40 CFR Part 192

Standards for Remedial Actions at

Inactive Uranium Processing Sites

RESPONSE TO COMMENTS

GROUND-WATER PROTECTION STANDARDS

SAR 1166

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Office of Radiation Programs

U.S. Environmental Protection Agency

Washington, D.C. 20460

1: INTRODUCTION

In this document EPA responds to comments received on the proposed rulemaking "Standards for Remedial Actions at Inactive Uranium Processing Sites," published in the Federal Register on September 24, 1987 (52 FR 36000-36008).

Subsequent to the announcement of the proposed rule, a public hearing was held on October 29, 1987 in Durango, Colorado. The record was held open until January 29, 1988.

In addition to requesting comments on the proposed ground-water protection standards, the Agency specifically asked for comments on 15 items. The responses received are summarized in Appendix A. The Agency has carefully considered the views expressed by commenters in formulating this final rule. Responses to selected comments on these items are also found in Appendix A.

Copies of written comments and transcripts of the hearing are available for inspection and copying at EPA's Central Docket Section, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. The docket number is R-87-01. (A fee may be charged for copying.)

Major concerns and issues arising from written and oral comments on the proposed rulemaking are summarized below. Each commenter is identified by a letter and number after the comment. EPA's response then follows. In the interest of clarity and economy, most comments are paraphrased, and closely related comments are combined. A list of the commenters with their identification numbers is given in Appendix B. A few comments referred to issues that were not the subject of this rulemaking or concerned wording of the existing standards that were repeated in the proposed rule for clarity. Such comments are not included in this document.

2: LEGAL, PROCEDURAL AND POLICY ISSUES

2.1 General

Comment 2.1.1 The summary statement concerning the proposed ground-water standards contains language that is unnecessarily absolute, e.g., the preamble summary states that the regulations will "correct and prevent contamination of ground water...". (I-5)

Response The EPA has reviewed the language referred to and has concluded that it is not unnecessarily absolute. When there is a question as to whether the language of the rule itself or the characterization in the preamble prevails, the clear meaning of the rule should govern.

Comment 2.1.2 Language in the proposed standards contains provisions that will help to provide additional flexibility in dealing with ground-water contamination problems at inactive mill sites. We urge

that any changes to the standards not make these provisions more restrictive. (I-3,G-2)

Response EPA has not found it necessary to make these provisions more restrictive.

Comment 2.1.3 Additional flexibility is needed in the proposed ground-water standards in order for DOE to be able to demonstrate compliance within the 1994 timeframe that the agency is seeking from Congress. (G-2,G-8,I-4,I-5)

Response Ground-water restoration is often a long-term undertaking. EPA agrees that DOE is unlikely to be able to completely restore ground water within the timeframe that was allowed by Congress for disposal of the tailings. Congress has also recognized this and has amended UMTRCA to extend the authority of DOE with respect to ground-water restoration indefinitely (P.L. 100-616).

Comment 2.1.4 The differing philosophical approaches at RCRA and Title I disposal sites has led to conflicting requirements in implementing longevity requirements and proposed ground-water protection standards. (G-8)

Response The commenter believes that there are conflicting requirements with respect to implementing longevity requirements under 40 CFR 192 and meeting the proposed ground water protection standards based on application of current RCRA regulations. This view apparently stems from the technical prediction that rock and gravel placed on top of an earth-covered pile to assure long-term stability will enhance infiltration of water through the cover and could lead to ground-water contamination. We have reviewed this matter and have concluded that covers can be designed to avoid this problem by using appropriate combinations of drainage and low permeability layers.

Comment 2.1.5 EPA should reconsider these standards based on new data:

- The National Research Council's report, Scientific Basis for Risk Assessment and Management of Uranium Mill Tailings (1986), revealed numerous failings in EPA's approach.

- The National Research Council's report, Health Risks of Radon and Other Internally Deposited Alpha Emitters (1988), indicates that the EPA risk estimate is substantially overstated.

- DOE has developed extensive experience in the remediation of Title I sites; EPA's program should reflect this practical experience. (I-1,I-4)

Response This comment primarily addresses the risk due to radon from uranium mill tailings piles and long-term stability issues for disposal. To this extent, it is only indirectly relevant to this rulemaking. However, the Agency considered the NAS/NRC report

"Scientific Basis for Risk Assessment and Management of Uranium Mill Tailings," referenced on page 1-2 of the Background Information Document (BID). Further, the Agency considered DOE experience in developing the proposed standards, as evidenced by the numerous references cited in the BID (see Chapter 3 and 4 in particular). Finally, the NAS/NRC BEIR IV report, which was considered in various draft versions during the Agency's development of the proposed standards, does not indicate that the EPA risk estimate is overstated; to the contrary, it is in substantial agreement.

Comment 2.1.6 Implementation should be postponed pending reevaluation of the regulatory goals and framework applicable to the uranium industry. (I-2)

Response The regulatory goals and framework applicable to the industry are established by statute, not regulations. Postponing the implementation of these ground water standards for inactive uranium mill tailings sites will not affect the active uranium industry, which is already regulated by standards issued in 1983. Any reconsideration of those regulations can be carried out independently of this rulemaking, which is in response to the remand of specific ground-water provisions, for Title I sites only, that were considered inadequate by the courts.

Comment 2.1.7 These standards should be developed by negotiated rulemaking between EPA, the affected industry and other interested parties. (I-1)

Response The feasibility of successfully completing a negotiated rulemaking, which has been requested by the industry, is being investigated. We note that, since the industry is not directly affected, the present rulemaking can proceed without prejudicing the regulations for Title II.

Comment 2.1.8 The regulatory analysis does not reflect impacts of the regulation on Indian Tribes or related small entities. (G-6)

Response EPA considered the general impact of these regulations on the Indian Tribes and other small entities. We believe it will be minor. In the example provided by the commenter, if there are farmers who are now using or planning the use of surface or ground waters that could potentially be contaminated by mill tailings, then these uses should be made known to DOE now, so that the cleanup method chosen can accommodate any future needs in a timely manner.

Comment 2.1.9 EPA should include a concepts section describing the major assumptions behind the standards and their applicability. (G-2,G-8)

Response The major assumptions underlying the standards and their applicability were described in the preamble to the proposed standards and have been repeated in the preamble to the final rule.

Comment 2.1.10 The interrelationship between Subparts A, B and C is not clear. (G-2,G-7)

Response The function of each of the subparts is described by its title. Subpart A applies to the permanent disposal of tailings and the prevention of future contamination from the disposed of tailings. Subpart B applies to the cleanup of contamination from the tailings piles that has already occurred. Subpart C contains guidance on implementation of the standards in Subparts A and B and includes specifications for supplemental standards that can be implemented under specified circumstances.

Comment 2.1.11 Parts of the proposed standards and supplementary information are vague, confusing, or ambiguous; both the BID and supplementary information contain errors. (G-1,G-2,G-6,G-7,G-8,P-2, I-4,I-5)

Response EPA has reviewed each specific comment regarding vague, confusing, or ambiguous information and clarified or corrected each point raised where needed. For example, a comment noted the EPA should define ground-water "use." EPA does not categorize water on the basis of use, therefore, use does not need to be defined in these regulations.

Another comment pointed out that organic contaminants have been found at the Grand Junction site. The discussion of organic contaminants in the BID has been expanded to reflect the identification of organic carbon in some ground-water samples at the inactive sites.

Other specific comments on particular sites were reviewed and changes made as needed in the BID to clarify and correct information. Some items, termed "errors" by commenters, simply reflect different sources of data. For example, a comment notes that EPA lists a 1.69 mg/l value for molybdenum in the Environmental Assessment for Riverton, whereas the highest value they could find was 0.9 mg/l. In fact, there are 2 molybdenum concentration values greater than 0.9 mg/l in this Environmental Assessment (1.1 and 3.7 mg/l).

Comment 2.1.12 The proposed standards may be applicable or relevant and appropriate requirements (ARARs) for other DOE programs and, possibly, non-DOE sites containing large volumes of naturally-occurring and accelerator-produced radioactive wastes. The secondary implementation costs associated with this standard due to such ARARs could be very significant and should be at least considered and recognized by the EPA. While other DOE projects have begun to evaluate the technical and budget implications of the proposed standard, no budget impact is available at this time. However, it is estimated that the costs of implementing these standards as ARARs could be in the hundreds of millions of dollars.

In this regard, DOE manages a number of sites that contain low-level radioactive waste as part of its Formerly Utilized Sites Remedial Action Program (FUSRAP) and Surplus Facilities Management Program (SFMP). Since there may be some broad interpretations regarding applicability of the proposed rule for ground-water standards at UMTRA Project sites, DOE requests the inclusion of the ARAR waiver conditions identified in SARA Section 121(d)(4) in the regulations:

> The selected remedial action need not attain the levels or standards of control herein required should one of the following three conditions apply:
>
> - The action is only part of a total remedial action that will attain such levels or standards of control when completed.
> - Compliance with such requirement will result in greater risk to human health and the environment than alternative options.
> - The action will attain an equivalent standard of performance through use of another method or approach. (G-8)

Response EPA considered the above conditions in developing this proposed rule. We concluded that only the second is applicable to these sites. That condition has been incorporated. However, in any case, any DOE sites that are subject to CERCLA/SARA requirements will be eligible for all waiver conditions under SARA, unless otherwise specified in SARA. Regarding the cost implications of use of these standards as ARARs, it is difficult to confirm or refute the estimate given. However, it should be noted that, in general, these standards simply apply general requirements imposed on contamination of ground water from all wastes regulated under RCRA, and that ARARs for ground water would, therefore, be essentially identical independently of these standards.

Section 2.2 Application of Standards

Comment 2.2.1 Differences between Title I and Title II ground-water protection standards should be systematically identified, assessed, and justified. (G-2,I-2)

Response There are several kinds of differences between Title I and Title II ground-water protection standards. In some cases the differences are the result of different conditions present at the Title I sites and are not appropriate to Title II sites, e.g., the conditions under which a liner is required. Other differences include specification of additional MCLs and more explicit guidance on cleanup of existing contamination. The reasons for these differences are discussed in the preamble to the final standard. (See also comment 2.2.3.)

Comment 2.2.2 It should be clearly stated that Title II standards are applicable if Title I and Title II tailings are commingled. (G-1)

Response The standards under Title I apply only to those processing sites listed under Title I or designated by DOE within one year of the promulgation of UMTRCA as Title I sites. Therefore, if tailings from a site listed under Title I are moved to and commingled with tailings at a site licensed under Title II or are reprocessed through a mill at a Title II site, then the standards promulgated under Title II apply to the commingled tailings. EPA is aware of only one site (Riverton, WY) where this is occurring. However, cleanup of any residual ground-water contamination at the Title I site from which the tailings had been removed will still be regulated under the standards promulgated under Title I.

Comment 2.2.3 It is believed that the numerical standards for MCLs will serve as precedents at Title II sites. (I-2)

Response EPA is considering the need to revise the numerical standards under Title II in view of the final standards under Title I. If EPA should propose changes in the Title II regulations, they would be subject to normal rulemaking proceedings. (But see also comment 2.1.7.)

Comment 2.2.4 Completed or substantially completed sites that perform as designed should be "grandfathered". (G-2,G-8)

Response We have not provided any "grandfather" clause for the six disposal actions that are already complete, or almost so (Canonsburg, PA; Salt Lake City, UT; Shiprock, NM; Durango, CO; Tuba City, AZ; and Lakeview, OR). Such a clause would, in any case, be appropriate only for disposal, not restoration. Current indications are that, although the covers on these piles are not quite as sophisticated as later designs, performance is exceeding design expectations at all sites. It appears likely that all of these covers will meet the standards. If not, a variety of remedies are available, including minor upgrading, and ACLs or supplemental standards, if appropriate. In the event that the piles do not perform as seems likely, and none of these remedies is appropriate, modification of the standards can be considered at a future date.

Comment 2.2.5 Applicability of the proposed standards at the more than 6000 vicinity properties should be clarified. (G-2,G-8)

Response In the final standards, we have clarified that vicinity properties are covered by the standards. When, in the view of the NRC, a substantial probability exists that ground-water contamination has occurred, or may occur in the future, the necessary assessments and corrective measures should be applied. It is not intended, however, that the extensive assessment and monitoring provisions appropriate for large quantities of tailings, as at disposal sites,

should be applied when such a substantial probability does not exist. EPA expects the implementing agencies to make these judgements.

Section 2.3 Consistency with other Requirements

Comment 2.3.1 Standards for the reclamation and closure of inactive uranium mill tailings facilities must be consistent with those established for hazardous waste facilities under the Solid Waste Disposal Act (SWDA). (P-1,G-2,I-5)

Response We concur, and believe that these standards are consistent with those established under SWDA, as is required by UMTRCA.

Comment 2.3.2 The proposed standard is inconsistent with SWDA; EPA has determined that regulation of mining wastes under Subtitle C of RCRA is not warranted. (I-4)

Response EPA's decision not to regulate mining wastes under Subtitle C of RCRA does not apply to uranium mill tailings. In making this decision, EPA specifically noted that some mine wastes might qualify for Subtitle C treatment.

