RESPONSES TO STAKEHOLDER COMMENTS ON NUREG-1757, DRAFT SUPPLEMENT 1

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ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AEC	Atomic Energy Commission
AEA	Atomic Energy Act (of 1954, as amended)
ALARA	as low as reasonably achievable
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
DCGL	derived concentration guideline level
DOE	U.S. Department of Energy
DP	decommissioning plan
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
IC	institutional control
LA/RC	legal agreement and restrictive covenant
LLRW	low-level radioactive waste
LTC	long-term control
LTR	License Termination Rule (10 CFR 20, Subpart E)
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MOU	Memorandum of Understanding
NRC	U.S. Nuclear Regulatory Commission
NEPA	National Environmental Policy Act
RCRA	Resource Conservation and Recovery Act
SRM	staff requirements memorandum (issued by Secretary of the NRC)
SSAB	site-specific advisory board
UMTRA	Uranium Mill Tailings Remedial Action [Project]
UMTRCA	Uranium Mill Tailings Remedial Control Act
UV	ultraviolet
WAC	waste acceptance criteria

1 INTRODUCTION

In September 2005, the U.S. Nuclear Regulatory Commission (NRC) staff published, for public comment, NUREG-1757, Draft Supplement 1, "Consolidated NMSS Decommissioning Guidance: Updates to Implement the License Termination Rule Analysis." Making the staff guidance available for comment provides a mechanism for public involvement in the NRC's decommissioning program. The staff received 12 comment letters from various stakeholders, including two licensees, four States, four public interest groups, one solid waste industry association, and one private citizen. The commenters and their affiliations are shown in Table 1, along with the accession number (ML number) of the comment in the NRC's Agencywide Documents Access and Management System (ADAMS).

Table 1. Stakeholder Comments on Draft NUREG-1757, Supplement 1

Affiliation and Name of Commenter	ADAMS Accession Number
Association of State and Territorial Solid Waste Management Officials: J. Deckler	ML060040128
Citizens Environmental Coalition: F. Gottdiener	ML053630098
Coalition on West Valley Nuclear Wastes: R. Vaughan	ML060050273
Colorado Department of Public Health and the Environment: S. Tarlton	ML060040110
Connecticut Yankee Atomic Power Company: G. van Noordennen	ML060040144
Kennecott Uranium Company: O. Paulson	ML060040118
J. Lieberman	ML060110183
New Jersey Department of Environmental Protection: J. Lipoti	ML060040122
New York State Department of Environmental Conservation: B. Youngberg	ML060050277
Nuclear Information and Resource Service; Sierra Club: D. D'Arrigo and P. Gunter; J. Johnsrud	ML053630099
Save the Valley, Inc.: R. Hill	ML060040142
Washington Department of Health: A. Scroggs	ML053630095

In 2006, the staff reviewed public comments on Draft Supplement 1 and determined a path forward for addressing the comments and finalizing the guidance. The staff also received input from the NRC's Advisory Committee on Nuclear Waste on the staff's plans to finalize guidance. On July 5, 2006, the staff completed SECY-06-0143 ("Stakeholder Comments and Path Forward on Decommissioning Guidance to Address License Termination Rule Analysis Issues"), which provided the Commission with a summary of the results of stakeholder comments on the draft guidance and requested Commission approval of staff recommendations for finalizing the decommissioning guidance. Supplement 1 was not finalized as a separate document. Instead, updated sections from Supplement 1 have been placed into the appropriate locations in revisions of Volumes 1 and 2 of NUREG-1757.

This present document lists stakeholder comments and provides the NRC staff responses to the comments. In reading the comments and responses, note the following:

- The comments have been grouped by issue.
- The comment numbers are added by the NRC staff for convenience and to simplify cross-referencing.
- The content of the comments is taken directly as provided by the commenters. In a few cases, minor editorial changes have been made by the NRC staff, only for readability.
- The formatting in original comment letters has in some cases been altered to fit this present document. The NRC staff has tried to retain formatting that is pertinent to the comments.
- The NRC staff uses a shorthand to refer to the different volumes of NUREG-1757. “Volume1" refers to NUREG-1757, Volume 1, Revision 2. “Volume 2" refers to NUREG-1757, Volume 2, Revision 1.

NUREG-1757 is intended for use by applicants, licensees, NRC license reviewers, and other NRC personnel. It is also available to Agreement States and the public. NUREG-1757 is not a substitute for the NRC regulations, and compliance with it is not required. NUREG-1757 describes approaches that are acceptable to the NRC staff. However, methods and solutions different than those in the NUREG will be acceptable, if they provide a basis for concluding that the decommissioning actions are in compliance with the NRC regulations. This present coment response document is not part of NUREG-1757 and does not constitute guidance.

2 GENERAL ISSUES

2.1 Comment from the Association of State and Territorial Solid Waste Management Officials

Comment: On its broadest interpretation, the revisions to NUREG 1757 provide mechanisms for site cleanups to achieve less than unrestricted release. Although we realize that environmental cleanups in general have allowed increasing use of restricted use cleanups, we would caution the Commission to continue to clearly state that the preferred course of action is to achieve cleanup to unrestricted use levels. Lesser cleanup, while allowable in certain situations, should continue to be an option that requires additional justification and scrutiny.

Response: The Commission clearly stated in the Statements of Consideration for the License Termination Rule (LTR) (Federal Register, 62FR39069, July 21, 1997) that release for unrestricted use is the Commission's preferred option. The staff states the same in Section M.1 of Appendix M, Volume 1.

2.2 Comment from the Citizens' Environmental Coalition

Comment: First off, I appreciate your release of the draft updates to implement the License Termination Rule Analysis. My group is currently engaged with other local and national environmental groups to ensure a comprehensive cleanup at the West Valley Nuclear Site in West Valley, NY. As you know, the License Termination Rule will set the standards for cleanup at this site. The nuclear material on site has the potential to affect the lives of the Western New York community and the entire Great Lakes watershed for hundreds of years. I am writing to request that you extend the comment period for another month, until the end of January 2006. Many of us in the environmental community will be taking time off within the next two weeks to be with our families and it is not the most convenient time to review a 300-page draft change to the LTR. Extra time is essential to confer with the other groups working on the site and ensure that we can amass input on these regulations. It is vital that the NRC receive the input of community groups on this issue, since we are the ones who will be feeling the true effects of the cleanup. Thank you for your consideration.

Response: The NRC staff believes that the 90-day public comment period was sufficient time for organizations to review and provide comments on the Draft Supplement 1. Therefore, staff did not extend the time for submitting comments. However, comments received after the formal comment period were considered by staff in finalizing the guidance.

2.3 Comment from the Coalition on West Valley Nuclear Wastes

Comment: I request a time extension for comments on NUREG-1757, Supplement 1. The following incomplete comments are submitted at this time, but additional time should be provided so that I and others may submit more complete comments.

The concept of Partial Restricted Release (page II-57 ff.) needs a more comprehensive review and implementation process than is provided by this comment period on a draft guidance document.

Finality of Decommissioning Decisions (page II-61 ff.) needs a more comprehensive review and implementation process than is provided by this comment period on a draft guidance document.

Procedures for onsite disposal of radioactive waste, page III-1 ff., need a more comprehensive review and implementation process than is provided by this comment period on a draft guidance document.

Response: The NRC staff believes that the 90-day public comment period was sufficient time for organizations to review and provide comments on the Draft Supplement 1. Therefore, staff did not extend the time for submitting comments. However, comments received after the formal comment period were considered by staff in finalizing the guidance.

2.4 Comments from the Colorado Department of Public Health and the Environment

Comment 2.4.1

Comment: While many of these proposals individually appear to be feasible, taken together, there may be relief for licensees at the cost of a reduction of protection of the environment. If one were to combine the practices of scenario relief based on short term land use, invoke intentional mixing of soil, and then reburying that material on site, the original source term that would otherwise be required to be remediated and sent offsite will still be present, but without assurance that groundwater or biota are adequately protected. The “diluted” values from mixing would possibly be used as inputs to a model that doesn't address sufficient pathways due to scenario picking, resulting in source terms being left on the site, possibly no longer under a license.

It appears that some of these proposals actually run counter to the lessons-learned outlined in SECY-03-0069, particularly with trying to avoid legacy sites. Allowing the resurgence of on-site burial of radioactive waste and intentional mixing of waste and burying it onsite with the possibility of having to readdress the materials at closure is not consistent with avoiding legacy sites.

Response: The NRC staff disagrees with the comment that there may be a reduction in protection of the environment. The staff requires licensees to comply with the LTR, which the NRC determined provides a sufficient level of protection. The LTR provides performance-based dose criteria, which allow flexibility for licensees in demonstrating compliance. Thus, the staff believes that the revised guidance does not reduce protection. Rather, the guidance provides alternate approaches to demonstrating compliance with the LTR criteria.

Regarding the onsite disposal of materials, 10 CFR 20.2002 has existed and onsite disposals have been approved for many years. The NRC staff has modified the guidance to identify only one generally acceptable approach for approving onsite disposals, when doses are no greater than a few mrem per year, i.e., well below the 25 mrem per year unrestricted-use criterion. The staff believes that this change will reduce the likelihood that onsite disposals would need to be remediated at license termination and thus would reduce the possibility of legacy sites due to onsite burials.

Comment 2.4.2

Comment: It is not clear that on-site burial and intentional mixing are consistent with State requirements, or those of the other Federal agencies. This would not be consistent with the intent of harmonization of standards so long sought by the agencies through the ISCORS.

Response: The NRC staff acknowledges that NRC policies for onsite burial and intentional mixing may differ from policies of States and other Federal agencies. However, the

Commission has previously determined that onsite burial and intentional mixing are acceptable under the LTR and other NRC regulations. NUREG-1757 provides guidance to implement the NRC's regulations and Commission-approved policies.

Comment 2.4.3

Comment: While guidance isn't mandatory, incorporating these practices into guidance is defacto approval and may lead to unintended consequences such as additional legacy sites. This reviewer believes the LTC license, intentional mixing, and onsite burial of radioactive wastes should not be included in the final document, and should be subject to rulemaking.

Response: In developing the guidance on these issues, the staff carefully considered the possibility of future legacy sites. The staff believes that the LTC license, intentional mixing, and onsite burial of radioactive materials will only be used infrequently, in limited circumstances. The staff believes that limited use of these alternate approaches will not lead to additional legacy sites or other negative unintended consequences. In part to reduce the possibility of future legacy sites, the staff has modified the guidance on onsite disposals, to identify only one generally acceptable approach, that of doses no greater than a few mrem per year.

In the LTR Analysis paper (SECY-03-0069), the NRC staff determined that the recommended changes to guidance are within the scope of the LTR requirements and thus did not require rulemaking. The Commission agreed with that determination. Thus, the NRC staff believes that the subject changes are appropriately made through Commission policy papers and guidance documents.

Comment 2.4.4

Comment: It may also be inferred from the NUREG-1814 list of sites that practices proposed in NUREG-1757 are driven by a lack of funding over anything else, since the affected sites appear to not have a responsible party or available funds for cleanup or surety. It may be better in the long run to go for an appropriation to clean these sites up properly (or turn them over to EPA) rather than adopt practices that are atypical, such as onsite burial and intentional mixing.

Response: The NRC staff disagrees with this comment. The staff and the Commission have determined that the flexibility provided in the LTR is appropriate and that licensees should be able to pursue these alternative practices, as long as the dose criteria and other requirements of the LTR are met. Because of the conditions on their use, the NRC staff believes these alternative practices are likely to be used only infrequently.

Comment 2.4.5

Comment: [re: Volume 2, Section 4, Appendices D, E, I, and Sections 2.1 and 2.8] Using the MARSSIM and MARLAP guidance documents to help generate data is appropriate. The necessary assessment and characterization goal-setting processes that involve stakeholders and public acceptance are missing. One may implement the guidance perfectly and not achieve closure because of political and public relations missteps.

Response: Openness in its activities is a strategic goal of the NRC. However, in general, licensees are not required by regulations to involve stakeholders in setting assessment and characterization goals for surveys and other measurement activities. Therefore, the NRC staff disagrees with this comment and has made no changes to the guidance.

Comment 2.4.6

Comment: [re: Volume 2, Section 4, Confirmatory Survey discussion, second new paragraph] There is a basic assumption in this paragraph that the goals of the sampling program are well defined. This is not always a reasonable assumption. The licensed facility will always choose the least costly and most uncertain sampling plan. The public in the area of the regulated facility will always choose the least uncertain sampling plan without regard to cost. Both approaches can be considered "technically sound." Consideration must be given to the public information and involvement aspects of closure. That part of the paragraph dealing with side-by-side surveys is acceptable.

Response: In general, licensees are not required by regulations to involve stakeholders in planning the details of surveys or sampling plans. Therefore, the NRC staff disagrees with this comment and has made no changes to the guidance. See also the response to Comment 2.7.

Comment 2.4.7

Comment: [re: Volume 2, Appendix D, Section 2.1] That part of the planning phase dealing with setting the cleanup goals is missing.

Response: The discussion of Appendix D applies only to the data life cycle. Setting cleanup goals is an important part of the overall planning phase for decommissioning, but it is not a part of the data life cycle and so is not included in the referenced section.

Comment 2.4.8

Comment: [re: Volume 2, Appendix D, Section 2.2] The validity of this process is dependent on obtaining good reliable samples from the field. If this cannot be done all the rest of this document is meaningless.

Response: The NRC staff agrees that obtaining reliable samples from the field is critical. However, the MARLAP document addresses only the radioanalytical processes beginning at the point a sample is obtained. Obtaining reliable, representative samples is not the focus of MARLAP. Guidance on obtaining samples is provided in Appendix A of Volume 2 and in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), which is referenced in Appendix A. The NRC staff has made no changes to the guidance in response to this comment.

Comment 2.4.9

Comment: [re: Volume 2, Appendix I.2, Source Term Abstraction] The rationale for using the arithmetic mean only, when doing dose modeling, is not convincing. More justification is needed to accept these assumptions to achieve uniformity. The use of a weighted average technique would resolve this issue; if the initial assumptions described are true, then the weighted average becomes the arithmetic mean.

Response: The NRC staff agrees that weighted means (weighted by area or volume, as applicable) may be appropriate when samples are not uniformly spaced. The staff has modified the guidance in Volume 2, Section I.2.3.2, to reflect this.

