissioning, decontamination, reclamation, and long-term site surveillance and control, provided such arrangements are considered adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning and reclamation of the mill, mill tailings site and associated areas, and the long-term funding charge is clearly identified and committed for use in accomplishing these activities. The licensee's surety mechanism will be reviewed annually by the Commission to assure that sufficient funds would be available for completion of the reclamation plan if the work had to be performed by an independent contractor. The amount of

surety liability should be adjusted to recognize any increases or decreases resulting from inflation, changes in engineering plans, activities performed, and any other conditions affecting costs. Regardless of whether reclamation is phased through the life of the operation or takes place at the end of operations, an appropriate portion of surety liability shall be retained until final compliance with the reclamation plan is determined. This will yield a surety that is at least sufficient at all times to cover the costs of decommissioning and reclamation of the areas that are expected to be disturbed before the next license renewal. The term of the surety mechanism must be open ended, unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance could be provided with a surety instrument which is written for a specified period of time (e.g., 5 years) yet which must be automatically renewed unless the surety notifies the beneficiary (the Commission or the State regulatory agency) and the principal (the licensee) some reasonable time (e.g., 90 days) prior to the renewal date of their intention not to renew. In such a situation the surety requirement still exists and the licensee would be required to submit an acceptable replacement surety within a brief period of time to allow at least 60 days for the regulatory agency to collect.

Proof of forfeiture must not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open-ended, and must be agreed to by all parties. Financial surety arrangements generally acceptable to the Commission are:

- (a) Surety bonds;
- (b) Cash deposits;
- (c) Certificates of deposit;
- (d) Deposits of government securities;
- (e) Irrevocable letters or lines of credit; and
- (f) Combinations of the above or such other types of arrangements as may be approved by the Commission. However, self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract

with a state or Federal agency), will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements.

Criterion 10--A minimum charge of \$250,000 (1978 dollars) to cover the costs of long-term surveillance shall be paid by each mill operator to the general treasury of the United States or to an appropriate State agency prior to the termination of a uranium or thorium mill license.

If site surveillance or control requirements at a particular site are determined, on the basis of a site-specific evaluation, to be significantly greater than those specified in Criterion 12 (e.g., if fencing is determined to be necessary), variance in funding requirements may be specified by the Commission. In any case, the total charge to cover the costs of long-term surveillance [~~and control~~] shall be such that, with an assumed 1 percent annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of site surveillance [~~and control~~]. The total charge will be adjusted annually prior to actual payment to recognize inflation. The inflation rate to be used is that indicated by the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

III. Site and Byproduct Material Ownership

Criterion 11--A. These criteria relating to ownership of tailings and their disposal sites become effective on November 8, 1981, and apply to all licenses terminated, issued, or renewed after that date.

B. Any uranium or thorium milling license or tailings license shall contain such terms and conditions as the Commission determines necessary to assure that prior to termination of the license, the licensee will comply with ownership requirements of this criterion for sites used for tailings disposal.

C. Title to the byproduct material licensed under this Part and land, including any interests therein (other than land owned by the United States or by a State) which is used for the disposal of any such byproduct material, or is essential to ensure the long term stability of such disposal site, shall be transferred to the United States or the State in which such land is located, at the option of such State. In view of the fact that physical isolation must be the primary means of

long-term control, and Government land ownership is a desirable supplementary measure, ownership of certain severable subsurface interests (for example, mineral rights) may be determined to be unnecessary to protect the public health and safety and the environment. In any case, however, the applicant/operator must demonstrate a serious effort to obtain such subsurface rights, and must, in the event that certain rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and is subject to either an NRC general or specific license prohibiting the disruption and disturbance of the tailings. In some rare cases, such as may occur with deep burial where no ongoing site surveillance will be required, surface land ownership transfer requirements may be waived. For licenses issued before November 8, 1981, the Commission may take into account the status of the ownership of such land, and interests therein, and the ability of a licensee to transfer title and custody thereof to the United States or a State.

D. If the Commission subsequent to title transfer determines that use of the surface or subsurface estates, or both, of the land transferred to the United States or to a State will not endanger the public health, safety, welfare, or environment, the Commission may permit the use of the surface or subsurface estates, or both, of such land in a manner consistent with the provisions provided in these criteria. If the Commission permits such use of such land, it will provide the person who transferred such land with the right of first refusal with respect to such use of such land.

E. Material and land transferred to the United States or a State in accordance with this Criterion shall be transferred without cost to the United States or a State other than administrative and legal costs incurred in carrying out such transfer.

F. The provisions of this Part respecting transfer of title and custody to land and tailings and wastes shall not apply in the case of lands held in trust by the United States for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States. In the case of such lands which are used for the disposal of byproduct material, as defined in this Part, the

licensee shall enter into arrangements with the Commission as may be appropriate to assure the long-term surveillance of such lands by the United States.

IV. Long-Term Site Surveillance

Criterion 12--The final disposition of tailings or wastes at milling sites should be such that ongoing active maintenance is not necessary to preserve isolation. As a minimum, annual site inspections shall be conducted by the government agency retaining ultimate custody of the site where tailings, or wastes are stored to confirm the integrity of the stabilized tailings or waste systems and to determine the need, if any, for maintenance and/or monitoring. Results of the inspection shall be reported to the Commission within 60 days following each inspection. The Commission may require more frequent site inspections if, on the basis of a site-specific evaluation, such a need appears necessary due to the features of a particular tailings or waste disposal system.

Dated at Washington, DC, this ____ day of _____, 1984.

For The Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.