This matter was addressed further by Congress in the 1980 amendments to SWDA, which mandated the temporary suspension of regulation under Subtitle C of certain mining wastes. The Conference Report (No. 96-1444) for the SWDA amendments of 1980 specifies that suspension of regulation of uranium mining wastes under Subtitle C is limited to overburden, i.e. regulation of uranium mill tailings under Subtitle C was not suspended. In its decision published on July 3, 1986 (51FR24496), EPA reserved the option of regulating certain hazardous mine wastes under Subtitle C. Since uranium mill tailings wastes are about an order-of-magnitude more hazardous than other radium-bearing wastes, e.g., phosphate mining tailings, EPA decided that they shall be regulated under Subtitle C.

Comment 2.3.3 Remedial actions for ground water must be consistent with state laws and regulations. (G-7)

Response Remedial actions needed to implement the proposed standards are performed by DOE with the full participation of any State that shares the cost (UMTRCA, Sec. 108(a)(1)). This wording indicates an intent to cooperate with States. Decisions regarding consistency with State laws and regulations with respect to the requirements of UMTRCA are the responsibility of DOE.

Comment 2.3.4 DOE must demonstrate compliance with EPA standards at every inactive site by the end of the statutory seven year period; if compliance cannot be demonstrated NRC cannot license the site. (P-1,P-3)

Response The clean-up of contaminated ground water will take longer than the time period Congress originally specified for disposal of the tailings. In recognition of this fact, Congress extended the time period for disposal of the tailings to September 30, 1994 and eliminated the time limit for the cleanup of contaminated ground water (P.L. 100-616, November 5, 1988).

Section 2.4 Roles and Responsibilities

Comment 2.4.1 It is unnecessary and inappropriate under UMTRCA, inconsistent with the Solid Waste Disposal Act and other legislation, contradictory of the Tenth Circuit Court of Appeals decision remanding the Part 192 ground-water regulations, and inconsistent with EPA's UMTRCA Title II standards (which provide for EPA concurrence) for EPA to let DOE, in consultation with NRC, establish site-specific alternate concentration limits (ACLs). Moreover, in Title I unlike Title II, NRC license jurisdiction is not implicated until the post-remedial period, 42 U.S.C. 7914(f)(2). This is a standard-setting function that properly belongs in some form with EPA and should not be delegated. (P-3,G-6,G-7)

Response We considered a number of approaches to the question how to establish an ACL mechanism. These included establishing no ACL mechanism, establishing generic criteria for ACLs, providing for some form of site-specific EPA review or oversight of ACL implementation, and (as in the proposed regulation) providing for no EPA role in setting ACLs at individual sites.

The ACL mechanism in RCRA was added after Congress enacted UMTRCA, requiring that EPA's general UMTRCA standards be consistent, to the maximum extent practicable, with the requirements of the Solid Waste Disposal Act. See Section 206(a) (amending the Atomic Energy Act by adding Section 275). It is speculative for commenters to state what Congress would have intended for EPA's standard-setting role in a context it did not foresee.

Depending on the circumstances presented, EPA's role has taken different forms. EPA (or RCRA-delegated States) administers the RCRA ACL program. The UMTRCA Title II regulations provided for the ACL mechanism to be administered by NRC but reserved a concurrence function for EPA. In the proposed Title I regulations, EPA reserved no concurrence function.

Without reflecting on the merits of other approaches, the proposed approach was neither plainly inappropriate nor unnecessary under UMTRCA or inconsistent with SWDA. Nor did it represent disregard of the Tenth Circuit Court's decision. As to the first point, this Federally-administered remediation program at relatively few sites is an open process to which a different approach than that taken in the Title II regulations could be appropriate. Second, the UMTRCA mandate to be consistent with the SWDA where practicable would not be violated. Since NRC is the concurring agency, it is plainly impracticable and undesirable for EPA to administer the UMTRCA-ACL program as if it were the RCRA-ACL program. Third, the proposed ACL

mechanism was consistent with the Tenth Circuit Court's mandate: these proposed standards would establish the numerical standards required by the court, and the ACL mechanism mirrored to a substantial degree an existing Title II mechanism in order to provide for a reasonable degree of flexibility. There was, finally, no question here of "delegation" of an EPA function to another agency but rather a question of how EPA may best carry out its functions.

It is true that Title I differs from Title II in that in Title I NRC licensing functions are not implicated until the post-remedial phase. (NRC's consultative function under Section 108, however, tracks DOE's remediation.) But the existence or not of NRC licensing jurisdiction does not answer the question how EPA may best carry out its UMTRCA functions regarding ACLs or, for that matter, anything else.

EPA has considered that question--how best to carry out its function here--in light of the comments received urging that, if ACLs are used, EPA retain some form of concurrence role. It has considered this matter in the context of NRC's present role in administering, with EPA concurrence, ACLs at Title II sites. We have, on reconsideration, decided that, in view of the Tenth Circuit Court's remand "...to treat these toxic chemicals that pose a ground water risk as it did in the active mill site regulations", to adopt the same mechanism for concurrence on ACLs as was used in Title II. In practice, EPA will use the same procedures for its concurrence with ACLs as it does for the Title II sites.

Comment 2.4.2 NRC staff lacks an adequate reservoir of technical expertise in areas critical to evaluating proposed ACLs. (G-6)

Response Regulatory agencies such as NRC are responsible for protecting the public health and environment from a variety of hazards. NRC already deals with many aspects of ground-water analysis. However, such agencies are often faced with technical questions they cannot resolve without outside assistance and that require them to exercise one of several options to fulfill their responsibilities. They can hire experts, contract with expert consultants, or obtain the assistance of other Federal agencies with expertise in the field. The Agency is confident that NRC has ample experience in such matters and will use any and all of these options as needed to fulfill their responsibilities. In particular, EPA will provide necessary general guidance on ACL matters to NRC, and will, when the ACL involves ground water beyond the site boundary, exercise its concurrence role.

Comment 2.4.3 It is not clear if an NRC license to DOE can include conditions pertaining to off-site ground-water contamination. (G-6)

Response Regardless of the mechanism NRC choses to use to concur with DOE's actions, DOE is required under UMTRCA (Section 101(6)(B)) to conduct remedial actions at Title I sites including cleanup of the environmental consequences of the tailings that have been dispersed prior to disposal (Section 108(a)(1)). This includes cleanup of

ground water off site that is contaminated as a consequence of the tailings pile.

Comment 2.4.4 A general license, which we understand NRC staff is considering at this time, is not compatible with site-specific analyses in support of ACLs. (G-6)

Response NRC is considering issuing a general license for the 24 sites to DOE when the disposal of tailings is complete. The general license will detail the requirements that DOE must apply to each site. If the general license does not accommodate all site-specific situations, then NRC may have to issue short addenda to the general license. These administrative procedures are the responsibility of NRC. In addition, however, they are responsible for concurring in several site specific determinations as required in sections 103, 104, 105 and 108 of UMTRCA. The Agency believes that these requirements and the requirements of the ground-water regulation assures that each site will receive individual consideration.

Comment 2.4.5 Does NRC provide an opportunity for public comment or input in its concurrence process? (G-2,G-6)

Response NRC is planning to hold informational meetings near the sites before they concur with DOE's surveillance and maintenance plans. These meetings will provide an opportunity for the public to express their concerns. NRC indicates that, even without these meetings, if the public has concerns and expresses them to NRC, NRC will respond.

Comment 2.4.6 What are the respective roles and responsibilities of NRC and DOE in the licensing process? (P-3,G-2,G-6)

Response DOE is responsible for remediating the mill site, cleaning up excess contamination, and submitting plans and reports to NRC for concurrence (sections 102, 108 of UMTRCA). NRC is responsible for assuring that EPA's regulations are satisfied through concurrence with DOE remediation and issuance of a license for the site when completed (sections 104, 105 of UMTRCA).

Comment 2.4.7 None of the substantive or procedural provisions of the proposed standards acknowledge the state's participation at crucial stages in the decision-making process. (G-7)

Response The extent of State participation is outlined in UMTRCA, and DOE and NRC have included the States in their procedures. It is, therefore, unnecessary to restate the extent of State participation in these regulations establishing standards and criteria.

Comment 2.4.8 When Indian lands are involved, there must be consultation with the affected Indian Tribes and the Secretary of the Interior. (G-6)

Response The commenter is correct. UMTRCA requires the DOE to consult with affected Indian Tribes and the Secretary of the Interior. However, it is not necessary to repeat these requirements in these ground-water regulations.

Comment 2.4.9 The clarification of the respective authorities and responsibilities under UMTRCA regarding issuance of ACLs as presented in these standards is appropriate and consistent with Congressional intent. (I-5)

Response No response required.

Section 2.5 Institutional Controls

Comment 2.5.1 Few, if any, state or tribal jurisdictions have the authority or the capability to enforce institutional controls over land use such as EPA suggests. Also, in most western states existing water law does not allow restriction of use based on water quality. (G-6,G-7,G-8)

Response The Agency recognizes that use of some institutional controls may be difficult, given limited enforcement capabilities. Institutional controls other than State and tribal restrictions on use of ground water are available. A variety of institutional controls is considered in the BID. A subjective ranking of these controls is made and discussed.

The most reliable institutional control is temporary or permanent ownership of land at the tailings disposal sites by the State or Federal government. In most cases, the contaminated ground-water plumes will be closely adjacent to disposal sites. States and tribes may wish to consider amending their water laws to provide for such controls, especially if the costs and benefits make use of such controls a sensible and practical course of action.

Comment 2.5.2 EPA should not consider use of institutional controls or land-use restrictions for ground-water protection at inactive sites; such controls are unreliable and inconsistent with UMTRCA. (P-3,P-4,G-6,G-8)

Response The institutional controls contemplated would be carried out under the jurisdiction of DOE and NRC under the legislative mandate of UMTRCA.

UMTRCA requires that the tailings be remediated "...in a safe and environmentally sound manner and to minimize or eliminate radiation health hazards to the public." (UMTRCA, Sec. 2(b)(1)). We believe that this requirement can by satisfied under the provisions of these rules. UMTRCA clearly supports use of institutional control in a

number of situations: e.g., permanent retention of processing sites by the United States government (Sec. 104(e)(1)(B) and Sec. 106) or by State government (Sec. 104(b)(1)) and by permanent notice in local land records (Sec. 104(d)).

Comment 2.5.3 Institutional controls such as deed restrictions are notices, not prohibitions, unless there is a mechanism for enforcement. (G-7)

Response The final rule states that institutional controls must be effective over the entire time they would be in use and that deed requirements would have to be enforced by permanent government entities. If the institutional control cannot be enforced, then that control could not be used.

Section 3 TECHNICAL ASPECTS

Section 3.1 Ground-water Standards

Comment 3.1.1 The standards must provide for nondegradation of beneficial uses to protect the environment as well as public health and must regulate nonhazardous as well as hazardous substances. (P-3,G-6,G-7,G-8)

Response We believe that these final regulations provide for nondegradation of beneficial use, as well as protective of the environment and public health. The Act does not require standards to regulate nonhazardous substances.

Comment 3.1.2 Additional flexibility is needed in the classification of ground waters. (G-2,G-8,I-4)

Response It is the policy of EPA to maintain a single classification of ground water in its regulations to the maximum extent possible. Low quality Class II ground water may still be needed in the future, regardless of whether other sources are available or not. In the Western States, where ground water is scarce in many areas, waters with total dissolved solids between 3,000 and 10,000 mg/l will be useful as drinking water or for other purposes. In any case, we believe that the supplementary standards incorporated in this rule provide enough flexibility to accommodate any problem site that the DOE remediates.

Comment 3.1.3 The regulations should allow alternate methods for estimating background water quality. (I-5)

Response EPA agrees that water upgradient of a site may not always be representative of a site, therefore we have modified the standard to require a monitoring program adequate to determine the background

levels at a disposal site and have left it up to DOE with NRC concurrence to determine the details of the monitoring program.

Comment 3.1.4 The ground-water data in the BID is based on site summaries, not detailed reports, and contains unsupported conclusions. (G-7)

Response While it is true that the BID contains summaries of the detailed reports, the original reports, which included site characterization studies, remedial action plans, environmental impact statements, and environmental assessment reports, were considered in developing the BID. The purpose of this document is to provide a summary of the information that the Agency considered in developing the standards. The document is not intended to be used for making decisions regarding ground-water protection at specific sites.

Comment 3.1.5 Pre-existing ground water at Tuba City was probably "Class 1". (G-6)

Response The statement referred to by this comment was based on the best information available to EPA at the time of proposal, which was that this water was Class II. The final evaluation of ground water at each of these sites will be made by DOE and must be concurred in by the NRC. In either case, the standards require restoration to satisfy the provisions of § 192.02(a)(3).

Comment 3.1.6 At the present rate of growth the Navajo Nation anticipates a need for the contaminated ground waters at the inactive mill sites within 25 to 50 years. (P-4,G-4,G-9)

Response This information should be communicated to DOE and, under these regulations, will have to be considered when cleanup of the ground water at each of the sites on Navajo Nation lands is carried out.

Comment 3.1.7 Natural concentrations of nitrates are elevated in parts of the Western United States; therefore, it cannot be assumed that all elevated nitrate levels in the vicinity of uranium tailings sites result from tailings seepage. (I-5)

Response EPA is aware that the levels of many of the contaminants may be naturally elevated in the Western United States. This is why the regulations require a monitoring program adequate to determine the background concentrations of listed contaminants.