2.5 Comments from Connecticut Yankee Atomic Power Company

Comment 2.5.1

Comment: NUREG-1757, Draft Supplement 1, proposes changes that should provide some regulatory relief for future decommissioning work. Some of the important changes include:

1. Allow reasonable scenarios (versus the worst case scenarios that have been generally used to date),
2. Allowing intentional mixing of contaminated soil, and
3. Allow future land use assumptions to be based on a 100 year versus a 1000 year horizon.

CYAPCO is supportive of the above changes, as these changes should make dose modeling and remediation more reasonable in the future while continuing to protect the safety of the public.

Response: The NRC staff notes the comment.

Comment 2.5.2

Comment: In addition, the NRC recommends the use of the Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP, 2004) as part of decommissioning planning. The MARLAP describes a methodology for planning, conducting, evaluating, and documenting environmental radiation surveys conducted to demonstrate compliance with cleanup criteria. The NRC is also recommending that the MARLAP should be used in concert with the Multiagency Radiation Survey and Site Investigation Manual (MARSSIM, 2000) as part of the Data Quality Objectives process in performing final status and potentially other surveys as part of the remediation and the Final Status Survey process. However, it is not clear that the NRC will require the existing plant sites which are undergoing decommissioning to follow the above recommendation (i.e., use of the MARLAP). CYAPCO recommends some flexibility in the required application of the MARLAP for plant sites which are currently in the advanced stage of decommissioning and cleanup activities.

Response: The recommendation to use the MARLAP for decommissioning planning is only guidance and is not a requirement. In addition, the NRC staff suggests that licensees consider use of MARLAP when appropriate and does not suggest changing a program that is already well developed, unless significant improvements could be made.

2.6 Comments from Kennecott Uranium Company

2.6.1 Comment:

Kennecott Uranium Company is the operator of the Sweetwater Uranium Project licensed under Source Material License #1350 located in the Great Divide Basin in Sweetwater County, Wyoming. The Sweetwater Uranium Project contains one of the four remaining conventional uranium mills in the United States.

Kennecott Uranium Company has reviewed NUREG-1757 Supplement 1 Consolidated NMSS Decommissioning Guidance Updates to Implement the License Termination Rule Analysis Draft Report for Comment. This document appears to allow certain licensees wide latitude in

addressing waste materials similar to 11e.(2) byproduct material, while actual conventional uranium recovery licensees are required to use the very stringent criteria imposed on the reclamation of uranium mill tailings impoundments by the Nuclear Regulatory Commission (NRC) through 10 CFR Part 40 Appendix A for 11e.(2) byproduct material itself. Materials with similar associated radiological risks should be treated in the same manner in the course of reclamation. If the risks associated with 11e.(2)-byproduct material require reclamation under the stringent standards of 10 CFR Part 40 Appendix A, then other materials that pose similar radiological risks should be handled in the same manner. As detailed below, the NUREG does not provide the same level of protection of the public heath and safety as the standards of 10 CFR 40 Appendix A.

THE STRINGENT NATURE OF 10 CFR PART 40, APPENDIX A

10 CFR Part 40 Appendix A imposes stringent requirements on the disposal and reclamation of uranium mill tailings (11e.(2)-byproduct material). These requirements include:

- **1000 Year Life and a Minimum of a 200 Year Life for Reclamation**

  10 CFR Part 40 Appendix A states:

  Criterion 6--*(1) In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design1 which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years,*

  This is a very stringent criterion and requires a substantial design that will account for damage to the cover by erosion for at least 200 years. This design is costly to implement.

- **Inflation Adjusted Fee to Cover Long Term Care and Surveillance**

  10 CFR Part 40 Appendix A in Criterion 10 states:

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

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

  This stringent requirement requires that the site holder provide funds to cover any long-term costs related to the reclaimed site. This minimum amount is computed based upon the annual funds required to cover long-term costs related to the site earned at a 1-% real rate of return from the initial payment. The minimum amount is escalated on a site-specific basis

if site surveillance or control requirements are determined to be significantly greater that those anticipated. For example, the minimum charge will be escalated if some degree of active care (e.g., vegetation control, maintenance of erosion control measures) is necessary to preserve the as-designed conditions of the site.

- **Long Term Custodian**

Consistent with Section 83 of the Atomic Energy Act, 10 CFR Part 40 Appendix A criterion 11 requires that reclaimed uranium mill tailings sites be transferred to a long term custodian such as the Department of Energy, another federal agency or a state. It is expected that the Department of Energy (DOE) will be the custodial agent for most, if not all, of these sites. The custodial agency pursuant to a perpetual NRC license implements the provisions of the long-term surveillance plan to ensure the integrity of the site. Since DOE is a perpetual licensee, there is always an agency in place to address any concerns about material control and accountability and site security. Section C of Criterion 11 states:

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

- **No Active Maintenance**

Criterion 12 requires that no active/ongoing maintenance be required for reclaimed uranium mill tailings sites, stating:

Criterion 12--*The final disposition of tailings, residual radioactive material, or wastes at milling sites should be such that ongoing active maintenance is not necessary to preserve isolation.*

Reclamation of uranium mill tailings impoundments rests upon four (4) legs, those being:

- Reclamation to last 1,000 years (minimum of 200 years)
- A long term custodian in the form of the Federal Government or a State
- Payment of a fee (minimum of $250,000, in 1978 dollars) that will earn interest at a 1-% real rate of return that will cover annual costs related to the site
- Requirement that the reclaimed tailings require no active maintenance

- **Protection of Groundwater**

In addition, 10 CFR Part 40 Appendix A contains stringent requirements for the protection of groundwater. These are very stringent requirements that an entire industry is required to meet and are summarized in the beginning of Criterion 5 as follows:

Criterion 5--*Criteria 5A-5D and new Criterion 13 incorporate the basic ground-water protection standards imposed by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E (48 FR 45926; October 7, 1983) which apply during operations and prior*

to the end of closure. Ground-water monitoring to comply with these standards is required by Criterion 7A.

In regards to the management and disposal of 11e.(2)-byproduct material, the Commission prefers to consolidate these wastes in a few large easily managed and monitored impoundments as opposed to a number of scattered sites. This is summarized in 10 CFR Part 40 Appendix A Criterion 2 which states:

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

This philosophy is also used in addressing spent nuclear fuel, hence the construction of a single large storage/disposal facility near Yucca Mountain, Nevada.

The National Mining Association's and the Fuel Cycle Facilities Forum's White Paper on Direct Disposal of Non-11e.(2) Byproduct Materials in Uranium Mill Tailings Impoundments discusses non-proliferation of sites stating:

The use of existing mill tailings impoundments to dispose of non-11e.(2) byproduct material also is philosophically consistent with Criterion 2 of Appendix A which requires NRC "to avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations" and would be consistent with NRC's long-standing policy favoring disposal over storage of LLRW wastes.

(See e.g., 58 Fed. Reg. 6730, 6731 (February 2, 1993), where the Commission explained that: "Although LL[R]W can be safely stored, NRC believes that the protection of the public health and safety and the environment is enhanced by disposal, rather than by long-term, indefinite storage of waste. Disposal of waste in a limited number of facilities licensed under 40 CFR Part 61 or compatible Agreement State regulations, will provide better protection of the public health and safety and the environment than long-term storage at hundreds or thousands of sites around the country.")

Criterion 2 clearly recognizes the benefit of the placement of radioactive material in large centralized sites as opposed to many small, scattered sites in order to reduce perpetual surveillance obligations and enhance long-term security. Clearly based on the above citation from 58 Fed. Reg. 6730, 6731 (February 2, 1993), the Commission agrees with this concept and the concept that wastes should be placed for disposal rather than be stored for indefinite periods as is proposed in NUREG-1757. A small number of large monitored disposal sites poses far fewer risks than a large number of decentralized disposal sites.

10 CFR PART 40 APPENDIX A REGULATIONS ARE MORE COMPREHENSIVE AND STRINGENT THAN NUREG-1757 STANDARDS

The regulations addressing 11e.(2)-byproduct material are clear and specific. NUREG-1757 Supplement I Consolidated NMSS Decommissioning Guidance Updates to Implement the

License Termination Rule Analysis addresses on site reclamation of other types of wastes which are in some cases similar to 11e.(2) byproduct material. NUREG-1757 Supplement I Consolidated NMSS Decommissioning Guidance Updates to Implement the License Termination Rule Analysis establishes certain definitions, which are as follows:

Durable institutional controls.
A legally enforceable mechanism for restricting land uses to meet the radiological criteria for license termination (10 CFR 20, Subpart E). Durable institutional controls are reliable and sustainable for the time period needed.

Reasonably foreseeable land use.
Land use scenarios that are likely within 100 years, considering advice from land use planners and stakeholders on land use plans and trends.

Robust engineered barrier.
A man-made structure that is designed to mitigate the effect of natural processes or human uses that may initiate or accelerate release of residual radioactivity through environmental pathways. The structure is designed so that the radiological criteria for license termination (10 CFR 20, Subpart E) can be met. Robust engineered barriers are designed to be more substantial, reliable, and sustainable for the time period needed without reliance on active ongoing maintenance.

These definitions, while establishing a certain level of protection, do not specify the same levels of protection that 10 CFR Part 40 Appendix A requires in regard to an earthen cover, long term institutional controls or a long term governmental site custodian that will own the site in perpetuity.

In addition, it describes a Long Term Control License, stating:

The LTC license is preferred over the LA/RC option for institutional controls involving NRC, as NRC licensing and enforcement is a proven approach, and the LA/RC option has some limitations: it has not been implemented by the NRC or legally tested; NRC's ability to enforce the LA/RC depends on the laws of the jurisdiction where the site is located; and it would be more difficult for NRC to enforce the LA/RC, in comparison to the LTC license. The LTC license is preferred for sites that will require more complex monitoring or maintenance activities. Complex monitoring or maintenance activities could include maintenance of an engineered barrier and groundwater or radiological monitoring activities, which require the site owner to have necessary knowledge, expertise, or technical abilities to carry out these activities and comply with all provisions of the LTC license.

The NUREG does not require construction of covers with a 1,000-year life. It merely states:

In some cases, protection can be sustained for long time periods by using robust designs that do not rely on ongoing active maintenance. For example, erosion protection covers designed for up to 1000 years that have been used for uranium mill tailings sites may also have use at some decommissioning sites.

Regarding covers lasting 1,000 years, it only states that they "... may also have use..." It does not require them for materials posing a similar radiological risk to 11e(2)-byproduct material.

The NUREG discusses funding, stating:

The LTR requires that sufficient financial assurance be established to enable an independent third party, including a governmental custodian of a site, to assume and carry out responsibilities for any necessary control and maintenance of the site. A trust fund, or other financial assurance mechanism, would be established independent from the custodian and managed by a trustee. Sufficient funds would need to be placed into the trust fund to produce an annual income that is sufficient to cover (1) the annual average costs of controls, maintenance, and monitoring, if needed; (2) independent third party oversight costs; and (3) trustee fees and expenses. Thus, the fund balance would be sustained over time and not depleted because the annual costs of controls and maintenance are provided by the annual interest income.

These funding requirements are nowhere near as stringent as those required for uranium mill tailings sites.

The NUREG discusses site oversight, stating:

The LTR requires an independent third party to provide oversight to assure that the custodians' controls are performed and corrective actions are taken, as needed, to sustain the controls and maintenance. The independent third party also would act as a backup to the custodian to assume and carry out the responsibilities for control and maintenance, if needed. The independent third party could be a government entity, or even NRC (under its new policy for the LTC license or legal agreement/restrictive covenant) if other government entities do not accept this responsibility.

This language does not even approach the custodial requirements for uranium mill tailings sites. This language does not require a governmental long-term custodian such as a State or the Federal Government.

The document clearly recognizes the inherent superiority of cover designs for uranium mill tailings impoundments, stating:

It should be noted, however, that for those cases where an erosion control cover is designed in accordance with the uranium mill tailings guidance in NUREG-1623, a case might be made for a durable, long-lived engineered barrier that does not rely upon ongoing active maintenance (i.e., maintenance needed to assure that the design will meet specified longevity requirements) and associated future costs. For this case, no degradation of the erosion control cover would be assumed.

It does not however require a cover design as described in NUREG-1623 for material posing a similar radiological risk to 11e.(2)-byproduct material.

The NUREG does reference rock durability requirements for erosion protection covers for uranium mill tailings impoundments, stating:

A procedure for determining the acceptability of a rock source is presented in NUREG-1623 and generally includes the following:

- *Test results from representative samples are scored on a scale of 0–10.*
- *The score is multiplied by a weighting factor, which focuses the scoring on those tests that are the most applicable for the particular rock type being tested.*

- *The weighted scores are totaled, divided by the maximum possible score, and multiplied by 100 to determine the rating.*
- *The rock quality scores are then compared to the criteria, which determines acceptability.*

The document essentially endorses the cover design requirements for uranium mill tailings impoundment, stating:

The staff could approve an engineered barrier design that is effective and maintains control of the material for a period exceeding 1000 years. Using the guidance and rationale contained in NUREG1623, the barriers should be designed to resist severe localized rainfall events and large floods on nearby streams. The design rainfall event should be the PMP, and the design flood should be the PMF. A design that meets the suggested flooding and erosion protection criteria of NUREG-1623 is acceptable. The rock quality score should be at least 85, and selection of input parameters to various models should account for the unknowns associated with a very long stability period and the high-risk site.

It does not however require the use of uranium mill tailings impoundment cover design for materials posing similar radiological hazards to uranium mill tailings.

In spite of the NUREG's reference to and endorsement of the requirements for the reclamation of uranium mill tailings sites and discussion of their applicability to onsite radioactive waste disposal, it does not require them. In addition, it ignores an important tenet of radioactive waste disposal, that being non-proliferation of sites.

This is an important issue because radioactive materials posing similar radiological risks should be regulated in the same fashion. This issue is addressed in the National Mining Association (NMA's) comments on Approaches to an Integrated Framework for Management and Disposal of Low-Activity Radioactive Waste: Request for Comment Federal Register (FR) Vol. 68, No. 222 / Tuesday, November 18, 2003. The National Mining Association (NMA's) comments state:

If the underlying assumption ("ideally wastes with similar risks should be managed proportionately to the risk they represent") is valid the logic is equally applicable to 10 CFR Part 61 LLRW disposal facilities, 10 CFR Part 40 11e.(2) disposal facilities and Subtitle D and other landfills.