Comment 3.1.8 It is difficult to measure gross-alpha activity in water with TDS concentrations over 500 mg/l; most uranium mill tailings facilities are located in areas with TDS concentrations over 500 mg/l. (I-5)

Response EPA recognizes that it is difficult to measure gross-alpha activity in high TDS waters; however, it is not technically impracticable. Methods do exist for the measurement of gross-alpha activity in high TDS waters, the simplest of which is diluting the water with distilled water and measuring an aliquot of the sample for the gross-alpha activity.

Comment 3.1.9 Generic criteria and guidance for establishing ACLs at UMTRA project sites should recognize that the remediation at these sites envisions low maintenance and assured integrity for 1000 years. (G-8)

Response The commenter is correct. The proposed rules provide that ACLs may be used instead of MCLs at the point of compliance where data provided by DOE support a finding that the presence of a constituent at the proposed ACL would not pose a present or potential hazard to human health or the environment. This determination must be made for the period over which the disposal is designed to last, i.e., approval of ACLs at Title I sites depends on reasonable assurance of conformance (with no planned reliance on maintenance) to the criteria for ACLs for at least 200 and, to the extent practicable, 1000 years.

Comment 3.1.10 The proposed standards are so strict that ACLs will be needed for every site, and it may not be possible to achieve consensus between concerned or affected parties on ACLs, thus delaying remedial actions. (G-8)

Response As much as EPA would like remedial actions to be carried out expeditiously, its main concern is to protect human health and the environment. However, the requirements for ACLs in these standards may be easily satisfied under circumstances where the opportunity for hazard to human health or the environment is minor. (See comment 3.2.1)

Comment 3.1.11 Some states with RCRA permitting authority may have a nondegradation standard that would preclude use of ACLs. (G-8)

Response RCRA permitting authority does not apply to these regulations under UMTRCA. The decision to conform to such a State standard is at DOE's discretion; DOE may apply ACLs, if NRC concurs.

Comment 3.1.12 The definition of ground water should not include the seepage "bulb" or "mound" beneath the tailings pile. EPA should adopt the NRC definition of "aquifer". (G-2,I-4,I-5)

Response If the seepage bulb or mound is not hydraulically connected to an aquifer, then it will normally be classified as Class III (TDS greater than 10,000 mg/l or insufficient volume to support a family) or an ACL may be applied for at the point of compliance. If the seepage bulb is connected to an aquifer, then it should normally be cleaned up.

Ground water is defined in the standards, therefore EPA did not find it necessary to define an aquifer.

Section 3.2 Point of Compliance (POC)

Comment 3.2.1 Clarification is needed concerning application of the RCRA regulation on POCs to UMTRA Project sites to reconcile RCRA intent with UMTRA Project longevity objectives. Location of the POC should recognize the specific design differences between RCRA and UMTRA Project facilities. (G-8)

Response We concur. These designs, unlike those required for RCRA, must accommodate the need for radon control and function over extremely long periods of time. Small amounts of seepage that do not affect any POE more than a few hundred feet from a pile, as long as this is part of the property over which governmental control is exercised in perpetuity, should provide adequate protection of health and the environment in all but exceptional cases. Application of an alternate concentration level in such cases would be appropriate.

Comment 3.2.2 The POC provision in Part B will require a complete description of the contaminant plumes, this will assist in the cleanup of chemical pollutants. (G-3)

Response No response required.

Comment 3.2.3 It may be unrealistic to meet ground-water quality standards at the downgradient uppermost aquifer beneath the toe of the pile. Some distance from pile edge is required before mixing, dispersion, and attenuation reduce concentrations to below proposed limits. (G-7,G-8,I-4,I-5)

Response See the response to comment 3.2.1.

Comment 3.2.4 The POC should be defined at some distance downgradient from the edge of the pile and should include the intervening geology as part of the waste management area. A rational alternative is to allow NRC and DOE to make the POC the boundary of the property that will be transferred to government ownership and licensed by NRC in perpetuity. (G-2,G-7,G-8,I-2,I-4,I-5)

Response To maintain consistency with RCRA, these regulations require that the POC be at the edge of the disposed of tailings. However, NRC may allow DOE to place additional wells for monitoring contamination of the ground water from tailings at any point as long as they are satisfied that DOE can demonstrate that they are complying with the standards at the point of compliance. See the response to comment 3.2.1.

Comment 3.2.5 The POC should be concurred in by the State. (G-7)

Response Under UMTRCA, States do not have a concurrence role. However, a State that pays part of the cost of remediation may "participate fully" in the selection and performance of the remedial action (UMTRCA Section 108(a)(1)). The precise interpretation of this language is not a subject of this regulation.

Section 3.3 Remediation Period

Comment 3.3.1 The proposed period of 100 years for natural restoration is inconsistent with the intent of UMTRCA and the requirements of SWDA and is not supported by analysis. (P-1,G-2,G-6,G-7,I-4)

Response We believe an extended period for natural restoration of 100 years is consistent with the intent of both UMTRCA and SWDA. UMTRCA's intent is that the cleanup be permanent, not that it necessarily be concluded as fast as possible. The period selected is the shortest period that is of significant use for natural restoration of ground water and the longest period that EPA feels that institutional provisions should be relied upon to protect human health and the environment.

Comment 3.3.2 Suggestions that a few years or decades may be adequate to demonstrate natural restoration of water quality is not supported by technical analysis. (G-2,G-6)

Response A number of technical analyses have supported the usefulness of natural flushing processes. At several sites removal of contamination by natural flushing of an aquifer has been estimated to require a number of decades. The DOE estimates that, at the Rifle, Colorado, sites, natural processes at the Old Rifle site could restore contaminant levels in the alluvial aquifer to background levels in a minimum of two years following disposal of the tailings. DOE also estimates that natural flushing would restore the aquifers at 3 or 4 additional sites to compliance with the standards in less than 100 years.

Comment 3.3.3 Any extended remedial period and concurrent institutional controls should be limited to a 20 to 30 year period with possible extensions. (G-7)

Response Limiting the extended remedial period to such short times would serve only a limited purpose. Although the choice between 30 and 100 years is admittedly somewhat arbitrary, the commenter does not present a basis for the shorter period. With the possibility of extensions, the difference becomes even less and would be open-ended. EPA believes that institutional controls cannot be applied reliably for indefinite periods.

Comment 3.3.4 EPA should be cautious in the regulatory use of models and provide procedures and safeguards to ensure proper use of modeling in decision-making. The development of ground-water modeling as a predictive tool is still in its infancy. Also, modeling can be abused, either deliberately or inadvertently. A minimum set of criteria that all models must comply with should be specified. (G-7)

Response The comment is well taken. However, under UMTRCA the standards that must be met by DOE are set by EPA; the implementation and application of those standards, including the validity of any models proposed for use, must be concurred in by NRC. We do not believe that it is appropriate to specify criteria for models in the standards, in part because of the factors raised by the commenter. In any case, the regulations require some monitoring to verify the accuracy of model predictions.

Comment 3.3.5 If modeling is used, participating states and tribes should be given full access to the model and its documentation and their concurrence should be required before recommendations based on modeling are implemented at a site. (G-7)

Response This matter should be addressed to the NRC, since they must concur in the models used by DOE.

Section 3.4 Monitoring

Comment 3.4.1 Long-term, continual ground-water monitoring is needed and should be required at all sites until it is demonstrated that safe levels of contaminants have been achieved. (G-2,G-3,G-7)

Response Long-term ground-water monitoring is required by these regulations for a period sufficient to demonstrate compliance and the adequacy of assumptions. The actual time will be decided by DOE and NRC after considering site-specific data.

Comment 3.4.2 The regulations should specify a minimum acceptable monitoring period as well as parameters for setting this period. (G-7)

Response We disagree. The minimum acceptable monitoring period should be determined by assessing site-specific parameters. This period will be proposed by DOE and must be concurred in by NRC. EPA feels that these government agencies are capable of determining the proper monitoring period (see previous comment).

Comment 3.4.3 Upgradient monitoring may not always be capable of providing the desired background water quality information. (G-2,I-5)

Response The standards have been modified to simply require a monitoring program adequate to establish background water quality, since upgradient monitoring cannot always provide the required background water quality information. This will allow DOE to use

crossgradient or other monitoring locations when necessary. (See comment 3.1.3)

Comment 3.4.4 What provisions are there in the event that unanticipated events occur or new information develops after licensing? (G-2)

Response Should such an event occur at a remediated site in the future, whatever agency controls the site would have to resolve the problem with the concurrence of the licensing agency, under provisions of Section 104(f)(2) of UMTRCA.

Comment 3.4.5 Mechanisms for monitoring, assessment, and corrective action must be a continuing program responsibility shared by DOE and States. (G-7)

Response These regulations require DOE to establish a monitoring program during the disposal period, any extended remedial period, and, for a specified site-specific period of time (comparable in purpose to the 30-year period required under Title II) in the post-disposal period. It is therefore conceivable that some of these sites could be monitored for well over 100 years. If, during this time period, additional maintenance or remediation is required, it would be the responsibility of DOE to see that such remediation or maintenance is performed. Following the post-disposal period, if the State has opted to retain ownership of the site, it would be responsible for its continued maintenance. Should the site remain under Federal ownership, the Federal agency involved would retain responsibility for its continued maintenance.

Section 3.5 Pile and Liner Design

Comment 3.5.1 The different philosophical approaches to design and containment of wastes under RCRA and UMTRCA have led to conflicting and mutually inconsistent requirements with respect to both ensuring longevity and meeting ground-water protection requirements. It is questionable that the current disposal cell design, based on longevity and radon reduction requirements, can be engineered to meet proposed ground-water protection standards. (G-8)

Response The regulations provide mechanisms, such as ACLs and supplemental standards, to accommodate those cases where design for radon reduction and design for protection of ground water conflict.

Comment 3.5.2 Modification of cover design and construction methods is necessary; given the present cover design, it appears certain that water will infiltrate and drain from the tailings on a continual basis. (G-6,G-7,G-8)

Response DOE expects, and preliminary studies seem to confirm, that the covers are exceeding their design specifications and will operate

in an unsaturated condition. In this situation, minor amounts of water will seep through the tailings in the 1000-year life of the remediation. The regulations provide a mechanism to allow for the ground water standards to be exceeded to a limited degree, when it is not reasonably avoidable, very close to the disposal area by allowing NRC to grant alternate concentration limits (ACL), if it can be shown that human health and the environment will remain adequately protected. This process will allow, when necessary, for minor design drainage of leachate following stabilization of a pile.

Comment 3.5.3 The final disposal design should possess the most impermeable cover reasonably achievable coupled with an engineered geochemical attenuation system beneath or downgradient of the tailings. (G-6,G-7,G-8)

Response We anticipate that these standards constituted such a requirement, with respect to cover design. However, actual disposal designs are not the direct subject of this rulemaking; the condition of ground water is. The DOE is responsible for developing final disposal designs that will satisfy the requirements of the existing standards under 40 CFR 192, as well as those promulgated here.

Comment 3.5.4 The rock cover on the stabilized tailings will act as a one-way valve, allowing infiltration but not evaporation. Since the pile covers will be unvegetated there will be no water loss through transpiration. These factors will lead to sustained generation of leachate from the disposal cells. (G-6,G-7)

Response Designs for radon protection and minimizing leachate formation are possible. Because these designs must be developed on a site-specific basis, EPA believes that incorporating cover design standards into the regulations would only restrict DOE's flexibility and is not in the best interests of the program.

Comment 3.5.5 Rodents could burrow through the top liners at disposal sites, bringing some of the radioactive tailings to the surface and allowing surface water contamination. (G-3)

Response This problem has been studied in the past (1,2) and has been found to be avoidable. Where rodents are a problem, DOE can take this into consideration when they design the cover of the pile.

Section 4 RISK ASSESSMENT

Section 4.1 Molybdenum Concentration Limit

Comment 4.1.1 The molybdenum concentration limit should be based on background uses and class of the ground water, not on drinking water standards. The proposed standards will result in use of ACLs at the majority of the disposal sites; this is unreasonable. (G-1)

Response The standards provide for a supplementary standard when the ground water is not potable and otherwise not of use. Any other water must be considered as potentially useful as drinking water and would have to meet the drinking water standards. EPA does not consider it unreasonable to assure, as required by the conditions for ACLs, that public health and the environment will be protected wherever the basic standards are not met.

Comment 4.1.2 The human toxicology base was considered inadequate by EPA for setting a general drinking water standard for molybdenum. (P-2,I-4,I-5)

Response The human toxicology base is adequate enough, however, to establish that cattle are more sensitive to molybdenum toxicity than are humans. The standard was chosen at a level that will protect cattle from developing molybdenosis and will not prove toxic to humans. Except for a few localized types of situations (of which uranium mill tailings piles is one), molybdenum is not a problem in drinking water. Therefore, EPA is not contemplating establishing an MCL for molybdenum under the Safe Drinking Water Act.

Comment 4.1.3 The proposed standard of 0.1 mg/l for molybdenum is unnecessarily conservative; a standard under 0.2 mg/l is not justified. (G-6,I-2,I-4,I-5)

Response The above comment is based on data from human studies. As noted above, the EPA standard also the prevents molybdenosis in cattle.

Comment 4.1.4 If standards for molybdenum levels are to be provided, there should be an analysis made of the forms of molybdenum involved at the sites and the possible effects reductions in molybdenum levels at the site may have on metabolically related nutrients. (P-2)

Response The information considered by the Agency in establishing the standard for molybdenum took into account the forms of molybdenum and its relationship with related nutrients to the extent such considerations were pertinent and data were available.

Comment 4.1.5 No risk assessment was made on the need for a molybdenum standard for the protection of livestock. (I-5,P-2)

Response As indicated in the BID, the molybdenum standard is based on the level in water that will protect cattle and humans from toxic effects and corresponds to provisional adjusted acceptable daily intake (AADI) for drinking water developed by EPA under the Safe Drinking Water Act (50 FR 46958). Since the AADI is set at a level that is protective of human health, no further risk assessment is appropriate.

Section 4.2 Uranium Concentration Limits

Comment 4.2.1 The limit for combined uranium-234 and uranium-238 is not scientifically supportable; the uranium standard is based on faulty weighting factors, risk estimates, and dose equivalents and is extremely conservative. (G-6,I-5)

Response The EPA has revisited the uranium standard and has concluded that it should also consider chemical toxicity of uranium as well as the cost implications of achieving (for uranium) the risk level of the current radium standard.

EPA is in the process of examining these factors, but will not reach a decision on the MCL before this standard is promulgated. However, the standard-setting process has proceeded far enough to assure that the MCL for uranium in drinking water will be close to the limit that was proposed and is promulgated in this regulation. Should the MCL as finally promulgated be different from the limit in this regulation, EPA will reconsider the limit at that time.

Comment 4.2.2 A uranium standard on the order of 0.1 mg/l would be adequately protective of public health and the environment. (G-6,G-7,I-2)

Response EPA has revisited the uranium standard, and concluded that, based on available information, a standard of 30 pCi/liter is required to adequately protect human health and the environment. The basis for this decision is provided in the Notice of Final Rulemaking.

Comment 4.2.3 Although the general method used by EPA in assessing the health effects of uranium is that of the ICRP, the assessment differs from that followed by ICRP in several details. (P-2)

Response This comment refers to an advanced notice of proposed rulemaking on drinking water standards (51 FR 34836). It has no direct relevance to the standard being discussed here.

Comment 4.2.4 EPA uses the ICRP nonstochastic annual limit on intake (ALI), not the stochastic ALI which is more protective, yet the limit is for a stochastic risk. (I-5)

Response EPA used the ICRP nonstochastic ALI in error; substitution of the correct ALI results in a value of 23 pCi/l. This value, however, does not include consideration of cost. The final standard is within the range being considered by EPA for an MCL for drinking water.

Comment 4.2.5 Use of the term "urinary tract" to describe what is presumably dose only to the kidney is confusing; if EPA's weighting factor includes both kidney and bladder, then the risk assessment may be too conservative. (P-2)

Response This comment must have been addressed to risk assessments performed for another rulemaking because we did not use the term "urinary tract" in this rule.

Comment 4.2.6 The uranium risk assessment methods used were simple screening methods with high built-in conservatism; this is not appropriate where the results can lead to high economic costs unjustified by the health risks. More comprehensive analyses should be made using better data to obtain a more realistic picture of the risk. (P-2)

Response This comment addresses risks published in a rulemaking on drinking water standards and has no relationship or relevance to this rulemaking.

Section 4.3 Risk Analysis

Comment 4.3.1 EPA should prepare a health and environmental benefits analysis to support the proposed standards. (G-8,I-1)

Response The legislative charge under Title I does not envisage balancing of costs and benefits. Rather, EPA is charged to issue standards that conform, to the maximum extent practicable, to the kind of protection and clean up of ground water required under RCRA regulations.

Comment 4.3.2 Lack of a satisfactory risk assessment poses interpretation problems in judging the reasonableness of certain actions. (G-8)

Response See the previous comment.

Comment 4.3.3 Non human health issues at the Title I sites, particularly potential impacts on agriculture, are not adequately addressed. (G-6)

Response Cleanup of contaminated ground water to these standards should protect agricultural uses. Other beneficial uses of the ground water must be addressed before ACLs or supplemental standards can be granted by the NRC. This should also assure adequate protection of agricultural uses of ground water.

Comment 4.3.4 Most of the contaminants found in uranium mill tailings piles occur naturally in undisturbed water and soils near the tailing sites and do not include many of the organics and contaminants regulated under RCRA. (G-6,G-7,I-5)

Response EPA realizes that many of the contaminants listed in RCRA regulations are not found at most inactive uranium mill tailings sites. However, some of these compounds have, unexpectedly, been

found at some sites. If DOE can show that they are not present at a site, then they will not have to be considered further.

Comment 4.3.5 The regulatory assessment in support of the ground-water standards should include an estimate of the probability of exposure and an assessment of the risk associated with various levels of exposure. (P-2,G-1,I-4,I-5)

Response The background information does not contain a probabilistic assessment of exposure, because to attempt to estimate how many people over the indefinite future will use the water from a contaminated aquifer is virtually impossible. See also comment 4.3.6.

Comment 4.3.6 Only 5 of the 12 UMTRA sites discussed in the BID have any current or potential use of the aquifer; the level of ground-water protection should be based on current and potential uses of the local aquifers. (P-2)

Response It is national policy to protect ground water independent of current use.

Section 5 ECONOMIC ANALYSIS

Section 5.1 Cost Analysis

Comment 5.1.1 The statement that costs are not to be considered in the decision to restore contaminated ground water (i.e., practical vs practicable) appears to be contradicted where the supplemental standards reference the concept of technically impracticable. (G-8)

Response The distinction between "practical" and "practicable" was introduced precisely to clarify the meaning of technically impracticable. To repeat: practical implies specifically balancing costs and benefits, i.e., not spending more than the value of the benefit obtained. By contrast, practicable means "able to be put into practice." Costs, if a consideration, would enter only on the basis of availability of funds.

Comment 5.1.2 Design and construction cost impacts for Subpart A have not been estimated as the proposed standards will require a unique technical approach for each disposal site. (G-8)

Response The comment is correct.

Comment 5.1.3 The proposed standards may serve as precedent for other radioactive waste cleanup projects; this cost should be considered. (G-8)

Response See comment 2.1.12. EPA recognizes that there may be additional costs if these standards are used as precedent for other radioactive waste cleanup projects. However, these costs can be assessed at the time these standards are considered for use in other projects.

Section 5.2 Benefit-Cost Analysis

Comment 5.2.1 EPA should assess whether costs of the proposed regulations bear a reasonable relationship to the benefits as UMTRCA requires. Limited waste cleanup funds should be expended at sites having relatively high impacts on human health and the environment. (P-2,G-7,G-8,I-4)

Response See the responses to comments 4.3.1 and 4.3.6.

Comment 5.2.2 There is no experience in estimating environmental harm that is long-term, manifest, and grossly disproportionate to anticipated health benefits. The record should indicate that cost/benefit analysis can be used as a tool to determine if the possible environmental harm is grossly disproportionate to the health benefits. (G-8)

Response Cost/benefit analysis is a tool for balancing comparable costs and benefits. The reference to "grossly disproportionate" is intended to preclude such finely drawn balances.

Comment 5.2.3 By the definition of "technically impracticable from an engineering perspective," EPA has precluded the use of benefit-cost analyses in assessing potential health effects from these sites. However, the discussion on implementation stresses providing "the maximum reasonable protection"; use of the word "reasonable" seems to imply some kind of benefit-cost analysis. (G-8,P-2,I-4)

Response The definition of "technically impracticable from an engineering perspective" does preclude the use of cost-benefit analyses of potential health effects from contaminated ground water for establishing the level of cleanup at these sites.

The concepts of "reasonable" (implying a cost-benefit balancing) and "technically impracticable from an engineering perspective" are incorrectly linked and compared in this comment. The goal of the standards is to provide protection for public health and the environment. By describing this goal as "maximum reasonable protection" in the discussion of the proposed standards, the Agency adopted a broad view of "reasonable," not a limited technical view of balancing costs and benefits.

Comment 5.2.4 Cost and benefit considerations should be included in the final standards. The concept of unreasonably high costs in relation to benefits should be explicitly identified as relevant to

the decision that supplemental standards are warranted because of technical impracticability. (G-8,I-4)

Response There are several reasons for not performing a cost-benefit analysis to determine the degree of cleanup appropriate for contaminated ground water. First, the benefit is difficult to quantify. The use of ground water from any particular aquifer is unpredictable, especially over long periods of time.

Second, the intent of Congress in providing the similar provision in CERCLA (§ 121(d)(4)(C)) was not to permit balancing of costs and benefits. The same section only provides for consideration of cost when Superfund would be unreasonably depleted, resulting in greater threat to public health and the environment elsewhere.

Finally, technical impracticability means that something is not capable of being performed, as discussed in supplementary information to the proposed rule (52 FR 36000). Thus, cost is not an explicit factor in considering impracticability.

Comment 5.2.5 Until both public health benefits and actual costs of remedial actions can be estimated with greater confidence, cleanup costs should not be discounted. (P-2)

Response Cleanup costs are discounted to take into account the time value of money, reflecting the likelihood that today's dollar is worth more than a dollar will be worth 10 or 20 years from now. Public health benefits are not discounted, because health benefits do not behave like monetary costs, as a function of time.

References

(1) Cline, J.F., F.G. Burton, D.A. Cataldo, W.E. Skiens, and K.A. Gano. Long-term Biobarriers to Plant and Animal Intrusions of Uranium Tailings, PNL-4340. U.S. Department of Energy, Pacific Northwest Laboratory, Richland, Washington 99352 (September 1982).

(2) Gano, K.A., J.B. States. Habitat Requirements and Burrowing Depths of Rodents in Relation to Shallow Waste Burial Sites, PNL-4140. U.S. Department of Energy, Pacific Northwest Laboratory, Richland, Washington 99352 (May 1982).

APPENDIX B - LIST OF COMMENTERS

Comment No.	Commenter	Date Docketed
	Organizations and Individuals	
P-1	Environmental Defense Fund	01-29-88
P-2	Dr. L. D. Hamilton; Brookhaven National Laboratory	01-29-88
P-3	Southwest Research and Information Center	01-29-88
P-4	Tuba City Citizens Committee for Uranium Radiation Control	02-11-88
	Government Agencies	
G-1	Wyoming Department of Environmental Quality	10-26-87
G-2	Nuclear Regulatory Commission	01-29-88
G-3	Department of the Interior	12-18-87
G-4	DOI - Bureau of Indian Affairs	01-13-88
G-5	Texas Department of Health	01-21-88
G-6	The Hopi Tribe	01-27-88
G-7	Colorado Department of Health	01-29-88
G-8	Department of Energy	01-29-88
G-9	Navajo Nation Department of Justice	02-01-88
	Industry	
I-1	Foote Mineral Company	10-26-87
I-2	Cotter Corporation	10-26-87
I-3	Pathfinder Mines Corporation	11-04-87
I-4	Kerr-McGee Chemical Corporation	01-25-88
I-5	American Mining Congress	01-29-88

APPENDIX A - QUESTIONS

Question 1. Should a liner requirement always be imposed on tailings piles that are moved to a new location? Should a liner be required only if the DOE or the NRC conclude that it is needed to satisfy the ground-water standards for disposal?

Responses to this ranged from "A liner requirement should be imposed on all tailings piles moved to a new location. This is the least that can be done to partially assure that future generations (in the next 1000 years) will not be faced with the same uranium tailings problems which we are now attempting to resolve." to "A liner in the true sense of the word requires leachate collection and treatment... This is not consistent with the specific congressional intent of a zero to minimal maintenance requirement for the inactive uranium sites." (G-4)(G-7)

Other views included:

- A mandatory liner requirement at all new locations, consistent with requirements for Title II sites. (P-3)

- The liner requirement should be a rebuttable presumption; the concern is that DOE or NRC should have an affirmative obligation to perform a rigorous geohydrologic analysis to demonstrate that leachate from the tailings would not have a detrimental impact on potential beneficial uses of a ground water during a period of 200 to 1000 years. A waiver on the liner requirement from EPA should be required. (G-9)

- Liners should be required at new locations unless DOE could present evidence that a liner is not required. (G-6)

- EPA has given no rationale for treating DOE less stringently than it treats private hazardous materials facilities' owners and operators or the operators of active uranium mill tailings piles and, therefore, EPA's standards must impose a liner requirement for consistency. An alternative would be to waive the liner requirement at those sites where the tailings are completely dry and DOE could demonstrate that during both wet cycles and maximum flood events the tailings would remain dry without a liner. (P-1)

- The need for a liner should be evaluated on a site-by-site basis. (G-1)(G-2)(G-5)(G-7)(G-8)(I-4)(I-5)

  Liners are relied upon (under SWDA) to prevent significant releases of hazardous constituents only during operations rather than the long-term for which the proposed standards are intended to apply. DOE and NRC should be allowed to exercise site-specific judgement in designing and approving ground-water protective measures at disposal sites. (G-2)(I-5)

  The long-term performance of a disposal cell will usually be governed entirely by the cap, not the liner. (I-4)

If a bottom liner is installed without an underdrain the disposal cell would become saturated, leading to the "bathtub" effect. EPA should require that the final disposal design possess the most impermeable cover possible (a maximum of 1×10^{-7} cm/s), coupled with a geochemical attenuation system beneath the tailings or immediately downgradient of the disposal cell as an alternative to the liner requirement. (G-7)

The low permeability covers placed on UMTRA Project tailings piles inhibit infiltration and are the primary seepage control mechanism. Where necessary, DOE, with NRC concurrence, will consider the use of a liner or a geochemical barrier at the base of the pile in addition to a low-permeability cover as a possible way to satisfy ground-water standards. The need for natural liners must be evaluated on a site-specific basis considering the depth to the water table, permeability of the foundation materials, quality of the water below the tailings pile, and the rate and amount of infiltration through the cover system. Since the UMTRA Project must design for 1000 years, and the longevity of synthetic liners has not been sufficiently demonstrated, liner selection is limited to natural materials. The layered, multi-material cover system is designed for radon attenuation and low permeability.