NUREG-1757 CREATES A DOUBLE STANDARD FOR THE RECLAMATION AND DISPOSAL OF RADIOACTIVE WASTES

The basis of these regulations is the protection of public health, safety and the environment, specifically protection from radiological risks. Implementation of NUREG-1757 as drafted would create a double standard for the reclamation/disposal of radioactive wastes. Uranium mill tailings would be subject to the very stringent requirements of 10 CFR Part 40 Appendix A while other similar materials would be subject to the less stringent requirements of this NUREG. In addition, this NUREG would allow disposal sites to proliferate.

This problem is not a hypothetical one. It is a real one. Shield Alloy Metallurgical Corporation has a site in Newfield, New Jersey. It lies essentially in the center of the Boro of Newfield. It contains wastes that comprise "20,000 cubic meters of high ratio and standard ferrocolumbian slag which contains about 400 pCi/g of uranium, a total of about 23 Curies." (Personal communication - State of New Jersey). 400 picocuries per gram of natural uranium is approximately 0.6 milligrams per gram which is 0.06%. Given that its uranium content is greater

than 0.05%, it is licensable source material. In fact, these materials are regulated under a source material license. It can only be assumed unless proven otherwise that this material is in radiometric equilibrium meaning that it has present within it isotopes from the entire uranium-238 and -235 decay chains in their naturally occurring activities.

This site and the materials contained in it are discussed in detail in a document located on the Commission's Web site at:

http://www.nrc.gov/info-finder/decommissioning/complex/shieldalloy-metallurgical-corporation-smc-.html

This document discusses the material on site, stating:

This material, called pyrochlore, is a concentrated niobium ore containing greater than 0.05 percent natural uranium and natural thorium. SMC was licensed by the NRC to ship, receive, possess, use and store source material under SMB-743. During the manufacturing process, the facility generated slag, and baghouse dust. Currently, there is approximately 18,000 m^3 (635,580 ft^3) of slag and approximately 15,000 m^3 (529,650 ft^3) of baghouse dust contaminated with natural uranium, thorium, and daughters stored on-site.

This document discusses the future plans for the site and the contained materials, stating:

Consequently, the NRC staff developed guidance on the use of a possession only license for long term control (LTC) of the site and provided it to SMC in May 2004. A meeting between NRC and SMC was held on June 29, 2004 to ensure that SMC understands the guidance. NRC staff currently anticipates SMC's submittal of a revised decommissioning plan in October 2005.

Although the LTC approach is in the early stages of planning, State of New Jersey officials (e.g., New Jersey Department of Environmental Protection (NJDEP), Senator Corzine, State Senator Madden) have expressed concerns with the use of NRC's LTC license for the SMC site. Their concerns are: 1) the proposed approach would create an unlicensed low-level radioactive waste disposal facility; 2) that there has not been a meaningful opportunity for community discussion; and 3) the radioactive material should be disposed of and not left for future generations.

NRC addressed these concerns by explaining that the LTC license provides institutional controls after decommissioning of the site, and therefore is not a low-level radioactive waste disposal facility. The SMC site was never used for the disposal of radioactive materials from other sites, and it is not planned to be used for that purpose in the future. NRC also explained that this policy is the result of many years of NRC experience and that NRC's role enhances the assurance of proper restricted use. Furthermore, restricted use under the LTR has been a decommissioning option available since the LTR was finalized in 1997. Finally, opportunities for public involvement have already occurred during NRC's licensing meetings that are open to the public. Additionally, in the future, there will be many opportunities for community discussion, as required by the NRC regulations, during SMC's development of the decommissioning plan and NRC's review of the plan.

This material clearly possesses the activity of uranium mill tailings derived from ores containing 0.06% natural uranium. In fact, its activity should be slightly greater than tailings derived from a uranium ore in equilibrium containing 0.06% natural uranium, since the uranium is still present in the ShieldAlloy material while in uranium mill tailings most (usually greater than 90%) of the uranium has been removed by the milling process leaving primarily uranium decay progeny in the tailings. These materials are calculated to contain a maximum aggregate activity of

2.44E-09 curies per gram assuming no loss of radon from the material and presence of all decay products in equilibrium activities. This calculation is based on Determination of the Generic Waste Acceptance Criteria Used in The National Mining Association's and the Fuel Cycle Facilities Forum's White Paper on Direct Disposal of Non-11e.(2) Byproduct Materials in Uranium Mill Tailings Impoundments (Oscar Paulson - 2005).

This ShieldAlloy material is equivalent in activity and by extension radiological risk to some uranium mill tailings regulated under the stringent requirements of 10 CFR Appendix A. For example, the tailings at the Sweetwater Uranium Project represent wastes from the processing of uranium ore with an average grade of 0.029% natural uranium which is less than half of the uranium concentration (and by extension less than half of the activity) of the ShieldAlloy wastes. The tailings at the Sweetwater Uranium Project should represent roughly half of the radiological risk of the ShieldAlloy wastes yet they are regulated under the stringent requirements of 10 CFR Part 40 Appendix A while the ShieldAlloy materials may ultimately be allowed to be capped and left in the midst of a populated area under a Long Term Control License. Materials of similar risk should be regulated similarly. If in fact materials with these low activities are of truly low risk, than conventional uranium recovery licensees should be allowed the same latitude with their tailings as ShieldAlloy may be allowed with their wastes. If in fact these materials require the stringent reclamation requirements imposed by 10 CFR Part 40 Appendix A, then the requirements of 10 CFR Part 40 Appendix A should be imposed on the ShieldAlloy materials. It is also interesting to note that most uranium mill tailings sites are located in remote arid areas in the American West while the ShieldAlloy materials are located essentially in the center of a town in a reasonably wet area. Logic would dictate that materials located in the center of an inhabited area should be reclaimed to higher standards than materials located in arid uninhabited areas.

A solution exists to the problems posed by the ShieldAlloy material and materials like it. The National Mining Association (NMA) and the Fuel Cycle Facilities Forum submitted a white paper to the Commission entitled The National Mining Association's and the Fuel Cycle Facilities Forum's White Paper on Direct Disposal of Non-11e.(2) Byproduct Materials in Uranium Mill Tailings Impoundments. This document proposes a solution to the conundrums posed by materials such as the ShieldAlloy material and to the issues of proliferation of sites, which would be created by NUREG-1757. This document is being included by reference. This document proposes disposal of materials similar to the ShieldAlloy materials in uranium mill tailings impoundments. In addition, waste materials containing extractable quantities of uranium such as the ShieldAlloy material could be processed by conventional uranium mills as alternate feed in which case the processing wastes following removal of the uranium would be by definition 11e.(2) byproduct material and be placed in the tailings impoundment.

Materials similar to 11e.(2) byproduct material currently placed in uranium mill tailings impoundments would include any materials that are licensable source material [that] either already contain all of the decay progeny present in uranium mill tailings or will in the future once the decay progeny fully ingrow (such as the ShieldAlloy materials), materials contaminated with source material which must be removed from a given site and any waste materials containing the decay chain progeny from source material from which the original source material has been either wholly or partially removed.

The Commission agrees in principle with this concept. Chairman Meserve (Commission Voting Record, SECY-99-0012: Use of Uranium Mill Tailings Impoundments for the Disposal of Waste Other than 11e.(2) Byproduct material and Reviews of Applications to Process Material Other than Natural Uranium Ores, July 26, 2000) agreed with the NRC Staff in that mill tailings sites may be used for the direct disposal of non-11e.(2) materials and stated that:

"Mill tailings sites can clearly provide appropriate disposal locations for materials that are physically, radiologically, and chemically similar to section 11e.(2) byproduct material. This might include non-AEA material (e.g., NORM/TENORM), as well as AEA material (i.e., source, 11e.(1) byproduct material, and special nuclear material). Moreover, in light of the fact that tailings impoundments must comply with requirements that are consistent with standards for the disposal of similar hazardous chemical wastes, see 42 USC §§ 2022(b)(2), 2114(a)(3), such impoundments offer the opportunity for safe disposal of certain materials that are regulated under RCRA, TSCA, and CERCLA. Thus, consistent with Commission policy of lowering the [cost of] decommissioning waste disposal and using existing mill tailings impoundments to dispose of materials in circumstances in which there is adequate protection of the public health and safety and the environment, I conclude that the Commission should allow for the disposal of material other than 11e.(2) byproduct material in tailings impoundments."

In addition, the Strategic Assessment Rebaselining Initiative (SARI) noted:

"Because several…sites [currently undergoing decommissioning] have large quantities of uranium-and thorium-contaminated waste with characteristics similar to those of mill tailings, it may be cost-effective to dispose of decommissioning waste at existing mill sites..." U.S. Nuclear Regulatory Commission, Strategic Planning Framework, 9-11 (September 16, 1996) (emphasis added).

CONCLUSION

Kennecott Uranium Company believes that the following reclamation and disposal standard should be created for the above-described classes of materials. Kennecott Uranium Company proposes the following regulatory language to be included in NUREG-1757:

Waste materials generated at any licensed site during operation, decommissioning, decontamination and/or reclamation that are either:

1. *Licensable source material;*

2. *materials contaminated with source material that must be otherwise addressed during decommissioning and decontamination; or*

3. *waste materials containing the decay chain progeny from source material from which the original source material has been either wholly or partially removed or never was initially present*

shall either be

1. *processed as alternate feed at a licensed uranium mill provided that the contained source material is uranium in its naturally occurring isotopic proportions and it is present in extractable quantities; or*

2. *placed for disposal in either an on-site or off-site impoundment constructed in accordance with 10 CFR Part 40 Appendix A and 40 CFR Subpart D—Standards for Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended.*

Inclusion of this language will insure that materials of similar radiological risk to uranium mill tailings (11e.(2) byproduct material) will be treated in an identical manner to 11e.(2) byproduct material thus insuring that materials posing similar risks are addressed in a similar manner.

2.6.2 Response:

This comment raises a broader issue concerning a consistent regulatory scheme for material containing uranium and thorium, regardless of their source. This concern is beyond the scope of the decommissioning guidance effort, because the staff is not revising the regulations (only guidance supporting the regulations and as directed by the Commission). The staff notes that although the regulations for low-level waste disposal (10 CFR Part 61), uranium mill tailings disposal (10 CFR Part 40, Appendix A), and license termination differ, due in part to their statutory origins, the regulations have generally similar features and provide similar protection of public health and safety and the environment. To address the comment about different regulatory approaches and to help licensees understand the similarities and differences among these approaches, the NRC staff has prepared a comparison of the approaches to restricted use and institutional controls for facilities regulated under the LTR, Part 40, and Part 61. This comparison is provided in the appendix to this present document and will be provided in the future on the NRC's decommissioning Web page.

The following addresses misconceptions and other concerns about statements in this comment. First, the comment states that NRC's regulations in 10 CFR Part 40, Appendix A, impose very stringent requirements. The NRC staff acknowledges that the regulations of Part 40, Appendix A, are relatively prescriptive. These regulations reflect the statutory requirements in the Uranium Mill Tailings Radiation Control Act (UMTRCA), which describes the risk management approach and specific criteria that Congress determined to be the appropriate level of protection for 11e.(2) byproduct material resulting from the reclamation of uranium mill tailings impoundments.

Second, the comment states that the NUREG guidance does not provide the same level of protection as 10 CFR Part 40, Appendix A, and creates a double standard for reclamation. It is important to note that for decommissioning sites, the NRC's LTR is the regulation that established the criteria for license termination for all NRC-licensed sites except uranium recovery and low-level waste disposal sites. The guidance in NUREG-1757 discusses implementation of the LTR and is not the standard; compliance with the guidance is not required. In addition, the LTR was developed as a performance-based regulation that sets specific dose criteria as general performance objectives applicable to a wide variety of licensed facilities. This approach gives licensees the flexibility to customize their decommissioning plans to their type of facility, specific site, and radioactive material. As a result, the LTR does not include the types of specific requirements similar to 10 CFR Part 40, Appendix A, which is applied to one type of facility. However, as the comment acknowledges, many of the fundamental approaches of 10 CFR Part 40, Appendix A, requirements have been included in the decommissioning guidance within the risk-informed framework of the LTR. Although the approaches in the two regulations are different, many of the principles for restricted use sites are similar and both regulatory approaches are protective.

The staff disagrees with the comment that the draft guidance "ignores an important tenet of radioactive waste disposal, that being non-proliferation of sites." The staff revised the guidance to emphasize that the LTC license is a last resort for restricted use sites, of which only a few are expected, and that NRC's ongoing rulemaking to prevent future legacy sites will also help reduce the number of future restricted use sites. Therefore, the staff does not believe that the use of the LTC license will result in proliferation of restricted use sites.

The staff disagrees with the proposed new regulatory language to be included in the guidance. The proposed language would require that materials with a radiological risk similar to that of uranium mill tailings will be treated in an identical manner. Such requirements conflict with the existing regulatory approach of the LTR, which allows a variety of methods for disposal or disposition of residual radioactivity. Also, the suggestion of creating a new standard for decommissioning sites is beyond the scope of the guidance development for NUREG-1757 and could be addressed only by a rulemaking.

2.7 Comment from the New Jersey Department of Environmental Protection

Comment: The New Jersey Department of Environmental Protection (Department) Division of Environmental Safety & Health has reviewed Supplement 1 of NUREG-1757 in the context of the applicability to contaminated sites currently in New Jersey. Shieldalloy Metallugical Corporation (SMC) has submitted a decommissioning plan that calls for leaving 57,000 cubic meters of contaminated slag and baghouse dust in the town of Newfield, New Jersey under the auspices of a Long Term Control (LTC) license. It is interesting that the Nuclear Regulatory Commission (NRC) chose to offer this option in a policy directive, and now this draft guidance, rather than as an update to 10 CFR 20 where it would undergo more rigorous public scrutiny. It appears, as we proceed through the steps of NRC possibly issuing an LTC license, that the citizens of Newfield, including elected officials and appointed planning board officials, have no opportunity to participate in decision-making on a site within their boundaries. The following exchange is from the transcripts of one of the public Site Specific Advisory Board meetings which was attended by staff of the NRC.

> Citizen: So your decision won't be based on whether or not the community submits a petition to you saying no, we don't want this here. That doesn't really hold that much weight with you. As long as they meet the restrictions that you set in place, then that's basically it. So basically having meetings with the public is just to assure the public that it's going to be done in a proper way; not whether or not we're going to stop it?
>
> NRC: That's correct.
>
> Citizen: So in other words, you're saying already that as long as they do what you say, we're stuck with the slag pile.
>
> NRC: If they meet everything that we require.
>
> Citizen: Well, then why are we having public meetings?
>
> NRC: Because maybe you'll raise an issue that causes them to go back and have to reassess.