It was also suggested that if a tailings pile is to be relocated, the following could also be done: construct a low-permeability, geochemical layer at the base of the pile; promote flushing of the tailings; or utilize above-ground disposal. None of these concepts provide an assurance of long-term effectiveness but these, and others that may be identified, will continue to be evaluated on a case-by-case basis. (G-8)

Response:

As noted by some commenters, the absence or presence of a liner does not by itself assure the longevity of disposal and ground-water protection. We believe that EPA's proposal, that a liner not be required when water retained in tailings piles is not a problem, is consistent with the Title II requirement, because tailings at active sites may contain large amounts of water and therefore require a liner, while tailings at most inactive sites no longer contain excess water. Requiring a liner at all tailings piles moved to a new location is not the best solution. A liner that is less permeable than the cover may cause water to pool in the tailings, eventually spilling over the edge of the liner or leaking through the liner with higher levels of contamination (from longer contact with the tailings) than if no liner were present.

The proposed standards require that DOE, with NRC approval, decide under what conditions a liner may be necessary. EPA agrees with the majority of commenters that this should be a site-specific determination. A liner would be required at those sites where DOE could demonstrate that during wet cycles and maximum flood events, ground water would be threatened in the absence of a liner.

It would not be appropriate for EPA to review liner decisions and cover designs. Under UMTRCA, the specific analysis of the need for a liner and the design of the cover for tailings piles that do or do not require a liner is the responsibility of DOE, with NRC approval.

EPA has decided to retain its original position. That is, the regulations require liners at those tailings piles which contain water above the level of specific retention. Tailings piles which are not relocated, or are relocated and contain little or no free water, and are stabilized with an adequate cover are not likely to require a liner to protect ground water.

Question 2. For designated processing sites from which tailings have been removed, is a specific requirement that DOE clean up the ground water before releasing the land to State or private owners needed to assure that such cleanup will occur?

Such a requirement is needed. (P-1)(P-3)(G-3)(G-4)(G-6)(G-7)(G-9)

- Some sites could revert back to Department of Interior (DOI) management and any ground-water contamination should be cleaned up before DOE releases a site back to DOI. A related concern expressed is that this rulemaking should require DOE to acquire full title to any BLM-managed lands to be used as disposal sites. (G-3)

- Without such a provision, it is doubtful that cleanup would ever occur by any method other than natural flushing, which the reviewer deems unacceptable. (G-4)

- The ground water should be restored to levels consistent with potential beneficial uses available prior to tailings emplacement. Also, to release lands prior to ground-water cleanup is inconsistent with potential human health and environmental hazards posed by contaminated ground water. (G-6)(G-9)

- There was implicit recognition that the standards would allow flexibility in the amount of cleanup required, based on site-specific current and projected use of the ground water. (G-7)

- DOE must demonstrate compliance with EPA standards at the time of NRC licensing, which must be within seven years of the standards' promulgation. There would be no way to enforce a cleanup program after the remedial action and licensing events have been completed. Unless EPA's standards require that DOE clean up the ground water before releasing land to other owners, within the statutory time frame, DOE might either release the property to other owners before cleanup is complete or choose not to perform any clean up and simply retain possession of the land, circumventing the intent of the law and allow creation of environmental sacrifice zones. (P-1)

-DOE had requested provision in the standards for release of land prior to ground-water cleanup. This request should be rejected and release of sites prior to cleanup of ground water should be prohibited. Such release would not be legal since NRC cannot license a site prior to cleanup; such release would not protect the public health, safety and the environment as mandated by UMTRCA; and there would be no guarantee that DOE would complete ground-water cleanup. (P-3)

Such a provision is unnecessary. (G-1)(G-2)(G-5)(G-8)(I-4)(I-5)

-DOE is required by Section 108 of UMTRCA to comply with standards promulgated by EPA. Also, DOE has cooperative agreements with affected States/tribes and the NRC requiring their concurrence in the remedial action plan. The issue of land acquisition and release is fully addressed in Section 104 of UMTRCA. In some cases, beneficial surface use may be possible during aquifer restoration and that release for surface use, with NRC concurrence, should be permitted if the DOE demonstrates that a significant adverse relationship does not exist between surface uses and ground-water restoration. (G-8)

-Release of processing sites for surface use, if such use would not adversely impact the ground-water cleanup program, is reasonable but may not be consistent with the law. (G-2)

-Annotation of the deed would be sufficient. (G-1)

-While it might be appropriate to release reclaimed tailings sites to a State for limited purpose use, release to private persons should not be permitted. Need for cleanup prior to such release would depend on site-specific factors such as contaminant types and levels, existing water quality, potential uses and availability of alternate water supplies and surface uses to which the land may be put. (I-5)

-Natural flushing may often be the most cost-effective means for achieving compliance. This might require many years and there is no need to require that it be accomplished prior to release of the land if institutional or other controls can assure that contaminated ground water is unlikely to be put to inappropriate use during the remedial period. (I-4)

Response:

EPA's position remains the same as originally stated in the proposed rules. Cleanup must take place in accordance with a remedial action plan proposed and carried out by DOE with NRC's approval. The cleanup must be carried out in such a manner as to be protective of human health and the environment. EPA believes that there are adequate provisions in UMTRCA and the regulations to prevent abuse of contaminated ground water before cleanup is complete that a specific requirement to assure cleanup is not necessary.

If some sites should be released for restricted use before ground water contamination is cleaned up, DOE must maintain control of the cleanup operation. The DOE does not intend to return the single site on DOI land to DOI until it has been completely cleaned up. Although DOE must demonstrate compliance with EPA standards before remediation is complete, the land may be used before this time for specific purposes with DOE and NRC approval. Use of the land must be restricted so that human health and the environment are protected from the potential hazards of ground water contamination. The land may not be released for unconditional use until the ground water is cleaned up. Land use restrictions, such as deed annotations, may not, however, be enough unless such restrictions can be legally enforced.

Question 3. Should institutional controls be relied upon, for a limited time, to prevent access of the public to ground water in order to permit use of natural flushing of contaminants, as proposed? If so, what types of institutional controls should be allowed? Should these be specified in the rule? Is the proposed time period appropriate?

Reliance on institutional controls during ground-water remediation is opposed. (P-1)(P-3)(G-4)(G-6)(G-7)(G-9)

- There is no assurance of future enforcement. (G-4)

- The proposed period of 100 years is without technical foundation and is inconsistent with UMTRCA. (G-6)

- Institutional controls during active remediation are not objected to but reliance on natural flushing for remediation is opposed as contrary to the intent of UMTRCA. If such controls are used, the regulations should require very limited and site-specific controls. Noting that it is inconceivable that Congress would have anticipated that the hazards posed by uranium tailings and the accompanying contaminated ground water would continue unabated for 100 years or half the minimum time period for effective control, the commenter stated that, if such controls are used, they must provide protection to both human health and the environment for 1000 years. (G-9)

- Reliance on institutional controls provides nothing in the nature of cleanup; the contaminants will remain dispersed in the ground water, possibly diluted by uncontaminated ground water or attached to soil particles, thus permanently contaminating the soils. The only effective institutional control is believed to be complete fencing, with a security system and government ownership of the site. Such controls are seen as contrary to Section 112(a) of UMTRCA that remedial action be completed within seven years. To the extent that EPA can promulgate RCRA-consistent controls to accomplish remedial actions within seven years, those controls should be specified.

  A maximum time of 20 years is suggested for compliance. EPA gives no rationale for choosing 100 years, which is half the

lower time limit and appears to bear no relation to the seven year deadline for completion of remedial action. (P-1)

-EPA is urged to reject any and all uses of institutional controls during the post-closure cleanup period; these should be used only during tailings stabilization and ground-water restoration activities at a site. Institutional controls are inconsistent with federal law and a federal appeal court's ruling, practically impossible to enforce, undemocratic and immoral. The commenter reviews arguments made in response to the January 1983 ANPRM and adds that, given the court's order to treat the ground-water standards for Title I sites consistently with those of the Title II sites, it is surprising that EPA would even consider allowing use of natural flushing as a substitute for active engineered ground-water restoration methods. UMTRCA does not give EPA the authority to require States, tribes or local governments to impose land-use or deed restrictions at reclaimed tailings sites. Since consistency with SWDA is required, the existence of an alternate ground-water source or public water supply should have no bearing on the decision. The suggestion of a remediation period of up to 100 years is opposed, citing that it is the current generation's moral obligation and responsibility to manage and control the toxic wastes it creates so that those wastes do not harm generations of the future. (P-3)

-If there were a fully enforceable mechanism for implementing institutional controls, such controls could be considered. Unfortunately such controls do not exist in Colorado. Also, institutional controls rely on active intervention whereas Congress intended passive control measures. Purchase of the land in question and dedication to an appropriate land use is viewed as the only implementable institutional control. Guidance specified in the rules in the area of institutional controls is needed. The proposed time period of 100 years is too long; it is inconsistent with normal land-use projections. Instead use of renewable periods of 20 to 30 years is suggested, with participation and concurrence of the State and affected Indian tribes. (G-7)

Reliance on institutional controls during ground-water remediation is supported. (G-1)(G-2)(G-3)(G-5)(G-8)(I-4)(I-5)

Acceptable controls should not be specified by EPA, rather, DOE should be allowed maximum flexibility to develop appropriate controls on a site-specific basis, subject to NRC concurrence. Suggestions of possible institutional controls include legal restrictions enforceable by government agencies, government ownership of the site, appropriation of water resources during period of natural flushing, deed restrictions and provision for alternate water supplies. (G-2)(G-8)(I-4)(I-5)

-The time period of 100 years is viewed as reasonable though in some cases this might not be adequate. (I-4)(I-5)

-Consideration of an appropriate time period has been ongoing since 1978 and there seems to be a consensus on the 100 year period. (G-8)

-The law requires DOE to maintain active site control indefinitely and to conduct monitoring, maintenance and emergency actions as needed. This long-term care is under NRC license and a 100-year period has no meaning for this care. EPA should recognize this and take care not to provide a basis for arbitrarily attenuating the DOE obligations. (G-2)

-Sites could be monitored by State agencies through federal contracts. (G-5)

Response:

EPA has decided to permit the use of institutional controls as proposed. The regulation requires that institutional controls must effectively protect human health and the environment and must receive NRC concurrence. NRC can require that a Federal presence is maintained during the extended remedial period. This assures the maintenance of institutional controls.

The proposed period of 100 years for the natural flushing of contaminants is somewhat arbitrary. Periods shorter than 100 years are considered too short to be useful for natural cleanup for some sites on technical grounds. Periods of longer than 100 years, however, are considered too long for institutional controls to be reliable. See section 3.3 of the response to comments.

UMTRCA provides that cleanup of ground water is the responsibility of DOE; as long as institutional controls are under the jurisdiction of DOE, they are therefore consistent with the law (see section 2.5 of Response to Comments).

The UMTRCA requirement that remedial action be complete in seven years has been modified. As part of this modification, the cleanup of ground water has been exempted from the remedial action completion date. Therefore, DOE does not have to complete the cleanup of ground water within a specified period of time.

Authority to require States, tribes, or local governments to impose land-use or deed restrictions is not required by these regulations. If such restrictions are available, then they may be used, where appropriate.

Question 4. Should the option to make use of natural flushing for cleansing of contaminants be limited to cases where some restoration of the ground water has already been carried out? Should the use of an alternate concentration limit (ACL) be permitted, as proposed, in the case of cleanup to be achieved (in whole or part) by natural flushing?