The Department believes that public input is an essential part of the cleanup of any site.

Response: The NRC staff believes that the LTR provides sufficient protection of public health and safety and provides for sufficient public input (in particular, through requirements in 10 CFR 20.1403 and 20.1405) to license termination decisions. However, it is the licensee who bears the primary responsibility for ensuring that a site meets the regulatory requirements of the LTR. It is the NRC staff's responsibility to determine if the regulations have been met and a license should be terminated. The NRC staff values public input, and citizens are able to provide input into the decision-making process. The NRC staff evaluates and considers that input in making its decisions.

In the LTR Analysis paper (SECY-03-0069), the NRC staff determined that the recommended changes to guidance were within the scope of the LTR requirements and thus did not require

rulemaking. The Commission agreed with that determination. Thus, the NRC staff believes that the subject changes are appropriately made through Commission policy papers and guidance documents.

2.8 Comment from the Nuclear Information and Resource Service and the Sierra Club

Comment: This is a request on behalf of Nuclear Information and Resource Service and the Sierra Club for an extension on the comment period for NUREG-1757 Supp1 implementation guidance for the NRC License Termination Rule.

Our organizations are involved at locations which would implement this guidance and would like an extra 60 days to complete our reviews and provide comments.

As you are no doubt aware, nonprofit organizations must raise resources to provide technical reviews and require time to contact, consult and incorporate the practical experiences from those in the vicinity of sites that have, are or will undergo license terminations under 10 CFR 20 Subpart E. We wish the extension of time to give input from the perspectives of our groups and contacts in communities affected by this guidance.

We had every intent to meet the December 30, 2005 deadline but now realize that will not be possible in more than a very cursory way.

We support the request of Felix Gottdiener of Citizens Environmental Coalition but request 60 days.

We hope you will please consider and decide favorably on this request.

Response: The NRC staff believes that the 90-day public comment period was sufficient time for organizations to review and provide comments on the Draft Supplement 1. Therefore, staff did not extend the time for submitting comments. However, comments received after the formal comment period were considered by staff in finalizing the guidance.

2.9 Comment from the Washington Department of Health

Comment: We would like to have volumetric release limits, or such guidance, established so we are more easily able to determine soil and solid releases. The current “few millirem per year” criteria is not very useful. Most release limits are identified volumetrically.

Response: The NRC staff's current direction in many program areas is to use performance-based criteria, such as dose constraints or dose recommendations. The staff understands that generically acceptable volumetric release concentrations would be useful, but at this time, the NRC staff has not developed or approved such volumetric concentrations for releases of solid material (including soils). However, pathway analysis dose models and codes are available to develop radiological criteria, in terms of soil concentration or surface concentration, that are more directly measurable for operational radiation surveys.

3 RESPONSES TO STAKEHOLDER COMMENTS ON ONSITE DISPOSAL UNDER 10 CFR 20.2002

The comments on onsite disposal under 10 CFR 20.2002 relate to the draft new Section 15.12 of Volume 1.

3.1 Comment from the Coalition on West Valley Nuclear Wastes

Comment: Procedures for onsite disposal should not provide a means for avoiding or evading otherwise applicable license requirements that must be met, for example, for near-surface disposal of radioactive waste.

Response: The NRC staff does not consider onsite disposal to be avoiding license or regulatory requirements. The regulations for land disposal of low-level radioactive waste are applicable only to licensees that dispose of material received from other persons. The existing regulation in 10 CFR 20.2002 allows for alternative methods for licensees to dispose of their own waste materials.

3.2 Comments from the Colorado Department of Public Health and the Environment

Comment 3.2.1

Comment: On-site disposal of radioactive wastes should not be routinely allowed. It may lead to a proliferation of sites, and may do little to mitigate the number of future legacy sites. On-site disposal of radioactive waste is not approved in Colorado, based on past experiences that have not borne out well over time (i.e., Colorado State University, Shattuck Chemical Superfund Site). This is a significant action, and should be considered through the rulemaking process rather than guidance.

A review of the status of decommissioning sites in NUREG-1814 shows that a majority of the non-reactor sites are contaminated with long-lived isotopes from legacy operations, with little or no surety, some of them as a result of on-site burials. That legacy alone should be enough to not allow on site burials and accumulation of wastes on site for ongoing operations.

Response: NRC regulations allow onsite disposal of radioactive material under 10 CFR 20.2002. The staff has carefully considered this objection to onsite burial. The onsite disposal guidance was revised to indicate that onsite disposals that result in a few millirem per year are generally acceptable. This dose level is well below the LTR criterion for unrestricted use of 25 mrem per year. However, requests for dose criteria other than a few millirem per year will be evaluated carefully by the NRC staff, based on the goal of preventing future legacy sites. The NRC staff believes that this approach will help reduce the possibility of legacy sites from onsite burials, while providing reasonable flexibility to licensees. The general acceptance of onsite burials, as long as appropriate conditions are met, is not changed by this revision to the guidance.

In the LTR Analysis paper (SECY-03-0069), the NRC staff determined that the recommended changes to guidance on onsite disposal are within the scope of the LTR requirements and thus did not require rulemaking. The Commission agreed with that determination. Thus, the NRC staff believes that the subject changes are appropriately made guidance.

Comment 3.2.2

Comment: If the NRC staff were actually considering these disposal activities as interim storage prior to license termination that would require excavation and off-site disposal prior to termination, then a different nomenclature should be considered (e.g., interim storage in on-site impoundments). The term disposal has connotations of permanence, and should not be used.

Response: By generally constraining doses from onsite disposals to a few millirem per year (see the response to Comment 3.2.1), it is more likely that a site can meet the LTR criteria (25 mrem/y for unrestricted use) without remediation of the onsite disposal. Therefore, the staff believes that the term "disposal" is appropriate under these conditions, and no changes have been made to the guidance.

Comment 3.2.3

Comment: The fact the timeliness rule applies may not be significant if the licensee has already left the site. That is one way NRC has ended up with legacy sites. Also, NRC staff is currently developing a proposed rule and associated guidance for changes in financial assurance and operations, with the purpose of preventing future legacy sites.

Response: The NRC staff notes the comment.

Comment 3.2.4

Comment: Giving approval for on-site burial may only defer decommissioning costs that may as well be avoided by the licensee by requiring they ship the waste as they generate the waste.

Response: See the response to Comment 3.2.1.

Comment 3.2.5

Comment: The sentence "The onsite disposal options provide alternatives for dealing with radioactive waste generated during operations, and will allow flexibility for the management of radioactive waste or allow the licensee to defer offsite disposal until decommissioning for license termination" sounds more like a description of why we have this problem rather than a reason to consider it.

Response: The referenced sentence has been removed from the onsite disposal guidance.

Comment 3.2.6

Comment: Do not allow licensees to defer offsite disposal until decommissioning for license termination. Get it out of there while the licensee is solvent. A review of surety for Colorado licensees showed that lowering possession limits to the minimum needed to operate is the best way to encourage timely waste disposition, and avoid increased surety. Surety is very expensive, and may not be affordable in the long-term.

Response: The NRC staff notes the comment. The NRC staff is currently developing a proposed rule and associated guidance for changes in financial assurance and operations, with the purpose of preventing future legacy sites.

Comment 3.2.7

Comment: NRC states that “it will continue the current practice of approving onsite disposal based on a dose criterion of a “few millirem” a year” but does not list here or in SECY-03-0069 any examples of these approvals. Has NRC approved onsite disposal since the LTR? What is the status of those sites?

Response: The NRC staff has approved a few onsite disposal requests since the LTR was implemented. In these requests, licensees calculated potential doses that are generally within a few millirem per year. Information on recent requests for onsite disposal is included in SECY-06-0143.

Comment 3.2.8

Comment: Onsite disposal that only meets the dose criterion for decommissioning (or a few millirem a year for that matter) does nothing to demonstrate impacts to biota or groundwater. The requirements in the guidance relative to dose modeling are vague at best, and only geared to a human receptor. This is not consistent with the proposed International Commission on Radiological Protection (ICRP) recommendations.

Response: The guidance has been revised to include considerations for the NRC staff to use to gauge the potential for an onsite disposal to result in subsurface contamination and/or to result in ground water contamination. The NRC's criteria (both the LTR criteria and the few millirem per year criterion) that are protective of public health and safety are also considered to be protective of biota.

Comment 3.2.9

Comment: Since onsite disposal should be discouraged, any onsite disposal must include adequate surety, not just those sites that will exceed the 100 mrem/y projection. The surety should be fully funded by another instrument if a sinking fund is used.

Response: The NRC regulations require licensees to provide sufficient financial assurance to decommission their sites, including remediation of onsite disposals. The NRC staff has revised the guidance to note that onsite disposals resulting in doses no greater than a few millirem per year are generally acceptable to the NRC staff. Generally limiting onsite disposals to those that could result in doses of a few millirem per year will facilitate timely remediation and license termination. In addition, the NRC staff is currently developing a proposed rule and associated guidance for changes in financial assurance and operations, with the goal of preventing future legacy sites. That rulemaking will consider the issue of whether a site-specific decommissioning cost estimate should include the cost of remediating the onsite disposal and whether additional financial assurance is needed for onsite disposals.

3.3 Comments from the New Jersey Department of Environmental Protection

Comment 3.3.1

Comment: The NRC requires that detailed information be provided on engineered structures or barriers. Is the licensee supposed to assume failure of the engineered barriers in determining if the dose is within the given criteria?

Response: The guidance notes that requests for onsite disposals of wastes containing mobile radionuclides, which reasonably may be expected to reach subsurface soils and potentially reach ground water, may need to provide detailed information on the design of any engineered structures or barriers used. Licensees do not have to assume complete failure of engineered barriers. Instead, licensees should analyze degradation of engineered barriers and include the resulting assumptions in the dose assessments for the onsite disposal. Section 3.5 of Volume 2 contains detailed guidance on engineered barriers.

Comment 3.3.2

Comment: [re: Option 2] The second paragraph implies that a restricted use site is a future legacy site. Then why would restricted use be allowed?

Response: The NRC regulations (LTR) provide radiological criteria for both unrestricted use (10 CFR 20.1402) and restricted use (10 CFR 20.1403). The NRC considers unrestricted use to be the preferable method for decommissioning and license termination. However, the NRC recognized that there may be a limited number of sites where license termination with restrictions may be appropriate, and thus included provisions in the LTR for terminating the licenses under restricted conditions for these few sites. In the sentence to which the commenter refers, the staff intended that the additional financial assurance should be adequate to remediate onsite disposals to prevent future legacy sites and to reduce the number of restricted use sites. This sentence was removed from the guidance.

3.4 Comments from the New York State Department of Environmental Conservation

Comment 3.4.1

Comment: In new Section 15.12 (page III-4), three onsite disposal options are described. Under Option 2, the NRC would approve the on-site disposal of radioactive waste as long as the projected dose was less than 100 mrem/y, and adequate financial assurance is provided if the projected dose exceeds 25 mrem/y. In addition, the on-site disposal area is to be revisited at decommissioning: “Onsite disposals or burials may have to be remediated for license termination.” This appears to go beyond the intent of section 20.2002, and we recommend deleting it. In New York State, a proposal for disposal under Option 2 would not meet the requirements of Section 380-3.5 of 6 NYCRR 380 (the State regulations comparable to 10 CFR 20.2002.). If this option is not deleted, the NUREG should be expanded to set clear and strict conditions under which the NRC would consider approving onsite burial in those cases where it is known, in advance, that the burial site will require remediation in the future. The NRC should explain the circumstances that would justify deliberately creating such a site.

Response: The NRC staff has revised the onsite disposal guidance to indicate that onsite disposals that result in a few millirem per year are generally acceptable. By generally constraining doses from onsite disposals to a few millirem per year, it is more likely that a site would meet the LTR criteria (25 mrem/y for unrestricted use) without remediation of the onsite disposal. However, requests for dose criteria other than a few millirem per year will be evaluated carefully by the NRC staff, based on the goal of preventing future legacy sites. The NRC staff believes that this approach will help reduce the possibility of legacy sites from onsite burials, while providing reasonable flexibility to licensees. However, staff has not changed its general acceptance of onsite burials, as long as appropriate conditions are met.

Comment 3.4.2

Comment: In the introduction to Section 12.13 (Page V-9), and elsewhere, the document refers to the use of intentional mixing for limited onsite disposal at operating facilities approved under 10 CFR 20.2002. In New York State, such disposals are governed by Section 380-3.5 of 6 NYCRR 380. It is unlikely that a proposal to use intentional mixing for on-site disposal could meet the requirements of Part 380.

Response: The NRC staff notes the comment. The NRC staff acknowledges that State requirements may differ from NRC requirements.

3.5 Comments from Save the Valley, Inc.

Comment 3.5.1

Comment: We note that a rulemaking effort is planned for FY 2006 "to address the prevention of future legacy sites." Again, this we would support.

Response: The NRC staff notes the comment.

Comment 3.5.2

Comment: Additional financial assurance appears to be the main focus of this prevention strategy. However, we believe that financial assurance should not be the only thing to consider to prevent future legacy sites. As we mention above, a concerted up-front assessment of the probable end-state of the site would also help. It is possible that a licensee could have the resources to ensure adequate financial assurance for many decommissioning aspects, but still end up with a restricted, unusable site.

Response: The guidance has been revised to include considerations for the NRC staff to evaluate the potential for an onsite disposal to result in subsurface contamination and/or to result in ground water contamination. These situations are more likely to increase decommissioning problems and costs. The NRC staff has revised the guidance to note that onsite disposals resulting in doses no greater than a few millirem per year is the approach which is generally acceptable to the NRC staff. By generally limiting onsite disposals to a few millirem per year will, it is more likely that onsite disposals will not need to be remediated at the time of license termination and that the site will be successfully decommissioned in accordance with the LTR.

Also, as mentioned in Comment 3.5.1, the NRC staff is currently developing a proposed rule and associated guidance for changes in financial assurance and operations, with the purpose of preventing future legacy sites.

4 RESPONSES TO STAKEHOLDER COMMENTS ON REASONABLY FORESEEABLE LAND USE SCENARIOS

The comments on reasonably foreseeable land use scenarios relate to the draft revisions to Section 5, Appendix I, and Appendix M of Volume 2.

4.1 Comments from the Association of State and Territorial Solid Waste Management Officials

Comment 4.1.1

Comment: In a related matter, restricted use releases rely on the concept of future land use, with the cleanup being tailored to be protective of some estimate of that land use. The Focus Group recognizes that for sites with long-lived isotopes, there is no reasonable means to estimate land use thousands of years into the future. While we can support the 100-year time frame as a way to address this uncertainty, the Commission should ensure that adequate mechanisms exist to revisit and update these assumptions on a regular basis.

Response: The approach that is discussed in the guidance recommends that the licensee evaluate both doses from the reasonably foreseeable land uses within the next 100 years to show compliance with the dose to the critical group and also doses from less likely but plausible scenarios. The termination decision will thus be informed by this range of analyses by considering the sensitivity of estimated dose to the land use assumptions. The NRC retains the ability under 10 CFR 20.1401(c) to require additional remediation in cases where significant risks to public health and safety and the environment are found to exist after license termination. However, the approach in the guidance, with its evaluation of a range of land use scenarios from those that are reasonably foreseeable to those that are less likely but plausible, provides assurance that such circumstances should be very rare. No changes were made to the guidance.

Comment 4.1.2

Comment: Coming full circle on this issue, the use of foreseeable land use must be accompanied by the inclusion of appropriate institutional land use controls to maintain the underlying land use assumption. The entire concept of a use-based cleanup results in the maintenance of this land use becoming a restriction on the cleanup. Conversely, the cleanup cannot be unrestricted if it is conditional on a land use to be protective. The document must be very clear on that concept. The NRC license could be one of these institutional controls (along with others) that could provide this protection as long as it is needed.

Response: The set of reasonably foreseeable land uses should be based on general practices in the region on similar land, as informed by future plans for the region. Thus, the NRC disagrees that institutional controls are required. The LTR limits dose to the average member of the critical group. Critical group is defined in 10 CFR 20.1003 as “the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity in any applicable set of circumstances.” It focuses on the group “reasonably expected to receive the greatest exposure….” In addition, as noted in response to Comment 4.1.1, the approach in the guidance recommends evaluating not only the reasonably foreseeable land uses but also the less likely but plausible land use scenarios. No changes were made to the guidance.

4.2 Comments from the Colorado Department of Public Health and the Environment

Comment 4.2.1

Comment: Section 5 and Appendices I and M describe application of a hundred year rule (and the peak dose during that period), which is insufficient for most of the applications of the Decommissioning Rule in Colorado. In nearly every instance where such a rule could be applied in Colorado over the next 10 or 20 years, we will need to consider 1600-year radium-226 (226Ra) or 4½ billion-year uranium-238 (238U) as radioactive contaminants of concern. Consideration of multiple time frames, radionuclide groups, and scenarios would benefit from guidance that states that there are site conditions for which "Reasonably Foreseeable land uses" cannot be predicted. Those site conditions would include situations where the contaminants are very long-lived relative to the rate of change in land-use patterns, such as 226Ra near an urban or even an intensively-farmed agricultural setting.

Response: See the response to Comment 4.3.1.

The NRC understands that, for a number of radionuclides, the peak dose occurs far in the future and can occur past the 100 years recommended for estimating land uses. However, as discussed in the response to Comment 4.1.2, compliance with the LTR is based on the dose to the average member of a critical group, which focuses on the group "reasonably expected to receive the greatest exposure…." Because land uses (and critical group habits) far in the future are unknowable, the analyst must use the best information available, which means using the current understanding as a basis (i.e., current practices in similar lands). It is unreasonable to always make pessimistic assumptions (e.g., all wells are hand dug and shallow) or highly optimistic assumptions (e.g., all wells in the future will be tested for all possible contaminants, no foods will be grown on contaminated soil). The approach in the guidance does recommend an evaluation of the less likely but plausible land uses to inform the license termination decision.

Comment 4.2.2

Comment: If land use planning is only good for 100 years, then a prudent and precautionary approach should be taken for any LTC or IC approach. It is unacceptable to use 100 years as a risk assessment planning tool for wastes that are long-lived.

Response: The NRC staff considers its approach to restricted use to be prudent and realistic. As discussed in the response to Comment 4.3.1, the 100-year timeframe is used only for estimating reasonably foreseeable future land use scenarios. The dose assessment time period (for compliance) remains 1000 years for all situations (i.e., dose assessments must evaluate the peak dose over the 1000-year time period after license termination). In addition to evaluation of both reasonably foreseeable land uses and less likely but plausible land uses while the institutional controls are functioning effectively, the regulations require (and guidance describes) that doses be assessed for situations where the restrictions fail. The guidance states that failure of institutional controls for this analysis should be assumed to be immediate. See also the response to Comment 8.5.5. No changes were made to the guidance.

4.3 Comments from the New Jersey Department of Environmental Protection

Comment 4.3.1

Comment: [re: Section 17.7.2.5, Information to Be Submitted] Dose assessments are usually carried out to 1000 years. Why does the NRC only require "possibly up to 100 years"? This seems unprecedented, especially when the radioactive materials that may be left in the community have half lives in the millions and billions of years. Also, since the NRC determined that 1000 years was presumed to be the lifetime of the radionuclides of interest, why would this time period apply when the nuclides of interest have half lives in the millions and billions of years?

Response: The dose assessment time period (for compliance) remains 1000 years for all situations (i.e., dose assessments must evaluate the peak dose over the 1000-year time period after license termination). The 100-year timeframe is used only for estimating reasonably foreseeable future land use scenarios (i.e., land uses reasonably likely to occur within 100 years, based on regional information and planning for similar land areas), which may be used as the compliance scenario for the dose assessments. Analyses of less likely but plausible scenarios should also be performed, which would allow the NRC to evaluate the sensitivity of the dose to scenario assumptions. The referenced paragraph, in Chapter 17 of Volume 1, has been reworded, and similar changes have been made in Chapter 5 and Appendix I of Volume 2, to clarify the difference in the two time periods.

Comment 4.3.2

Comment: [re: Section 17.7.2.5, Information to Be Submitted] Is the LTC option only available to sites where the radionuclides present will be able to decay for 10 half-lives within the 1000 year time period, thus restricting the LTC option to radionuclides under a 10 year half-life?

Response: There is no specific limitation on radionuclide half life for use of an LTC license as the institutional control for restricted use. Table M.1 of Volume 1 indicates that an LTC license may be appropriate for sites with a hazard of longer duration.

Comment 4.3.3

Comment: [re: Section M.5, Total System Approach to Sustain Site Protection at Restricted Use Sites] The NRC states that institutional controls should be established with the objective of lasting 1000 years to be consistent with the time-frame used for calculations. Why then does the NRC require only 100 years for the dose assessment calculations to demonstrate ALARA?

Response: See the response to Comment 4.3.1.

4.4 Comment from the New York State Department of Environmental Conservation

Comment: [re: Land Use] On Page IV-52, in Section 1.3.3.3, Guidance on Specific Issues, Land Use, there are two somewhat different time periods referenced. In the second paragraph of this section it is stated, "Any land uses that similar property in the region currently has, or may have in the near future (e.g., less than 100 years), should be characterized a reasonably foreseeable." Later, this sentence appears in the final paragraph on that page, "The societal uses of the site in the future should be based on advice from local land planners and other stakeholders on what possible land uses are likely within a time period of the next few decades to around a hundred years." Neither provides clear direction on the time period that should be

evaluated. If there are conditions under which it would be adequate to evaluate less than 100 years (for example, short half-life of radionuclides), it would be helpful to explain those. Otherwise, we recommend revising both references to require consideration of a 100-year period.

Response: See the response to Comment 4.3.1. The guidance terminology has been revised to use one phrase to avoid future confusion. The sections are now changed to say "(e.g., approximately 100 years)." In addition, a paragraph has been added which details situations in which exceptions to this general rule could occur, as suggested in the comment.

5 RESPONSES TO STAKEHOLDER COMMENTS ON INTENTIONAL MIXING

The comments on intentional mixing relate to the draft new Section 15.13 of Volume 1.

5.1 Comments from the Association of State and Territorial Solid Waste Management Officials

Comment 5.1.1

Comment: The section on intentional mixing is likely to be one of the more controversial aspects of the document. Although most federal and state agencies have historically opposed the dilution of contaminated media as a means to achieve cleanup, we believe that there is a place for the concept of intentional mixing. Specifically, the Focus Group supports the intentional mixing of contaminated materials to meet waste acceptance criteria. This appears to be a practical means of achieving site cleanups in a cost effective manner.

Response: The NRC staff notes the comment.

Comment 5.1.2

Comment: Two important aspects of this concept are that the footprint of the contaminated area cannot be expanded (clean material cannot be used to dilute contaminated material), and that the objective is to excavate all contamination and achieve unrestricted release. However, we are much less comfortable with the concept of intentional mixing designed to leave contamination in place, and fully oppose the use of clean materials to dilute contamination.

Response: The NRC staff notes the commenter's issues concerning intentional mixing. The staff believes that the general concepts and policies described in the draft guidance provide the appropriate bounds or limitations on the use of intentional mixing, and this policy of mixing for compliance with the LTR is supported by the Commission. In addition, materials left in place at license termination will result in doses no greater than 25 mrem/y, whether or not intentional mixing is used as part of the decommissioning approach. The staff has made no changes to the guidance on intentional mixing in response to this comment.

5.2 Comments from the Colorado Department of Public Health and the Environment

Comment 5.2.1

Comment: Intentional mixing of soil to meet waste acceptance criteria at an off-site facility or to meet LTR criteria should be subject to NEPA review, may not be consistent with State requirements, or those of other agencies, and should not be encouraged. Intentional mixing of waste is counter to decades of environmental policy in this country, and should have a more thorough vetting, particularly with other Agencies. This is a significant action, and should be considered through the rulemaking process rather than guidance.

Response: The NRC staff notes that the NRC approval process for a waste stream is not intended to preempt local and State regulations with jurisdiction over waste disposal facilities. In regard to intentional mixing to meet WAC, the guidance already notes that local and State requirements may also apply to waste that is transported to a disposal facility, and NRC approval of a process for a waste stream does not imply approval for disposal by the local or State regulators with jurisdiction over the disposal facility. Also, the NRC staff would review requests for intentional mixing to meet the LTR, in its review of the licensee's decommissioning

plan, which would include an NRC environmental review, under NEPA. As the guidance on intentional mixing provides information on compliance with or implementation of existing regulations and the Commission has approved these policies, the staff disagrees that the issue of intentional mixing should be considered through the rulemaking process.

Comment 5.2.2

Comment: It appears that the concept of intentional mixing includes the following logic: the generator liable for the pollution at the site can down blend it with clean soil, put it back in the ground, and terminate the license, possibly absolving themselves of future liability. Perhaps this should be evaluated from the taxpayer's standpoint instead of the generator's.

Response: The NRC staff will evaluate intentional soil mixing on a case-by-case basis and will base the evaluation on compliance with the dose and other criteria of the LTR. See also the response to Comment 2.4.1.

Comment 5.2.3

Comment: The statement contained in footnote #1 [of Section 15.13] is quite important and perhaps should be moved back into the text in the opening paragraph.

Response: The NRC staff considers the footnote sufficient to clarify when soil mixing is intentional versus when it is incidental to the remediation process.

Comment 5.2.4

Comment: The draft guidance on which this final draft is based included a review of other agencies' regulations and policies relative to intentional mixing. It is unclear whether the NRC review of the other agencies' regulations and policies in the supporting documentation included input from the agencies on the NRC interpretation. This is important to support the ongoing efforts to harmonize regulations and practices across agencies.

Response: The referenced NRC review of other agencies' regulations and policies on soil mixing was provided in SECY-04-0035, in March 2004. That review did not include input from the other agencies on the NRC's analysis of their regulations and policies. The NRC staff acknowledges that the NRC's approach may be inconsistent with the approaches of some other agencies. To some extent, this reflects the differences in decommissioning regulations of the various agencies.

Comment 5.2.5

Comment: The practice of dilution, including clean soils from outside the footprint (which was NOT advocated in the evaluations) to meet onsite cleanup levels, does not reduce the source term. It lowers the average concentration, which makes the dose go down in the models. It does not actually clean up the source term, and may actually increase the cross-section of contamination water may infiltrate through, potentially contaminating groundwater.

Response: If a licensee proposes the use of soil mixing to comply with the LTR, the licensee's dose assessments must properly account for alterations to the source term and potential impacts to ground water. This will be evaluated as part of the NRC staff evaluation of the licensee's dose assessments.

Comment 5.2.6

Comment: If the material is excavated and blended, it should be considered "treatment," and require stabilization or other processes to immobilize any remaining contamination prior to replacement. Relying on engineered barriers alone may not be consistent with RCRA. Consider making these requirements consistent with RCRA treatment requirements. Exemption from RCRA was meant to avoid dual regulation, not less protection.

Response: The NRC staff considers the use of intentional mixing to be acceptable in certain conditions for compliance with the LTR. NUREG-1757 provides guidance on implementing the LTR, not RCRA. The NRC staff considers the LTR and the associated guidance to provide adequate protection of the public health, safety and the environment.

Comment 5.2.7

Comment: Not changing the classification of the waste in 10 CFR 61.55 is appropriate, but perhaps should also include not changing the classification of any waste. For example, non-11e.(2) materials may be found at sites not formally included in the UMTRA program (we have had some of these sites in Colorado), and dilution of those materials to meet WAC at a local landfill has been proposed. Recognizing that NRC has abdicated its authority over pre-1978 byproduct material means that non-11e.(2) materials that are byproduct material (but in name) are being remediated at sites under State or EPA authority. These agencies may be looking to this guidance to be considered in their reviews. Consider expanding the scope of the requirement beyond 10 CFR 61.55 only.

Response: The NRC staff believes that considerations of mixing to change the classification of other wastes is a very site- and material-specific consideration. These cases are beyond the scope of the current guidance efforts, and staff has chosen not to develop guidance on this at this time. The NRC staff does not agree it has "abdicated its authority over pre-1978 byproduct material" (an apparent reference to the date of enactment of UMTRCA). The scope of the NRC's authority is governed by Congress.

Comment 5.2.8

Comment: What about mixed waste? Would this intentional mixing be considered to change the classification to hazardous only (if the radiological component is sufficiently reduced)? What about 11e.(2) at mill tailings sites? Would this be used to downblend the activity so the material can be used in the random fill zone of the cap design, or not sent to the impoundment at all? Again, this practice must be considered in the realm of "treatment."