The use of natural flushing and ACLs in ground-water restoration is opposed. (P-1)(P-3)(G-6)

-Natural flushing is based on theoretical projections, with possible delays in recognizing any inadequacy and no regulatory or legal basis for corrective action. (G-6)

-These options would result in cleanup at certain sites being waived entirely through a combination of waiving regulatory safe levels of contaminants by a grant of ACL and then waiving active cleanup in favor of a passive program which entails the masking (through absorption, dilution or decreases in ground-water quantity) rather than the actual removal of human-introduced contaminants. (P-1)

Consideration of natural flushing or use of ACLs only after all other active aquifer restoration methods have been employed is favored. (G-4)(G-9)

-If natural flushing is allowed, the flushing period should be reduced from 100 years to a shorter period to allow use of other remediation measures if the flushing is not successful. ACLs should be used only where active restoration efforts demonstrate that complete cleanup is not achievable with available technology; in no event should ACLs be considered as the initial goal for aquifer cleanup. (G-9)

-While there may appear to be some merit in requiring an initial active cleanup phase followed by passive measures, very little cleanup is achieved if active measures are implemented for only a year or two. This requires large amounts of funds with little accomplishment. A suggestion instead of an engineered, enhanced natural flush (EENF) system representing innovative implementation of fundamental concepts such as high permeability trenches, nonconsumptive irrigation ditches for altering the hydraulic gradient on a local scale, and perhaps some chemical agents to enhance contaminant flushing from soils is made. In perhaps two or three decades cleanup by this approach would easily exceed any short term improvements obtained by a temporary pump-and-treat program. Such a system would be less expensive than pump-and-treat, permanent, and require minimal or no maintenance. The commenter feels that ACLs could be used as part of larger cleanup strategy such as the EENF concept but does not believe that they should be applied at any site relying solely on natural flushing with no attempt or plan to clean up the existing contamination. (G-7)

This option should not be limited and use of ACLs should be permitted. (G-1)(G-2)(G-5)(G-8)(I-2)(I-4)(I-5)

-Natural flushing should be allowed in conjunction with active restoration or as a sole mechanism for cleanup if the concentrations of contaminants will decline to appropriate levels within the period of institutional controls. If some active restoration is required prior to natural flushing and institutional controls, the extent and objectives of partial restoration will be extremely difficult to establish. Specific guidance regarding the objectives of such limited restoration should be developed and provided to DOE for review prior to promulgation. ACLs should be permitted where ground-water restoration would involve natural flushing. The guidance for issuance of ACLs requires demonstration that the hazardous

constituents detected in the ground water will not pose a substantial present or potential hazard to human health or the environment at ACL levels. Given that ACLs will protect human health and the environment in the specific hydrogeologic circumstances, it is reasonable that ACLs should be permitted for all cases of cleanup. (G-8)

-Decisions on active and natural restoration will likely be site-specific and the flexibility to use natural restoration alone should be retained. Approval of the ACL means that the contaminant concentrations do not pose significant present or potential hazards to humans or the environment. Natural flushing to reach background or drinking water levels would provide an additional margin of safety. (G-2)

-To limit the use of natural flushing to those cases where some restoration has been performed would place unnecessary restrictions on the ability of DOE to achieve cost-effective protection of public health. For the same reasons ACLs should be permissible in cases where natural flushing is permitted in whole or part. The establishment of ACLs is predicated on a finding that public health and the environment will be protected. (I-5)

-The natural flushing option should be allowed in all cases where the physical characteristics of the ground-water system are favorable. If ACLs cannot be established for sites using natural flushing, accelerated flushing will be required. The end results, effectiveness of the remedial action, will be identical, but the costs will be much higher. (I-2)

Response:

In this question, natural flushing was assumed to be a viable alternative. In order to use this option, the regulations require DOE to establish a program to monitor the progress of natural flushing. At any time they determined that the flushing was not proceeding as projected, they could modify the remediation. Periods shorter than 100 years are considered too short for natural cleanup of some sites on technical grounds.

Alternate concentration levels (ACLs) may be applied to a site only if DOE can show that human health and the environment are protected. In order to apply an ACL during natural flushing, DOE would have to show that the requirements for an ACL will apply throughout the area affected by the ground water.

Therefore, EPA's position remains as in the proposed regulation. If passive restoration is projected to occur naturally in 100 years or less, the ground water will not be used as a public drinking water supply, and institutional controls and a monitoring program are implemented, the remedial plan may rely in part or full on natural flushing. ACLs may be used where justified.

Question 5. Are the proposed bases for supplemental standards for cleanup reasonable and adequate for the protection of public health? Should other bases be provided and, if so, what are they? Should the

provisions for natural flushing and supplemental standards for cleanup apply only to existing contamination or should they also apply, as is proposed, to "new" contamination due to failure of the disposal design to perform as intended?

Reliance on the draft Class III ground-water classification criteria at the UMTRA Projects is opposed. The second criteria, restoration causing more environmental harm than it would prevent is acceptable if it is made clear in the final rule that Congress and EPA's determination that there are real public health and safety and environmental hazards associated with nonradiologic contaminants from UMTRAP sites requires that DOE and NRC admit to the environmental benefit of clean up. The third criteria, technical impracticability, is acceptable only if EPA can fashion a sufficiently specific definition of the term "technically practical" to make implementation possible. (P-1)(P-3)

- There appears to be a fourth criterion, where passive restoration of an aquifer can be projected to occur naturally within a period of less than 100 years and the ground water is not now used or projected to be used for a community water supply. Because of the inability to accurately predict the potential for future use of an aquifer as a community water supply, this circumstance should not allow a facility to meet higher contaminant levels than those set by the regulations. The commenter would not support any further bases. The provisions for natural flushing should apply, if at all, only to existing contamination. (P-1)

- Only listed contaminants are addressed; this may not be reasonable for protection of public health. (G-9)

- The proposed bases are sufficiently broad to be easily implemented or nearly impossible to implement, depending on approaches taken by DOE and NRC. In any case, the requirements are not met for the Tuba City site. (G-6)

Any standards set for clean up of ground water must apply to new contamination resulting from failure of the disposal design to perform as intended. (G-4)(G-7)

- Additional modifications to the current disposal design will improve its hydrological and contaminant release performance and supplemental standards should not be allowed at new disposal sites until Colorado and independent experts agree that the best available technology has been applied to the impoundment design.

  The proposed bases for application of supplemental standards were not entirely adequate, and EPA and the implementing agencies should develop specific guidance in such areas as determination of the potential for future changes in land use at processing sites and cost/benefit analysis. (G-7)

- EPA should consider adding consideration of costs when such costs would be unreasonably excessive in relation to the benefits to be gained from reduction of risks. Maximum flexibility should be

retained, including the flexibility to consider natural flushing and supplemental standards. (G-2)

-Explicit consideration of costs should be included in the regulations, and a more expansive interpretation of Class III ground water should be allowed. The provisions authorizing natural flushing and supplemental standards should always apply. (I-4)

The proposed bases for supplemental standards are reasonable for the protection of human health and the environment but the bases should be extended by specifically including consideration of costs and benefits and clarifying that ground-water restoration is not necessarily required when supplemental standards are invoked. Supplemental standards and natural flushing should also apply to new contamination due to failure of the disposal design to perform as intended; the commenter notes that supplemental standards can be applied only when the ground water has an extremely low potential for extraction and use and when sufficient remedial action is undertaken to protect human health and the environment. (G-8)

The restrictive definitions of the first and last criteria are of particular concern. A suggestion was made that the basis for determining applicability of supplemental standards should be based on a site-specific analysis of the risks presented to public health and the environment and a similar analysis of the full range of alternatives for achieving public health protection including the environmental and economic costs of each. This decision should be made based on expert judgment along the same lines and with same considerations as for establishing ACLs. The provisions for natural flushing and supplemental standards should apply to new contamination as proposed; the controlling consideration should be protection of public health. (I-5)

Response:

The commenters felt, for the most part, that the proposed bases for natural flushing and the supplemental standards were adequate for the protection of human health and the environment. The suggestions that cost be considered as a basis for natural flushing or a supplemental standard were not incorporated.

The commenters did not provide any substantial reasons for not applying natural flushing or the supplemental standards to new contamination from tailings piles due to failure of the disposal design to perform as intended. Therefore, EPA will continue to allow application of natural flushing or supplemental standards to new contamination.

Question 6. Under these proposed standards, alternate concentration limits would be concurred in by the NRC. Should EPA establish generic criteria and/or guidance governing the application of the provisions of 264.94(b) of this Part to these judgments for these standards?

Generic criteria and/or guidance is not needed; Section 264.94(b) provides a clear health, safety and environmental finding and a list of factors to be considered in establishing ACLs. (G-2)(I-4)(I-5)

- -A methodology for establishing ACLs at Title II sites is currently being developed. (G-2)

- -NRC, like EPA, is constrained by UMTRCA to assure that actions taken by it under that Act adhere to the paramount purpose of protecting public health and the environment from unreasonable risks. Also, as a practical matter, EPA will have an opportunity to provide input to setting the ACLs through comments on site EISs and consultations between agencies. (I-5)

- -NRC and DOE should be allowed to exercise their judgment without additional guidance from EPA. (I-4)

Generic criteria and guidance are supported for differing reasons. (P-1)(G-6)(G-7)(G-8)

- -EPA should provide additional flexibility to the RCRA ACL guidance, specifically regarding the point of exposure, the period of applicability of ACLs, release of contaminants to surface waters, and other provisions. (G-8)

- -Given ACL delegation to NRC, EPA guidance and concurrence in NRC procedures is absolutely critical. (G-6)

- -Guidance is necessary to ensure consistent interpretation. (G-7)

- -Guidance might be an acceptable way to ensure that NRC does not accept ACLs which are inconsistent with EPA's standards. (P-1)

The delegation of ACL concurrence to NRC is specifically objected to. (P-3)(G-9)

- -NRC has regulatory authority over the radioactive contaminants only and nonradioactive contaminants are regulated under this rule and subject to ACLs. (G-9)

- -DOE's consideration of ACLs might be facilitated if generic criteria are provided. (P-3)

State and tribal concurrence should also be required, since these entities are directly affected and are in a better position than NRC to evaluate ACLs. (G-4)(G-9)

Response:

Establishment of regulations for generic criteria for granting ACLs would present extreme difficulties for rulemaking, since it often involves complex judgments that are not amenable to being reduced to regulatory requirements. In this regard we note that such regulations do not exist for sites directly regulated under RCRA, for similar reasons. We have reconsidered the issue of EPA approval of ACLs and

decided to retain the approach implemented in the Title II regulations. That is, EPA has reserved a concurrence role for any ACL that would result in the otherwise applicable ground-water standard not being met at the site boundary or 500 meters from the disposal area, whichever is closer to the point of compliance. This approach, in addition to responding to the concerns voiced by commenters, also adheres more closely to the Court's admonition to treat these pollutants "...as it did in the active mill site regulations." It is EPA's intent, in carrying out this concurrence role, to adhere to the same generic procedures for ACLs that it applies to the Title II sites.

EPA is required by UMTRCA (Section 206) to be consistent, to the maximum extent practicable, with RCRA. For this reason, we have incorporated relevant portions of the RCRA regulations. These regulations provide for use of ACLs when it can be shown that the criteria specified in § 192.02(a)(3)(iii)(B) are satisfied. It remains the view of the Agency that, as at the Title II sites, it is not necessary for EPA to retain a concurrence role if the NRC has determined that these criteria are satisfied when the otherwise applicable standard will be met within the site boundary (or at a distance of 500 meters, if this is closer to the point of compliance). It is clear for controlled minor seepage within site boundaries and when public use is not possible, that ACLs will usually be appropriate in such situations.

The participation of States in the application of these standards has been discussed previously (see comments 2.3.4, 3.1.11, 3.2.5).

Question 7. Should EPA publish, as part of this standard, a restricted list of just those radioactive and toxic constituents that are present at these sites, or continue to rely on the entire list (supplemented as proposed) of constituents encompassed by RCRA regulations? Should the proposed list of additional listed constituents be changed?

A restricted list is either inappropriate or not needed for this standard. (P-1)(P-3)(G-2)(G-4)(G-7)(G-8)(G-9)(I-5)

- DOE's general approach to characterizing ground-water contamination is to apply a screening level, multiphased program for all suspected contaminants. This is followed by detailed determination of those contaminants detected by the screening program. The proposed list of additional listed constituents should not be changed. (G-8)

- While a limited constituent list might be a good idea, the sites have not been fully characterized and new constituents could be identified. The existing provisions for DOE identification and NRC concurrence provides sufficient flexibility to accommodate any new constituents found at the sites. The site specific nature of the issue almost precludes defensible standards until all sites are evaluated and the need no longer exists. (G-2)

- Ground water needs to meet requirements for irrigation and livestock watering in addition to human health concerns, thus any listing should be broad enough to allow for cleanup based on

agricultural requirements and should mandate cleanup for any reasonable purpose for which the water might be used for 1000 years. Unanticipated levels of arsenic were discovered during remediation at the Lakeview site and, under the proposed rule, the unanticipated contamination would not have been remediated. (G-9)

-Experience with some of the actual mill sites has shown a variety of unexpected chemicals can be encountered in drums and as residual contamination from operation of the mill. (G-7)

-EPA should not publish a restricted list but should leave it to DOE and NRC to develop such a list based on what they find at the various Title I and Title II sites. NRC's Uranium Recovery Field Office has provided data from 17 sets of samples at nine tailings ponds; each sample was tested for 150 potential ground-water contaminants and none of the samples indicated the presence of any of the 12 volatile or the 81 semi-volatile organic compounds tested for. The limits set for the additional listed constituents should be changed. (I-5)

-EPA recognized in the proposed rule that some organics were used at the UMTRAP sites, even though present monitoring has yet to show presence of any organics. It may, however, be appropriate to allow use of a restricted list after initial ground-water screening at a site established that no organics were present. (P-1)

-Analysis of one set of ground-water samples for all Appendix VIII constituents and for any other pollutant or contaminant present at each site either in the tailings themselves or in the ground water is recommended. DOE could eliminate constituents not detected; such a list would be site-specific. Water samples should be analyzed for certain indicator contaminants such as sulfates, chlorides, total dissolved solids, and major cations and anions at each site. Nontoxic contaminants must be addressed to protect agricultural uses of ground water. Monitoring for these indicator contaminants is necessary to guide decisions on ground-water remediation techniques - a variety of aquifer restoration methods are now available but no one method adequately addresses all pollutants. Finally, the commenter disagrees with EPA's assumption that any minor contaminants would be taken care of in cleanup of the principal contaminants. (P-3)

Publication of a restricted list is supported. (G-5)(I-2)(I-4)

-Supported only if it would not delay the rule. (G-5)

-The list should include only those radioactive and toxic constituents that are present at the inactive sites. Most of the synthetic chemicals that EPA has identified as being of particular concern under RCRA simply are not found at tailings sites. EPA should change the proposed list of additional constituents because the limits are not scientifically justified. (I-4)

-The regulatory approach should be changed to include contamination of ground water with nonhazardous constituents that compromise beneficial uses of the water. (G-6)

Response:

EPA agrees with the majority of commenters that the entire list of hazardous constituents should continue to be relied on for these regulations. The finding of organic compounds at some of the sites and the unexpected levels of arsenic at the Lakeview site reinforce the need for the complete list. Where relevant new MCLs have been approved, they have been added to table 1. Adding nonhazardous constituents to the list because they inhibit beneficial uses of the water is not viable. The purpose of these regulations is to protect human health and the environment from the radiation health hazards of the mill tailings and to minimize other environmental hazards from such tailings. Nowhere are nonhazardous constituents mentioned; therefore, these constituents are not addressed by these regulations.