Response: The NRC staff acknowledges that soil may be contaminated with RCRA hazardous wastes and may be considered mixed wastes. For mixed wastes, the NRC staff recognizes that the decommissioning approach may require approval by other agencies. These cases (mixed waste or 11e.(2) byproduct material) are beyond the scope of the current guidance efforts, and the staff has chosen not to develop guidance on this at this time.

Comment 5.2.9

Comment: Since NRC has previously changed classifications of waste to suit individual licensees' needs (e.g., Sequoyah Fuels), it is unclear why this practice should be considered or approved.

Response: The NRC staff believes the practice of intentional mixing may be appropriate for specific decommissioning sites and inclusion in the guidance was warranted. The change in classification of the Sequoyah Fuels material was based on characteristics of the material and its origin (and not based on mixing or dilution) and was specific to that facility. The specifics of the Sequoyah Fuels facility are beyond the scope of the current guidance efforts and no changes to the guidance have been made.

Comment 5.2.10

Comment: With respect to small rubble that may be included, it is recommended that there be a limit to organic material content (roots, trees) so as to not cause void spaces during settling. There should also be geotechnical parameters specified (e.g, compaction rates).

Response: The NRC staff disagrees with providing a limit on organic content of mixed soils. The importance of organic material to the long-term performance criteria is greatly dependent on the site-specific nature of the soil and of the exposure scenarios. In some cases, void spaces may cause a problem and in some they may not. Geotechnical parameters will be evaluated to the extent appropriate as part of the evaluation of the licensee's demonstration of compliance with the criteria of the LTR. The staff has not changed the guidance.

5.3 Comments from James Lieberman

Comment 5.3.1

Comment: [re: page V-14] **Remove the term "rare" in addressing mixing with clean soil.** In my view, the LTR does not prohibit mixing clean soil with contaminated soil to achieve the dose limits of the regulation. On the other hand expanding the footprint of contamination should not be the first choice for remediation. However, if removing contamination from a site and shipping it to a LLW site for disposal is not feasible such that the site will not be remediated, then mixing should be considered. As Chairman Diaz noted in his vote sheet on SECY-04-0035, there may be sites where the licensee proposes to use clean soil outside the contaminated area footprint to meet the License Termination Rule (LTR) release criteria where that approach is the most practical and cost effective way to meet the LTR release criteria. Thus, I can accept the limitation that it should only be done "where the only viable alternative to achieving the dose levels of the LTR is to use clean soil from outside the footprint of the area containing the contamination." However, I recommend that the undefined term "rare" be deleted. There are not many sites where this will be an issue. What is rare to some may be considered frequent to others. The issue is not the number of times mixing might be used. The issue is whether mixing appears to be the only viable approach to achieve an adequate remediation. Safety not quotas or frequency should justify its use.

Response: The NRC staff agrees with the comment. The guidance has been revised to remove the term "rare." The staff discourages the use of clean soil in intentional mixing, but the staff will consider cases where the only viable alternative to achieving the dose levels of the LTR is to use clean soil from outside the footprint of the area containing contaminated soil.

Comment 5.3.2

Comment: Soil from outside the site should be allowed to be mixed. Notwithstanding that mixing to reduce the concentration with clean soil is a limited option to be used where it appears it is the only viable option (which is more restrictive than the Chairman's approach of using it where it is the most practical and cost effective way to meet the rule) the proposed guidance at

V-14 does not allow for using mixing if clean soil came from outside the site boundary. What the staff is saying is that trucking clean dirt from across the street is unacceptable for mixing but shipping contaminated dirt thousands of miles is acceptable with the increased risk of injury and death. What happened to the issue of "net public or environmental harm" discussed in 10 CFR 20.1403(a)? It seems to me that if using clean dirt from outside the site appears to be the only viable approach, then why should it not be permitted. This should be changed. I appreciate that Commissioner Merrifield had reservations with mixing. His vote sheet for SECY-04-0035 provided that

> when it comes to intentionally mixing clean soil (particularly if the clean soil comes from off-site) with contaminated soil to achieve a waste acceptance criteria, I have serious reservations; and the Commission should be directly consulted if such a proposal is submitted by a licensee. This consultation should occur after the staff has conducted a technical review and is prepared to make a recommendation on the application. Again, this action is consistent with the staff's proposed option 3.

His views on using soil from offsite sources appear to be addressed at achieving waste acceptance criteria for offsite disposal and not for on site remediation. In any event, the SRM did not reflect his views. Again the test should be what is needed to achieve an appropriate remediation that meets the LTR. If the staff is uncomfortable with using soil from offsite sources even if it is the solution to a difficult remediation case, then the answer is not to outright prohibit it, it is to seek Commission guidance on a particular case. Of course that was what the staff proposed initially for the mixing issue in SECY 04-0035. The Commission responded in the May 11, 2004 SRM and told the staff that Commission consultation was not needed and the staff should make the decision. Accordingly, the limitation should be removed. In such a case, the test would be whether mixing appears to be the only viable approach to a successful remediation in accordance with the LTR.

Response: The NRC staff discourages the use of clean soil in intentional mixing, but the staff will consider cases where the only viable alternative to achieving the dose levels of the LTR is to use clean soil from outside the footprint of the area containing contaminated soil. The staff's review will also take into account the licensee's justification for its proposal, based on ALARA (i.e., removal and disposal of the soil offsite would not be reasonably achievable), and evaluation and consideration of all reasonable alternatives. The staff has revised the guidance to remove the limitation on the use of clean soil from offsite to be used in mixing. Based on the recent SRM on SECY-06-0143, the guidance also was revised to state that if a licensee proposes intentional mixing using offsite clean soil to meet the LTR criteria, the NRC staff will consult with the Commission on the acceptability of the proposal.

Comment 5.3.3

Comment: Mixing in appropriate circumstances should be allowed to reduce classification of waste for disposal sites. From a health and safety perspective, the appropriateness of the disposal of waste at a low-level waste site is not the pedigree of the waste but the characteristics, etc., of the waste that arrives at the disposal site. Classification addresses what is shipped to a low-level waste site and what may be buried at the site. Why should it make a difference from a safety perspective whether the classification of material was reduced for technical and operational reasons which is permitted or for other reasons such as mixing was used as it was the only apparent way to have a viable disposal. This is an important public policy issue considering the limited burial capacity for B and C waste. From a practical view, it may be difficult to sufficiently mix higher classified material with cleaner material to reduce it to lower classified material. But if you can do it, and the resulting material is consistent

with a performance analysis which demonstrated that the performance objectives of Part 61 are met, it seems that the material should be allowed to be disposed of at the new classification level. Decisions in this area should involve the regulators of the involved disposal site. This may well be an area consistent with Commissioner Merrifield's view that the staff should seek Commission consultation on since it is not clear that this issue was not specifically raised to the Commission in SECY 04-0035. I recommend that the NUREG be modified to allow it as an option noting the need for Commission consultation.

Response: Current practice does not allow waste classification to be changed intentionally by mixing. The staff has made no changes to the decommissioning guidance on this issue, as this is a matter more appropriately considered under 10 CFR Part 61.

5.4 Comment from the New Jersey Department of Environmental Protection

Comment: The Department allows intentional mixing when it can be shown that the material to be mixed was native to the site, e.g. a site that mined sand and removed certain minerals which left the naturally occurring radioactive materials concentrated above soil cleanup standards. In this case, the Department would allow offsite uncontaminated soil to be used in the intentional mixing.

Response: The NRC staff notes the comment.

5.5 Comments from the New York State Department of Environmental Conservation

Comment 5.5.1

Comment: In the second paragraph of Section 15.13.2, Review Procedures (Page V-10), it is stated, “Intentional mixing should not be proposed as a sole remedy, for example to achieve the LTR release criteria using minimal funds, unless this is the only solution to achieving the license termination dose criteria.”(underlining added). We are unaware of a situation in which the latter would be true. If intentional mixing is feasible, it must be feasible to move the contaminated soil. If the contaminated soil can be moved to be mixed, it can also be moved to be placed into a container for shipment to a radioactive waste disposal facility. We recommend deleting the phrase, “unless this is the only solution to achieving the license termination dose criteria.”

Response: The NRC staff intended to indicate “the only practical means…” rather than “the only solution…” to achieve the license termination dose criteria. The staff has revised the sentence.

Comment 5.5.2

Comment: On page V-14, the Approval Conditions for use of intentional mixing are listed. Condition 1 calls for the area containing the mixed contaminated soil to be equal to or smaller than the footprint of the zones of contamination before decommissioning begins. We recommend that this be changed, to limit the overall volume of contaminated soil, not just the area extent. Otherwise, licensees can propose creating mounds of mixed soil, as long as the areal extent remains the same. This could limit the future uses on a site, or lead to a subsequent increase in the areal extent of the contamination, when future occupants spread the pile for their own purposes (this would not necessarily result in further dilution, depending on the height of the pile). A more effective criterion would be that the total volume of contaminated soil should not be increased by mixing. This would prevent the creation of mounds of contaminated soil on the site, and would place a reasonable limit on the use of mixing solely to avoid disposal.

Response: Because the dose criteria of the LTR are performance-based, the NRC staff disagrees with the proposal to prohibit increasing the volume of contaminated soil by mixing. If a licensee proposed creating a mound of mixed soil, the dose assessment and ALARA evaluation must address the reasonably foreseeable uses of (and changes to) that mound of soil. The guidance already notes that licensees should provide information on the final configuration and design attributes of the area containing the intentionally mixed soil, in their proposal for intentional mixing. The staff considers this acceptable and made no changes to the guidance in response to this comment.

Comment 5.5.3

Comment: We do not support the statement in condition 2, "Staff will consider rare cases where the only viable alternative to achieving the dose levels of the LTR appears to be using clean soil from outside the footprint of the area containing contaminated soil." We question whether this would ever be the case. If intentional mixing is feasible, then it must be feasible to move the contaminated soil. If the contaminated soil can be moved to be mixed, it can also be moved to be placed into a container for shipment to a radioactive waste disposal facility. We recommend deleting that sentence, on page V-14 and elsewhere. If not, at least the words "appears to be" should be changed to "has been clearly demonstrated to be."

Response: The NRC staff disagrees with the comment on viability or feasibility. To the NRC staff, "feasible" or "viable" means achievable within available resources (including monetary resources). Thus, moving contaminated soil off a site may not be viable even if it is theoretically possible. However, the NRC staff has replaced the words "appears to be" with "is" in the revised guidance.

Comment 5.5.4

Comment: In the fifth paragraph on Page V-14, it is stated,

> The staff will consider the inclusion of uncontaminated soil that comes from below the contaminated zones within the footprint as long as it is consistent with the overall approach described for achieving license termination, and considers the impacts associated with an increased depth of disposal (e.g. [e]ffect on groundwater).

Clean soil under the contaminated zone should be used as sparingly as clean soil on the surface. The goal should be to avoid contaminating clean materials, wherever they are present. We recommend deleting this option, and instead limiting the volume of mixed soil, as explained in our comment 5.c [Comment 5.5.2].

Response: The NRC staff disagrees with removing the option to include uncontaminated soil from below the contaminated zones. The staff has made no changes to the guidance in response to this comment.

6 RESPONSES TO STAKEHOLDER COMMENTS ON REMOVAL OF MATERIAL AFTER LICENSE TERMINATION

The comments on removal of material after license termination relate to the draft revised Section G.1.1 of Volume 2.

6.1 Comment from the Colorado Department of Public Health and the Environment

Comment: The dose-based approach on a site-by-site basis will result in a plethora of release limits that will be used around the Country. Release of solid materials or volumetric should either follow ANSI N13.12, or stay with RG 1.86 and FC 83-23. This reviewer believes in this instance that conservative, table listed values should be used unilaterally in order to achieve consistency in release rather than allowing calculated release limits from each site. A risk assessment from facility A will yield DCGLs different from facility B, both of which may end up sending contaminated materials to facility C. This clearly is not consistent, and is not protective of the public, although it may provide relief to the licensees. The risks from material released from any site should be consistent in practice, not theory.

Response: The NRC staff disagrees with this comment. The NRC has adopted the dose based criteria of the LTR for license termination. The staff believes that the approaches described in Section G.1.1, "Structures Versus Equipment," for dealing with "building structures, and systems and components that may be left in place at license termination," are consistent with the LTR for unrestricted use of a site (dose criteria of 25 mrem/y and ALARA), and are protective of public health and the environment.

As stated in the paragraph following discussion of the three approaches, "For all three approaches, the residual radioactivity in building structures, systems and components, and all other media at the site (e.g., soils or ground water) must be in compliance with the criteria of the LTR…." Therefore, even though the concentration release limits (DCGLs) may be different for each site, the resulting dose from residual radioactivity at each site must be in compliance with the LTR. The staff has not revised the guidance.

6.2 Comments from the New Jersey Department of Environmental Protection

Comment 6.2.1

Comment: Number 3 indicates that materials may be left onsite if the potential dose from the residual radioactivity is within the dose criteria of the LTR. It should be specified that the dose from the building structures, and systems and components should be added to any residual radioactivity remaining in the soil and/or groundwater so that the total dose does not exceed the dose criteria of the LTR.

Response: The staff agrees that the dose from the building structures and systems and components should be added to any residual radioactivity remaining in the soil and/or ground water so that the total dose does not exceed the dose criteria of the LTR. The staff believes that this is addressed in the paragraph following discussion of the three approaches, so no changes have been made to the guidance.

Comment 6.2.2

Comment: The first paragraph on page VI-8 states that for offsite use scenarios, the dose criteria is still 25 mrem/y. This seems to contradict the guidance in the December 27, 2002,

NRC Memorandum, “Update on Case-Specific Licensing Decisions on Controlled Release of Concrete from Licensed Facilities”, that volumetrically contaminated material should meet the criteria of a few millirem/y.

Response: The staff disagrees with the comment that the referenced paragraph on page VI-8 is inconsistent with the guidance presented in the December 27, 2002, memorandum. Page 2 of the memorandum addresses “proposed offsite concrete releases,” whereas the update to Section G.1.1 addresses the materials that can be left onsite after license termination. The “Background” of Section G.1.1 already discusses the distinction between releases before and after license termination. In addition, the staff has revised the wording of the referenced paragraph to improve clarity.

7 RESPONSES TO STAKEHOLDER COMMENTS ON ENGINEERED BARRIERS

The comments on engineered barriers relate to the draft revised Section 3.5 of Volume 2.

7.1 Comments from the Association of State and Territorial Solid Waste Management Officials

Comment 7.1.1

Comment: The section on engineered barriers warrants several comments. First, a concept is expressed in the document of unrestricted release on a site with an engineered barrier. This seems conceptually inaccurate. The presence of a barrier, which requires monitoring, inspection, and maintenance, as well as restrictions that ensure the protection and continued functionality of the barrier, precludes unrestricted use.

Response: The NRC staff disagrees with this comment. The guidance has been developed with the expectation that engineered barriers will be used primarily for restricted release sites. However, use of engineered barriers at an unrestricted release site is not prohibited by regulation. If an engineered barrier is used at an unrestricted release site, only the passive performance of the barrier to mitigate radiological impacts may be credited (i.e., performance of the barrier without monitoring, inspection, and maintenance). As indicated in the guidance, the performance of the engineered barriers should consider the reasonableness of a breach by an inadvertent intruder and the potential degradation of the barriers over time because monitoring and maintenance are assumed to not be active. In addition, other reasonably foreseeable disruptive conditions from humans or natural events and processes should be evaluated and uncertainty in projecting the passive performance of the barriers must be considered. The NRC staff made no changes to the guidance.

Comment 7.1.2

Comment: Second, the concept of a barrier being passive and not requiring maintenance is also not accurate. Experience in the UMTRA program, which is widely referenced in the document as having robust barriers that do not require maintenance, is that inspection and maintenance of these barriers are required.

Response: The concept of passive performance of an engineered system is not unique to decommissioning of a radiologically contaminated site; therefore, the staff disagrees that the concept is not accurate. However, passive performance of an engineered system cannot be assumed. As indicated in the guidance, it must be justified through design, experimentation, analysis, and support, and uncertainty in projecting performance, particularly over periods of time that exceed the experience base, must be considered. No changes were made to the guidance.

See the response to Comment 7.3.4 regarding experience in the UMTRA program.

Comment 7.1.3

Comment: Lastly, we believe that references to barrier technology in the document are outdated. Both the Department of Energy and the Environmental Protection Agency have ongoing studies of barrier performance. This has led to new recommendations in barrier design, including the emerging use of evapotranspiration barriers in place of multiple layers. The document should reference the appropriate state of the art in this technology.

Response: The guidance has been revised to better reflect more recent experience of both the Department of Energy and the Environmental Protection Agency, among others.

See also the response to Comment 7.3.5 regarding evapotranspiration barriers.

7.2 Comment from the Coalition on West Valley Nuclear Wastes

Comment: The Glossary, p. xi, defines *Robust engineered barrier* as a "man-made structure that is designed to mitigate the effect of natural processes or human uses that may initiate or accelerate release of residual radioactivity through environmental pathways. The structure is designed so that the radiological criteria for license termination (10 CFR 20, Subpart E) can be met. Robust engineered barriers are designed to be more substantial, reliable, and sustainable for the time period needed without reliance on active ongoing maintenance." The last sentence of this definition is important and appropriate; it specifies that such a barrier is expected to be sustained "without reliance on active ongoing maintenance."

Response: The NRC staff notes the comment.

7.3 Comments from the Colorado Department of Public Health and the Environment

Comment 7.3.1

Comment: It appears that this draft guidance promotes the same concepts for design of final covers that have been advocated in the past. Newer information based on relatively recent research and "lessons learned" from completed sites do not appear to be included in this draft guidance. It would be advantageous for this guidance to critically evaluate and include relevant design and construction information from landfills under other regulatory programs, such as CERCLA, RCRA C (hazardous waste) and RCRA D (solid waste).

Response: The guidance has been revised to better reflect more recent experience of the Department of Energy, the Environmental Protection Agency, and others.

Comment 7.3.2

Comment: The "Engineered Barrier" concept discussed in this draft guidance appears to continually promote and support similar concepts that were used about 20 years ago for generic design of the UMTRA disposal cells. It appears that site-specific, as well as "lessons learned" information developed over the last 20 years or so with respect to actual performance of UMTRA disposal cell covers has not been applied to this proposed updated guidance.

One example of an optimistic view with respect to UMTRA cover performance relates to the discussion concerning the process to be used for an engineered barrier analysis. The statement is made that for covers designed in accordance with uranium mill tailings guidance NUREG-1623, no degradation of the cover is assumed. Therefore, active maintenance is not relied upon for assurance that the design objectives are achieved. It is our understanding that this is not really the case at many UMTRA disposal cells. Problems have developed at the disposal cells that were not anticipated during design, such as deep-rooted vegetation encroaching the cell, thereby requiring active maintenance.

Response: The guidance references to UMTRA disposal cell covers were for purposes of erosion control and stability. From this perspective, these covers have required little to no

maintenance to prevent erosional release of radioactive materials. Thus, in general, the guidance appropriately reflects experience with UMTRA-type covers.

The guidance has been modified to emphasize that the UMTRA experience is cited as an example of a successful design approach for erosion control and site stability. Section 3.5.5 has been modified to summarize UMTRA as well as other experience.

Comment 7.3.3

Comment: In addition, other significant, relatively recent information obtained on landfill cover design through the Environmental Protection Agency's (EPA) Alternative Cover Assessment Program (ACAP), the Department of Energy's (DOE) Alternative Landfill Cover Demonstration (ALCD), or recent alternative landfill cover guidance published by the Interstate Technology & Regulatory Council (ITRC), have apparently not been considered in preparation of this document.

Response: The experience of the programs cited in the comment were considered in development of the guidance, although they were not explicitly cited. A number of the references provided in Section 3.5.5 represent the compilation of work from a diverse group of researchers, including ACAP and ALCD. Section 3.5.5 of the guidance has been revised to better reflect more recent experience of both the Department of Energy and the Environmental Protection Agency, among others.

Comment 7.3.4

Comment: Conversely, features that were rejected for UMTRA cell cover design by the NRC, such as incorporating geosynthetic materials into a low permeable barrier cover system, continue to be discouraged. It has been conclusively demonstrated by rigorous academic research as well as side-by-side field tests, that the use of a composite cover (compacted clay liner [CCL] or geosynthetic clay liner [GCL] and geomembrane together) is a more effective barrier system than using a CCL, GCL, or geomembrane individually. However, this document promotes the outdated UMTRA design philosophy, claiming that a composite cover performance is only acceptable for the timeframes of available field studies (10+ years). Noted experts in the geosynthetic field, such as Robert M. Koerner, Director of the Geosynthetics Research Institute, argue for extremely long service lifetimes, provided the material is installed properly. Koerner and others suggest that 250 to 700 years is not unreasonable for geomembrane service life.

Response: As mentioned in the response to Comment 7.3.2, the UMTRA experience is cited as an example of an acceptable approach to ensuring long-term erosion control and stability based on experience at tens of sites over several decades. Infiltration control using UMTRA and traditional compacted clay layer covers has proven to be much more challenging, based on the information developed by the few programs that have collected detailed monitoring data of the performance of large-scale engineered caps for infiltration control.

The original guidance adequately reflects that in most cases composite caps are preferred to compacted clay barriers and that justification for the performance of composite caps beyond the timeframe of recent experience may be possible. Minor modifications have been made to the text regarding geomembranes and GCLs to ensure the guidance appropriately reflects the academic research and experience. The text associated with composite covers has not been modified.

Comment 7.3.5

Comment: From an overall concept, it is our opinion that an even better cover system for long-term considerations, particularly in arid or semi-arid climates, is an evapotranspiration (ET) cover. This draft guidance, however, does not discuss an ET cap as a potential "engineered barrier." In fact, the references provided in Table 3.1 that relate to a "soil cover system" are outdated (written in 1991) and obviously do not include the most recent protocol for design and construction of ET cover systems. In addition, any reference to constructing CCLs from the 1991 guidance would also be outdated. The most currently accepted method of placing CCLs is through the use of an Acceptable Zone based on the "Lines of Optimums" concept. The Lines of Optimums concept was developed after 1991. It is curious that this draft guidance dismisses geosynthetics as an appropriate cover system due to potential long-term concerns, yet the ET cover, which is the most time-durable cover system because it emulates the natural environment better than the other cover concepts, is not discussed in detail.

Response: The NRC staff agrees that evapotranspiration (ET) covers were not discussed in the original draft guidance. Information on ET covers has been added to the guidance.

Comment 7.3.6

Comment: Another theme promoted throughout this guidance is the conclusion that actual field procedures, no matter how much quality effort is provided, cannot overcome theoretical concerns that have been determined in the "office." For example, it is stated that one cause of degradation of geomembranes used in composite soil caps is due to long-term exposure to UV light. This concern appears to be overstated. While this concern is theoretically correct, construction specifications for utilizing geomembranes should specify a maximum UV light exposure time period, as recommended by the geomembrane vendor, thus rendering this issue moot. An adequate Quality Control/Quality Assurance (QC/QA) Plan would also assure that the maximum time exposure to UV light required by the specifications is adhered to.

Response: The staff disagrees that guidance implies theoretical concerns will override actual field procedures. In fact, the guidance stresses the need for adequate QA/QC for many different types of barriers. However, QA/QC can not overcome fundamental limitations of the materials with respect to their service environments. The guidance appropriately presents common degradation mechanisms experienced by various barriers, many of which can be initiated by inadequate QA/QC. The guidance also emphasizes that more data is needed (in various forms, such as tests, monitoring information, analysis, analogs) to justify the long-term performance of engineered barriers.

The guidance lists exposure to UV light as one of a number of potential degradation mechanisms for geomembranes. Geomembranes are susceptible to UV light exposure, which, the NRC staff agrees, can be managed through QC/QA. The guidance does indicate that geomembranes have been used successfully for the timeframes of available field studies (10+ years). However, geomembranes do not have the experience base of common natural materials or a manmade material like cement, which has been used for hundreds to thousands of years. Therefore, until the experience base is developed, the staff believes a cautious approach is appropriate for the long-term performance of novel materials in engineered barriers. The staff made minor modifications to clarify the discussion of geomembranes.

7.4 Comments from the New Jersey Department of Environmental Protection

Comment 7.4.1

Comment: In the third paragraph on page II-73, it seems that the NRC is changing the definition of unrestricted. Unrestricted release should mean that there are no restrictions, including no restrictions on removing or modifying an engineered barrier. To allow otherwise is extraordinary.

Response: The NRC staff disagrees with this comment. The definition of unrestricted is not being changed. Unrestricted release means that the public is free to access and use the site. Therefore, if an engineered barrier would be subject to damage or disruption from the reasonably foreseeable activities of humans, the damage or disruption would need to be considered in the analysis. No changes were made to the guidance.

Comment 7.4.2

Comment: The last paragraph on page II-73 states that the licensee has to document how the engineered barriers will be maintained for "as long as necessary." What is the definition of "as long as necessary"? The Department's regulations specify an "appropriate period of time" to mean the length of time for the radionuclides to decay seven half-lives. On a technical basis, this definition would seem suitable for the LTC license option.

Response: The phrase "as long as necessary" means as long as necessary to ensure compliance with the LTR. The guidance has been clarified.

Comment 7.4.3

Comment: The NRC states that engineered barriers should be designed with the goal of remaining effective over the time period needed to achieve compliance, especially for long-lived radionuclides. The Department agrees with this statement.

Response: The NRC staff notes the comment.

Comment 7.4.4

Comment: What is the definition of "reasonably foreseeable natural or human processes"? Isn't it reasonable to assume that no engineered barrier can withstand human processes? For example, once institutional controls fail (or even before), someone could come in with earth moving equipment so they can level the land for some other purpose and in doing so, degrade the engineered cap and uncover and spread the radioactive material.

Response: The NRC staff disagrees with part of the comment. "Reasonably foreseeable disruptive conditions from humans or natural events and processes" should be interpreted as those processes and events that are probable or likely to occur over the analysis period. The context for the language is for loss of institutional controls under restricted release or for no institutional controls under unrestricted release. The intent of performance assessments is to provide reasonable assurance, considering uncertainties in engineered and natural systems over long time periods, that the actual performance of the engineered barrier will comport with its design. Natural or human processes and events are possible stressors to the engineered barrier design, and their impacts on the performance of the engineered barrier should be evaluated in the performance assessment. Human (and natural) processes would be expected

to degrade engineered barriers to differing degrees, dependent on the site, the barrier, the likely processes, and other factors. The guidance, in Section 3.5.2 of Volume 2, was revised to better describe reasonably foreseeable disruptive conditions.

Comment 7.4.5

Comment: The NRC suggests that natural analogs might provide information as to the possible long-term changes to an engineered system. Can the NRC give examples of natural analogs?

Response: The guidance, in Section 3.5.3 of Volume 2, has been revised to include examples of analog sites that were used to enhance staff confidence in the ability of earthen covers to prevent erosion for very long periods of time. In particular, information about Native American earthen mounds has been provided, as well as general considerations (including caveats) for evaluating natural analogs.

Comment 7.4.6

Comment: Experience of 10+ years for degradation of engineered caps has little applicability when the timeframe required to be met is 1000 years, and the material will actually remain for billions of years.

Response: The NRC staff acknowledges that experience is limited for the long-term performance of some engineered barriers. However, some barriers, especially for purposes of stability and erosion protection, may have suitable analogs (e.g., discussed above in response to Comment 7.4.5) such that the multifaceted approach to designing, testing, assessing, implementing, supporting, and evaluating engineered barriers provided in this guidance should result in protection of public health and safety. Also, analogs and the experience base are not the only elements to justify the long-term performance of engineered barriers. The guidance has been modified accordingly (see also the response to Comment 7.4.5).

Comment 7.4.7

Comment: [re: Section 3.5.4.3, Potential Levels of Functionality and Uncertainty] The last sentence on page II-87 states that most engineered caps would not provide a substantial barrier to common practices assumed in intruder analysis (e.g., home construction, well installation). Based on this statement, isn't it reasonable to assume complete failure of the engineered barrier?

Response: It is reasonable in most cases to assume failure of those portions of the engineered barrier disrupted by the intruder. However, the area or volume disrupted may be a fraction of the total area or volume of the engineered barrier. Therefore, it may be unnecessarily conservative to assume failure of the whole barrier in these cases. Consideration of partial failure of engineered barriers should be on a case-specific basis. The guidance has been clarified in response to this comment.

8 RESPONSES TO STAKEHOLDER COMMENTS ON RESTRICTED USE AND INSTITUTIONAL CONTROLS

The comments on restricted use and institutional controls relate to the draft revised Sections 17.7 and 17.8 and Appendix M of Volume 1.