Question 8. EPA could consider publishing a restricted list of just those radioactive and toxic constituents that are principal contaminants at these sites and specifying a limit for each of these, under the assumption that any minor contaminants would be taken care of in the cleanup of these principal contaminants. With such a restricted set of constituents and corresponding complete set of limits, EPA could then consider dropping the provisions for ACLs and rely solely on the remaining provisions for exceptional cases. Should EPA adopt this approach?

The restricted list is opposed or is not warranted, and the ACL provisions should be retained. (G-2)(G-4)(G-7)(G-8)(G-9)

A restricted list is supported or accepted but the ACL provisions should be retained. (P-1)(I-2)(I-4)

-The ACLs provided needed flexibility. (G-2)(G-8)

-Developing ACLs with concurrence of the affected States and tribes is favored for exceptional cases. (G-4)

-The commenter disagrees with the assumption that minor contaminants would be taken care of in the cleanup of the principal contaminants and, also noted that it would seem more appropriate for the standards to reflect the philosophy, if not the specific wording, of the CERCLA aquifer restoration requirements. (G-9)

-The loss of flexibility would impede selection of cost-effective remedial actions. (I-2)

-This approach is feasible only if EPA's assumption regarding removal of minor contaminants is true; EPA must be able to

demonstrate that the cleanup methods chosen for the principal contaminants will also remove any organics that may be present. (P-1)

-It is appropriate to focus the regulations on the principal contaminants but the ACLs are necessary to enable DOE to consider site-specific conditions and select appropriate remedial actions. (I-4)

-The concept of a restricted list and the assumption that cleanup of the principal contaminants would also clean up minor contaminants is supported. It is felt that ACLs will still be necessary for flexibility in addressing site-specific conditions on a cost-effective basis. (I-5)

-EPA needs to provide generally applicable standards sufficiently well guided technically to ensure that potential beneficial uses of ground water will be protected following remedial action. It is unclear even conceptually how this could be done by narrowing matters of regulation and hoping that everything else will take care of itself. (G-6)

Response:

As in the previous question, EPA has determined that the entire list of hazardous constituents should be retained. The unexpected discovery of some organic compounds at some sites underscores the need for the complete list. In addition, since those compounds that do not have an MCL listed would have to be cleaned up to background (which in the case of organics would be zero) or be granted an ACL, EPA has added MCLs to Table 1 of the standard for those relevant compounds for which MCLs have been established. EPA believes that ACLs provide needed flexibility and have decided to retain them in the regulation.

Question 9. Should EPA specify a minimum or the entire period for post-disposal ground-water monitoring in Subpart A, or leave it to the DOE and NRC to determine this on a site-specific basis, as proposed? If EPA should specify a period, what length would be appropriate to demonstrate conformance to the disposal design standard, and on what basis should this value be chosen?

Selection of the monitoring period should be left to DOE and NRC to determine on a site-specific basis. (G-1)(G-2)(G-8)(I-4)(I-5)

-DOE would use factors in 40 CFR Part 264.117 in establishing the site-specific monitoring period, subject to NRC review and concurrence. A memorandum of understanding addresses the basic requirements applicable to Title I sites and the site surveillance and maintenance plans address specific site requirements. (G-8)

Monitoring may not be required at certain disposal sites; e.g. sites where the uppermost aquifer is insulated by thick sequences of low permeability and/or highly attenuating materials, sites

above Class III waters, or sites where the water table is deep. Because of this, monitoring should not be mandatory. Should the proposed standards be ARARs at other DOE sites (e.g. FUSRAP/SFMP), the definitions of "remedial period" and "post-disposal period" would need to be revised to reflect the unique concerns of those sites; EPA should clarify that these definitions apply only to the UMTRA Project. (G-8)

-Performance objectives should be provided for site-specific flexibility instead of specifying a post-disposal monitoring period. (G-2)

-The monitoring period will depend on the nature and severity of the hazard posed by any contamination, stability of the site, and rate of movement of such contamination; at some sites three years may be sufficient, at others five years or more may be necessary to demonstrate conformance with disposal design standards. (I-5)

Specification of a minimum monitoring period, usually in the range from 30 to 100 years, is supported to assure that the design criteria perform as anticipated. (P-1)(P-3)(G-4)(G-6)(G-7)(G-9)

-If natural flushing is permitted, EPA should require monitoring of the ground water for the entire flushing period to verify underlying assumptions. (G-9)

-Lack of a specific minimum monitoring period could lead to controversy among the implementing agencies. A monitoring period of several decades will be necessary to confirm the operation of new disposal cells since construction will be based on a design rather than performance standards. Also, post-disposal monitoring should always be co-extensive with any extended remedial period to confirm projections of computer simulations and prevalent expert judgment. Confirmation monitoring will be necessary at both disposal and processing sites; this should be consistent with RCRA, 30 years.

Use of site-specific conditions to determine length of post-disposal ground-water monitoring is similar to what the 10th Circuit Court struck down. (G-7)

-The need for post-disposal ground-water monitoring will depend on the site management strategy. Where completely dry tailings are moved to a lined and capped facility and all contaminated ground water is removed and treated, a short period (e.g. 15 years) might be appropriate. Because of the record of liner and containment breaches at RCRA and other disposal facilities, monitoring is believed imperative. If the clean-up strategy is natural flushing, monitoring should be for at least the 100 years at the end of which the natural flushing is supposed to achieve compliance. This is necessary because the inexact nature of current state-of-the-art modeling, which forms the basis for the natural flushing assumptions. (P-1)

-The notion that monitoring can last up to 100 years is rejected, and any post-closure monitoring should be conducted prior to NRC's site licensing. It is noted that legislation may be required to permit approval of monitoring plans of 10 to 15 years; the present statute would not permit monitoring past 1990. The use of active, engineered ground-water restoration techniques should alleviate the need for extensive post-closure monitoring. (P-3)

Response:

The regulations currently require that DOE maintain monitoring of the closed site for a period of time comparable to the time period required under § 264.117 for waste sites regulated under RCRA (i.e., 30 years). The exact period of time post-closure monitoring is required has been left to the DOE to determine, with NRC concurrence. EPA believes that this is the most reasonable solution and is in keeping with the requirement that these regulations be consistent with RCRA regulations.

In instances where DOE has chosen to extend the remedial period to allow natural flushing, the regulations require that the progress of the flushing be monitored throughout the extended remedial period. In this case, post-closure monitoring would not begin until the extended remedial period expires. In this example, monitoring would be required for as long as 130 years if EPA required a specific 30-year post-closure monitoring period. EPA believes that this would be unreasonable.

The Tenth Circuit Court of Appeals remanded the ground-water provisions of the original regulation because the regulation did not contain specific numerical standards for the protection of ground water. Neither the remanded provisions nor the Court mentioned any requirements for specific time periods. EPA believes that these regulations meet the requirement for consistency with RCRA.

Question 10. For tailings regulated by NRC under Title II of the Act, section 84(a)(3) requires NRC to develop regulations to conform to general requirements applicable to the possession, transfer, and disposal of hazardous materials regulated by the Administrator. Should the standards proposed here incorporate such requirements for tailings regulated under Title I?

Several reviewers found this question ambiguous or challenged EPA's position.

-Since the subject EPA provisions are still being refined and the requirements that will apply to the Title II sites have not been fully evaluated, incorporating these for Title I sites may be premature. The requirements as to financial assurances and cradle-to-grave manifests and transportation are examples of EPA requirements that are not needed. The proposed rule includes a reasonable level of detail for implementation. (G-2)

-NRC's authority has not been characterized with precision; NRC's obligation is to develop regulations which are, to the maximum extent practicable, at least comparable to requirements applicable to the possession, transfer, and disposal of similar hazardous material regulated under SWDA. When EPA adopts standards for mining wastes and when NRC issues comparable regulations for tailings, then such requirements may be incorporated for Title I sites without objection. (I-5)

-The question is poorly drafted. If EPA is asking should the standards for UMTRA sites be RCRA-consistent in the same manner as standards for active uranium mill sites, the answer is affirmative. EPA should adopt standards containing provisions that parallel all relevant RCRA rules; these should be consistent for active and inactive sites. However, the question appears to ask whether EPA should require NRC to conform its regulations to EPA's UMTRAP standards; there is no statutory requirement for this so long as EPA's standards are directly implemented at all UMTRAP sites. (P-1)

-The question is ambiguous. These standards should conform with EPA's SWDA standards for materials posing similar hazards but NRC should not be required to undertake further rulemaking. There are a small number of inactive sites, the remedial program is underway, and cleanup is the responsibility of the government. Another layer of regulatory requirements is unnecessary. (I-4)

Such additional requirements are unnecessary. (G-7)(G-8)

-DOE, with NRC oversight, has accepted environmental protection responsibilities for Title I sites and developed procedures for possession, transfer, and disposal of tailings and other contaminated materials. DOE and its contractors are bound by applicable Federal and State regulations in the handling of any wastes not contaminated by the milling process. At the Title I Canonsburg and Ambrosia Lake sites, for example, DOE and its contractors worked successfully with applicable State agencies to ensure full compliance with regulations. (G-8)

-The purpose of remediation or decommissioning is to make the land suitable for uncontrolled release. If the site is not suitable for uncontrolled release, then adequate remediation has not been accomplished and the existing standards for possession, transfer and disposal of hazardous materials are sufficient. (G-7)

Requirements for Title I tailings are supported. (P-3)(G-4)(G-6)(G-9)

-There is no difference in health threats between Title I and Title II tailings and there should be the same responsibility to assure a safe and clean environment regardless of the entities providing the cleanup. (G-4)(G-9)

-The standards for ground-water protection at Title I sites must be consistent with those for Title II sites. (P-3)

Response:

EPA agrees that requiring NRC to develop additional regulations for Title I sites governing the possession, transfer, and disposal of hazardous materials regulated by the Administrator is premature and not necessary under these regulations. There are only 24 Title I sites and there are no active operations at any of them. Also the sites are being remediated under government control and will remain in government control upon completion of the remediation. DOE has demonstrated that they can responsibly implement EPA regulations without additional regulation.

Question 11. Is it appropriate to base the uranium contaminant limit on radioactivity alone or should the chemical toxicity of uranium result in a more restrictive value?

The proposed radioactivity concentration limit of 30 pCi/l will protect against possible kidney damage associated with drinking water that contains uranium and this limit is supported. (G-7)

All other reviewers supported consideration of the chemical toxicity as a basis for the uranium contaminant limit but several expressed differing views as to what the limit should be.

Both chemical and radiometric toxicity should be considered and the more conservative limit selected. (G-2)(G-4)(G-5)(G-9)

- A limit based on chemical toxicity would not result in a lower limit than the one proposed. (G-2)

The National Academy of Science's "Suggested No Adverse Response Level" of 0.035 mg/l should be used as the limit, corresponding roughly to 23 pCi/l. (G-6)(P-1)(P-3)

However, a limit of 0.1 mg/l as suggested by Cotter Corporation at the Public Hearing would not be objected to. (G-6)

- The recommended uranium limit would not only address the greater chemical hazard but would reduce analytical costs since typical laboratory costs for total uranium analysis are one-fourth to one-sixth those for individual uranium isotopes. (P-3)

The uranium limit for ground water should be based on chemical toxicity alone. (I-2)(I-4)(I-5)

- EPA has established its uranium limit to protect against stochastic effects (cancer) using the limits recommended for nonstochastic effects (threshold effects). Based on the recommendations of the National Workshop on Radioactivity in Drinking Water, convened by EPA in May 1983, for a limit of 100 ug/l (based on safety factor of 50-150), the proposed limit should be stated in mass rather than radiological units and a limit of 1-2 mg/l would be well below the likely threshold level at which any concern for chemical toxicity would exist. (I-5)

-Also referencing the NAS study, a limit of 0.1 mg/l is recommended. (I-2)

-It is arguable that no limit is even warranted but, in any event, any limit should be far less stringent than that proposed. (I-4)

EPA may wish to consider the chemotoxicity of uranium in the final standards. The proposed standard of 30 pCi/l based on radiotoxicity is 10 pCi/l lower than the EPA upper value of the adjusted acceptable daily intake corresponding to 40 pCi/l based on limited chemotoxicity data. (G-8)

Response:

The Agency has revisited the uranium standard and has concluded that it should consider chemical toxicity of uranium as well as the radiotoxicity. In developing the proposed standard, the Agency used nonstochastic dose conversion values for uranium instead of the more appropriate stochastic values and did not consider the cost implications of achieving a risk level equivalent to that of the standard for radium.

EPA is in the process of examining these factors, but will not reach a decision on the MCL for drinking water before this standard is promulgated. However, the standard-setting process has proceeded far enough to determine that the MCL for uranium in drinking water will be close to the limit that was proposed and is promulgated in this regulation. Should the MCL as finally promulgated be different from the limit in this regulation, EPA will reconsider the limit at that time. On the basis of these considerations, the standard for uranium has been established at 30 pCi/liter for this regulation.

EPA will consider the National Academy of Science's "suggested no adverse response level" of 35 ug/l when deriving the maximum concentration limit for drinking water.

Question 12. Should the Agency consider revising the Title II regulations to incorporate those portions of Title I regulations that are different from the Title II regulations, e.g. the additional contaminant limits in Table A?

The Title II regulations should not be revised for consistency with the proposed Title I rules. (P-3)(G-1)(G-8)(I-3)

-There is concern that any such revisions in Title II regulations not affect current agreements regarding commingling of Title I and Title II tailings in Wyoming and South Dakota. (G-8)

-Any change which would make the standards more restrictive, for Title I or Title II sites, is entirely unjustified. (I-3)

-If EPA adopts a liner requirement at Title I sites consistent with Title II requirements and abandons proposed institutional controls, the only differences will be the concentration limits for uranium, molybdenum and nitrate. NRC could consider adding these limits to its regulations if pending litigation over NRC's

active-site ground-water requirements necessitates new rulemaking. (P-3)

Revision of the Title II regulations to incorporate various features of the the proposed Title I rules is supported. (P-1)(G-2)(G-4)(G-7)(G-9)(I-2)(I-4)(I-5)

Revising Title II rules to include the flexibility provided by proposed Title I standards is favored. (G-2)(I-2)(I-4)(I-5)

- Many of the current Title II decommissioning efforts at existing sites are similar to Title I remediation in that the tailings were generated before standards were established and there may not have been any significant milling operations for years. Values and rationale for the additional constituents could be factored into Title II ACL decisions without a rule change. (G-2)

- The differences in operational status between Title I (inactive) and Title II (active) sites will warrant some differences in the operating standards. The Title II sites are licensed; the presence of a responsible party subject to continuing regulatory oversight assures interim steps can be taken prior to final reclamation and decommissioning to contain or reduce potential ground-water impacts. The standards adopted for the active sites are not appropriate for the type of waste involved, high volume and low toxicity, or the nature and extent of hazards posed. (I-5)

- Several comparisons have been made between the Title I and Title II regulations, and the proposed regulations should be amended to apply to active as well as inactive sites. (I-2)

- It is recognized that natural flushing can be adequate to restore contaminated ground water and will allow the exercise of judgment on a site-specific basis as Title I features that should be included in Title II. The time is ripe for a total re-examination of EPA's mill tailings regulatory program. (I-4)

Inclusion of the additional contaminant limits in Title II regulations is favored. (P-1)(G-7)(G-9)

- Licensed Title II sites are subject to NRC and Agreement State regulation and it is anticipated that the current federal NIPDW regulations and State standards would be utilized for making Title II decisions until the National Interim and Final Primary Drinking Water Regulations are established for all constituents of concern. (G-7)

- Consistent with the mandate of UMTRCA, those deficiencies representing an endangerment to human health and the environment should be incorporated into Title II regulations. The prompt identification and regulation of toxic constituents now will minimize or potentially eliminate a need for costly aquifer remediation at some future date. (G-9)

Response:

The Agency was considering revising Title II regulations to incorporate some of additions in the Title I regulations. However, the American Mining Congress has requested that the Title II regulations be submitted to a negotiated rulemaking. Therefore, until the request for the negotiated rulemaking is resolved, the Agency will not proceed further regarding the Title II regulations.

Question 13. Are the estimated costs of implementing these proposed standards accurate and based on reasonable assumptions?

The EPA estimated costs are considered to be reasonable, based on knowledge and experience at Tuba City and on the Navajo lands. (P-1)(G-4)(G-6)(G-9)

Although the bases for the EPA estimates of costs were not reviewed, a comparison between these projected costs at the 24 sites and DOE's estimate of total UMTRA Program costs was made. Based on EPA's estimate of $12 million per site, the cost of implementing the ground-water standards would be $288 million based on use of institutional controls, possibly $400 million without the proposed institutional controls. Thus, ground-water restoration at Title I sites would account for 30 to 50 percent of the $1 billion estimated by DOE as total UMTRA Program costs. These costs were felt to be reasonable and proportional to the health and environmental benefits derived from aquifer restoration. (P-3)

EPA's cost estimates are probably too low. (G-7)(G-8)

- The estimates were based on overly simple assumptions and on limited data and many items were omitted from the cost estimates. Also, the BID considered information from only 12 of the 24 sites; one of the omitted sites, Falls City, has an inordinately high restoration cost because of plume size and contaminant concentration. DOE estimated aquifer restoration costs at five sites - Gunnison, Riverton, Lakeview, Tuba City and Falls City - using the Random Walk Algorithm (Illinois State Water Survey, 1981) based on various ground-water treatment options. Costs from these 5 site-specific evaluations were then extrapolated to the remaining 19 UMTRA Project sites based on similarities of cost-controlling factors. For the 12 sites for which EPA estimated total costs of $154 million under most probable scenario, DOE estimated aquifer restoration costs of $628 million. Post-disposal monitoring for a projected 30 years would cost an additional $45.82 million (reference attached material). (G-8)

- Based on the commenter's review and interviews with several ground-water experts, the estimates could be low by a factor of 10 to 100%. (G-7)

Because of the large discrepancy between cost estimates made by EPA and those by DOE, it is recommended that a more comprehensive analysis of remedial action costs be made. (I-2)(I-4)

-The commenter was unable to evaluate the EPA estimates because of the lack of documentation or references, and some apparent errors or inconsistencies in the calculations. (I-2)

No comment is made on the specific cost estimates presented but long-term monitoring costs, incremental costs of ground-water protection at new disposal sites, and costs of coverage at vicinity properties (if coverage of these is intended by EPA) should be addressed. (G-2)

Response:

EPA has received new cost information from DOE and finds that the new information is reasonably close to the EPA cost information. EPA has incorporated this new information into Chapter 6 of the BID and summarized it for the regulations. The new information indicates that EPA's original estimates were close to the final estimated costs.

Question 14. What criteria should be used to judge "technically impracticable from an engineering perspective"? Can and should these criteria be specified in the rule or should they be left to the judgment of the DOE and NRC?

Criteria either could not or should not be identified. (P-3)(G-2)(G-4)(G-6)(G-9)(I-4)(I-5)

This determination should be left to DOE and NRC. (G-2)(G-4)(G-6)(I-4)

The determination should be with State and tribal concurrence. (G-2)(G-4)(G-6)

-The apparent EPA interpretation of impracticable doesn't leave any room for interpretive criteria. Also, there will be opportunities for public input to the decision through the NEPA review and cooperative agreements with States and tribes. (G-2)

-Specific criteria are not possible because of the variability of sites and EPA should not delegate its mandated responsibility in this regard. (G-9)

-The determination as to the applicability of supplemental standards should be based on comparison of the risks to public health and the environment and the cost of various remediation alternatives. These would be site-specific determinations, best left to DOE with NRC concurrence. (I-5)

-Elevating unenforcable guidelines to the status of legally binding regulations and supported substitution of "technically possible" for "technically impracticable from an engineering perspective" is opposed (see comment by P-1). (P-3)

EPA should develop criteria, rather than leaving this responsibility to the discretion of DOE and NRC. However, no suggestions as to specific criteria were provided. (P-1)(G-7)

- EPA should develop both specific criteria and guidance documents and/or procedures for use in the decision as to what is technically impracticable from an engineering perspective. Also, such decisions should be subject to State and tribal concurrence. (G-7)

- Use of the term "technically possible" instead of "technically impracticable from an engineering perspective" is suggested; this would be clear enough that a list of complex criteria would not be needed to elucidate its meaning. Criteria should be articulated in the rule to fulfill EPA's responsibility to promulgate specific regulations for the cleanup and prevention of ground-water contamination as directed by the Appeals Court. (P-1)

The concept of technical impracticability is a recent development and has not yet been applied in remediation; application of this concept should be left to the judgment of DOE and NRC. If EPA decides to specify criteria in the final standards, DOE would like to review the criteria prior to promulgation. If the supplemental standard of technical impracticability is applied on a case-by-case basis, the DOE would develop extensive documentation, including an evaluation of the degree to which remediation is possible, and then consider the costs and benefits. The onus would be on DOE to identify cases of technical impracticability and to argue for the application of this concept at specific UMTRA Project sites. DOE recommends that the following criteria be included at a minimum:

- absence of technology to achieve the desired goals (i.e. MCLs)
- no methods available to achieve these goals within the bounds of financial resources or the schedules over which such work can be controlled,
- two or more mutually exclusive technical criteria, rules, or laws.

The DOE believes that, if technical impracticability is found to exist, an evaluation should be undertaken to apply controls or conduct a partial cleanup in an attempt to meet the standards with consideration of the costs incurred for the benefits achieved. (G-8)

Response:

EPA discussed the general meaning of "impracticability" in the preamble to the proposed rule and this has not changed. In the preamble to the proposed Subpart S of RCRA, EPA has addressed "technically impracticable" as it applies to RCRA facilities. When "technical impracticability" is implemented in that rule, the Regional Administrator reserves the right to require remediation to levels which are technically practicable and which significantly reduce threats to human health and the environment. EPA provides this information as guidance to the implementing agencies, but will not

impose any specific criteria for judging "technically impracticable from an engineering perspective" on the implementing agencies.

Question 15. The criteria proposed here to specify ground water as Class III, and therefore qualified for supplemental standards, are based on draft proposals still under consideration by the Agency. Are these criteria appropriate for this application, or would others be more appropriate for use at these sites?

The proposed Class III criteria are appropriate. (G-4)(G-6)

Provided the ground water will not have the potential to contaminate other classes of water for the next 1000 years. (G-4)

The inclusion of draft classification criteria in the final standards is rejected. (P-1)(G-2)(I-4)

- NRC has identified several significant limitations in the ground-water classification system and its implementation as proposed by EPA in December 1986 and these concerns also applied to implementation as part of the proposed standards for ground-water protection at the UMTRAP sites. (G-2)

- The Agency should take a broad historic perspective in regard to the threshold criteria, that the ground water not be a current or potential source of drinking water, noting that it is extremely difficult to predict future population migrations and concentrations in this country. EPA should, instead, assume that all ground water in the West is a potential water supply source. No technical support for the 10,000 mg/l limit is known, and this criteria should also be dropped. Limiting the treatability criteria by tying it to public water supply system technology is questioned. Instead, the DOE should be required to select from the current universe of cost-effective technologies such as supercritical fluid oxidation, reduction, extraction (heating and/or freezing), separation, chemical detoxification (thermal), biological detoxification, binding, ozonization, and any in situ decontamination technologies. The 150 gpd yield criteria is considered irrelevant and should be deleted. (P-1)

It is entirely improper to introduce the concept of Class III ground water into these standards since there is an insufficient technical basis given for their inclusion and any standards to be applied for ground water should be consistent with applicable State standards. By using a ground-water classification standard in these regulations, EPA is ignoring the State's role and allowing the DOE to determine land use through ground-water classification which has not been previously adopted by federal rulemaking procedures. (G-7)

A special class of ground water should be defined specifically for the UMTRA Project. Criteria for including ground water in this class would be: widespread ambient contamination that cannot be cleaned up using treatment methods reasonably employed in public water supply systems, or well yields of less that 150 gallons per day, or a total

dissolved solids threshold concentration limit that is lower than the present 10,000 mg/l. (G-8)

As an alternative EPA could specify a process by which human health and the environment would be protected and aquifer restoration may be minimized. Class III ground waters are not a potential source of drinking water and are of limited use. It is clear that the intent in including Class III ground water is to avoid or minimize restoration while protecting human health and the environment through avoidance of use. Such an evaluative process could be performed for UMTRA Project sites that overlie Class II waters. Should analysis at a specific site demonstrate to NRC's satisfaction that complete restoration is unnecessary to protect long-term human health and the environment, then partial or no restoration would occur. (G-8)

Supplemental standards are appropriate where the affected ground water is Class III but should also be available for Class II ground water under the Guidelines on a site-specific basis where protection of human health and the environment can be reasonably assured. Factors to be considered in allowing supplemental standards where the affected ground water is Class II should include: quality of the water, source of the water, quantity of the water, availability of alternate sources of water, actual and reasonably probable use of the water, nature and extent of contamination, costs of remedial action, potential for human exposure and detrimental environmental effects. (I-5)

Response:

The regulation has been modified to protect all beneficial uses. The term "Class III" has been changed to "limited use" to better reflect the intention of EPA in identifying this supplemental standard.

EPA recognizes that identifying certain ground waters as elegible for supplemental standards does not provide explicitly for recognition of State ground-water classification schemes. However, the regulations do recognize special situations in which normally unuseful waters may require protection, and in any case, the supplemental standards require selection and performance of remedial actions that "...come as close to meeting the otherwise applicable standard as is reasonable under the circumstances." EPA decided that the only equitable method was to distinguish limited use ground water in the standard. The relationship of the States to the implementing agencies is described in UMTRCA, and States should refer to the Act in determining how they may interact with the implementing agencies.

Class II ground waters do not qualify for this supplemental standard because of their potential for use in the future. Supplemental standards other than the "limited use" standard are available for waters that meet the criteria for Class II if the relevant conditions apply.