8.1 Comments from the Association of State and Territorial Solid Waste Management Officials

Comment 8.1.1

Comment: We recognize that the main purpose of this document is to strengthen this scrutiny, and to provide information regarding the types of controls required on restricted use sites to ensure that they remain protective of human health and the environment. In that regard, we do support the use of a Long Term License as a strong institutional control.

Response: The staff notes the comment.

Comment 8.1.2

Comment: It should be noted that States continue to improve the effectiveness of institutional controls at the State level, including the development of environmental covenants that are enforceable and run with the land in perpetuity. It is possible for these covenants to also provide NRC or other agencies with enforcement authority.

Response: The NRC staff has revised the guidance on institutional controls (in Volume 1, Appendix M, Section M.1.3) to discuss the availability of environmental covenants in some States.

8.2 Comments from the Coalition on West Valley Nuclear Wastes

Comment 8.2.1

Comment: Page II-2 refers to the possibility of a "long-term control (LTC) license (a new type of possession-only license that functions as a legally enforceable institutional control)" and also refers to "restricted use sites that cannot arrange legally enforceable institutional controls…." There are two problems or potential problems with these concepts. First, depending on how it is structured and issued, an LTC license may not be legal. An LTC license should not provide a means for avoiding or evading otherwise applicable license requirements that must be met, for example, for near-surface disposal of radioactive waste. Second, the concept of "restricted use sites that cannot arrange legally enforceable institutional controls" appears faulty. The option of restricted use becomes available if and only if certain requirements are met, as set forth in the LTR. "Restricted use" is not a *given* or guaranteed option for decommissioning under the LTR, and NRC guidance should not offer suggestions about ways to proceed with restricted-use decommissioning at any site that cannot show compliance with the regulatory requirements for restricted use.

Response: The Commission approved the option of an LTC license if a licensee has not been able to arrange other types of legally enforceable institutional controls. Therefore, the LTC license could be used to comply with the requirements for legally enforceable institutional control and durable institutional controls, if needed. As the guidance indicates, under an LTC license, all the applicable requirements for restricted use under 10 CFR 20.1403 must be met.

Therefore, the LTC license does not provide a means for avoiding or evading applicable decommissioning requirements as the comment suggests. The staff agrees with the comment that restricted use is not a given or guaranteed option for decommissioning under the LTR. The final guidance has been revised to emphasize that licensees who are considering the restricted use option and have not been successful in arranging acceptable institutional controls or independent third-party arrangements can consider the two new types of NRC legally enforceable and durable institutional controls.

Comment 8.2.2

Comment: On page II-5, the list of information needed to support the use of alternate criteria ("If the licensee is requesting license termination using the alternate criteria provisions of 10 CFR 20.1404…") should also include the information recited in the *prior* paragraph. In particular, any license termination using the alternate criteria provisions of 10 CFR 20.1404 will need to show compliance with the "cap" requirements of 10 CFR 20.1403(e). This is a point that I have previously raised and resolved with NRC. Simply stated, the use of "alternate criteria" is not a complete alternative to 10 CFR 20.1403; it provides only for dose criteria that can serve as an alternative to the 25 mrem/y criterion given in Sections 20.1402, 20.1403(b), and 20.1403(d)(1)(i)(A). Other requirements of 20.1403 remain applicable, assuming restricted use.

The proposed (highlighted) insertion of the phrase "in 10 CFR 20.1403" on page II-5 may increase the confusion about whether the use of "alternate criteria" and 10 CFR 20.1403 are mutually exclusive. They are *not* mutually exclusive, and the phrase "in 10 CFR 20.1403" should not be inserted on page II-5 without the type of clarification outlined here in my paragraphs 4 and 5. Granted, the necessary type of clarification does appear on page IV-40; its appearance there may be sufficient. ("An alternative release proposal in accordance with 10 CFR 20.1404 may allow a dose of up to 1.0 mSv/y (100 mrem/y) with restrictions in place. However, if the restrictions fail, the dose may not exceed the values in 10 CFR 20.1403(e). Furthermore, all of the other provisions of 10 CFR 20.1403 must be met.")

Response: The staff agrees with this comment regarding missing information about the alternate criteria provisions. The overview discussion about use of alternate criteria provisions in the final guidance has been revised as suggested to add information on compliance with the dose "cap" requirements in 10 CFR 20.1403(e).

Comment 8.2.3

Comment: On page II-6 ff., the LTC license discussion ("If a licensee cannot establish acceptable institutional controls or independent third party arrangements, the licensee may propose one of the two new options involving NRC: an NRC Long-Term Control (LTC) license or an NRC Legal Agreement and Restrictive Covenant (LA/RC)…") encounters the same problems discussed above in my paragraph 3. The same problem occurs again on pages II-13, II-14, and subsequent pages where the LTC license is offered as an option. The statement of page II-56 ("a licensee proposing to use the LTC license needs to comply with all the criteria of 10 CFR 20.1403, even though the license will not be terminated.") provides an important safeguard but does not address other licensing requirements that may need to be met.

Response: See the response to Comment 8.2.1.

Comment 8.2.4

Comment: Figure 17.1 (page II-10) and the discussion on pages II-7 through II-9 are wrong; they mischaracterize the role of 10 CFR 20.1403(e). Section 20.1403(e) is a *requirement* that must be met in order for a site to be eligible for restricted release (with or without the use of alternate criteria). In Figure 17.1 and in the text on page II-7, 10 CFR 20.1403(e) should be shown as an eligibility criterion in step 2. Alternatively, if NRC believes that 10 CFR 20.1403(e) is not an eligibility requirement in the strictest sense, given the paragraph structure of 1403(a) and (e), then 10 CFR 20.1403(e) is an absolute regulatory mandate to reduce residual radioactivity such that the "cap" would be met if institutional controls were no longer in effect at any site eligible for restricted release. In any case, compliance with 10 CFR 20.1403(e) is mandatory for restricted release. Figure 17.1 should not indicate that compliance with 10 CFR 20.1404 is available as an alternative to compliance with 10 CFR 20.1403(e).

Response: The NRC staff agrees with the comment that all requirements for restricted use must be met for a site to be eligible for restricted use, including the dose "cap" requirements. Figure 17.1 and the associated text have been revised accordingly.

Comment 8.2.5

Comment: Compliance with 10 CFR 20.1403(e) is improperly omitted from the long discussion of Restricted Use, Eligibility Demonstration, and Acceptance Criteria on page II-11 ff. The only apparent references (pages II-12 and II-13) are too vague and make the 10 CFR 20.1403(e) dose "cap" sound optional, or subsidiary to other requirements, which is not the case. This lack must be corrected in accordance with the LTR and in accordance with the discussion above in paragraphs 4-7. Compliance with 10 CFR 20.1403(e) is mandatory for restricted release, and its applicability needs to be described clearly in this guidance document. The overview of Alternate Criteria in Appendix M (pages II-49 to II-50) should also clearly indicate the applicability of 10 CFR 20.1403(e).

Response: As mentioned previously, the NRC staff agrees that the dose "caps" required by 10 CFR 20.1403(e) are requirements and, therefore, not optional or subsidiary to other requirements. The guidance already addresses these requirements in Section 17.7.2.5 (now Section 17.7.6 in the final Volume 1, Revision 2) and, as mentioned in the response to Comment 8.2.4, other changes have been made for clarification.

Comment 8.2.6

Comment: On page II-37, it is unreasonable and unprotective for NRC to add the following proposed language: "The licensee is not required to reach consensus with the affected parties on the various aspects of the proposed institutional controls." At the very least, the phrase "not required to reach consensus" needs to be clarified, or, preferably, the regulatory language ("shall seek advice") will be allowed to prevail, with some presumption that the advice will not only be sought but heeded to some extent.

Response: The NRC staff disagrees with this comment. The guidance language quoted in the comment clarifies that the LTR does not require a licensee to reach consensus with the affected parties; this language was intentionally included in the draft guidance to respond to stakeholder input (provided at the NRC staff's public decommissioning workshop, held in April 2005). The guidance also already includes the regulatory language "shall seek advice," and therefore, the NRC staff considers the language in the draft guidance to be correct and appropriate. The NRC staff made no revisions to the guidance in response to this comment.

Comment 8.2.7

Comment: Similarly, on page II-39, it is unreasonable and unprotective for NRC to strike out the following language:

"As required by 10 CFR 20.1403(d)(1), the advice to be sought is whether the institutional controls proposed by the licensee will have the following qualities:

- provide reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group will not exceed 0.25 mSv/y (25 mrem/y);
- be enforceable;
- not impose undue burden on the local community or other affected parties; and
- be backed by sufficient financial assurance for any necessary control and maintenance of the site by an independent third party."

Public input on institutional controls is needed.

Response: The NRC staff believes the commenter is referring to the language that is struck out on page II-38 of Draft Supplement 1. The staff notes that the information in Section 17.8 (Volume 1, Rev. 1) was reorganized in the revision included in Draft Supplement 1. After further reorganization, the referenced struck-out language now is provided in Section M.6 of Volume 1, Rev. 2.

Comment 8.2.8

Comment: On page II-74, where "NRC proposes that the following [three] assumptions be used when applying engineered barriers to achieve decommissioning at a site," NRC should clearly state whether *active maintenance* of engineered barriers falls within the definition of institutional controls.

Response: Although the NRC does not formally define institutional controls, active maintenance is dependent on institutional controls being in effect. Therefore, the guidance in Section 3.5.2 of Volume 2 states that compliance with the criteria assuming loss of institutional controls includes the loss of maintenance.

8.3 Comments from the Colorado Department of Public Health and the Environment

Comment 8.3.1

Comment: Since the LTC license is not terminated in the usual sense, would this require NEPA review or a rulemaking instead of just incorporating it in guidance? This would appear to be a significant change, and should be reflected in the regulations, rather than guidance.

Response: SECY-03-0069 ("Results of the License Termination Rule Analysis," May 2, 2003) evaluated both rulemaking and guidance and recommended that guidance was appropriate for the few sites that might consider using the LTC license option. The Commission approved the staff recommendation to develop guidance. Consistent with the NRC's decommissioning process, a NEPA review would be done for a site that proposes use of an LTC license for restricted use. The staff has implemented the LTC option with the final guidance and does not plan a rulemaking for this option.

Comment 8.3.2

Comment: Section 17.7.1 discusses LA/RC for NRC use, however, many states now have effective environmental covenant mechanisms available. These can be more effective than the NRC LA/RC and should be mentioned as allowable, at the state's discretion.

Response: See the response to Comment 8.1.2.

Comment 8.3.3

Comment: Section 17.7.2.2.1 presents a very valuable discussion of considerations for evaluating long-term care needs.

Response: The NRC staff notes the comment.

Comment 8.3.4

Comment: P. II-8 describes lower hazard level as above 25 mrem/y, but less than 100 mrem/y; and higher hazard level as above 100 mrem/y, but below 500 mrem/y. It should also clarify that decommissioning is not complete unless the site hazard has been reduced to a level below 500 mrem/y in the event that any institutional or engineered controls fail.

Response: The staff revised the final guidance text and Figure 17.1 to clarify that licensees proposing restricted use termination must comply with all LTR requirements in 10 CFR 20.1403, which includes the 100 mrem/y and 500 mrem/y dose caps. Engineered barriers, however, are separate from institutional controls and, therefore, not assumed to immediately fail like institutional controls as the comment implies (see also response to Comment 8.5.3).

Comment 8.3.5

Comment: P. II-17, Section A, discusses the enforceability mechanisms of institutional controls. Due to the remoteness of the NRC offices from most licensed sites, it may be securable to delegate in some way the enforceability responsibilities to Agreement states, who would likely have a greater local presence.

Response: If a materials site (non-Federal licensee) is located in an Agreement State, that State has regulatory responsibility and could work with the licensee to establish a legally enforceable institutional control that is enforceable by the State.

Comment 8.3.6

Comment: [re: p. II-39] While it is certainly appropriate for a licensee to create a public involvement process as decommissioning approaches, it may also be beneficial to have created such a process at the beginning or during the facility life. An established public group is educated on the issues at the facility and is more likely to understand the difficult issues to be addressed in closure.

Response: The guidance, in Section M.6 of Volume 1, states that an established public group may be used by the licensee to obtain public advice. However, the LTR does not require public involvement for other than decommissioning activities. It is thus beyond the scope of the LTR and the guidance to suggest creating a public involvement process at the beginning of or during the facility life. The NRC staff has not changed the guidance in response to this comment.

Comment 8.3.7

Comment: P. II-48, Item 5, describes the requirements for sites where uncontrolled access could result in public exposures greater than 500 mrem/y; however, it is not clear that these criteria are materially different than those required for 100 mrem/y. Furthermore, decommissioning is not complete unless the site hazard has been reduced to a level below 500 mrem/y in the event that any institutional or engineered controls fail, and such sites would not be addressed in this guidance.

Response: This comment incorrectly states that public exposures could be greater than 500 mrem/y. Item 5 was reworded to make absolutely clear that the average member of the critical group "would not exceed 1.0 mSv/y (100 mrem/y) or, under certain conditions, would not exceed 5.0mSv/y (500 mrem/y)." Therefore, the three requirements listed in item 5 are only for sites that exceed the 100 mrem/y, since the 500 mrem/y cap cannot be exceeded. The staff agrees with the comment that decommissioning is not complete unless the site is below the 500 mrem/y criterion, when assuming institutional controls are not in effect. Engineered barriers, however, are separate from institutional controls and, therefore, not assumed to immediately fail like institutional controls as the comment implies (see also the response to Comment 8.5.3).

8.4 Comments from James Lieberman

Comment 8.4.1

Comment: As a general comment, the staff should appreciate that guidance associated with restrictive releases should be considered a "work in progress" in light of the fact that no licensee has completed the regulatory process and has had its license terminated under the restrictive release provisions of 10 CFR Part 20, Subpart E (LTR). In the past, NRC has frequently issued guidance after it has accumulated experience in an area and the guidance reflected that experience. That experience is lacking in the Part 20 restrictive release area. That is not to say that guidance should not be issued and experiences from similar areas, e.g. Part 40, be considered. The staff internally, licensees, States, and other stakeholders need to understand the staff's expectations in this area. However, the staff needs to be mindful that there may be unintended consequences in issuing guidance that has not been implemented and tested. The staff needs to maintain the flexibility to depart from the guidance based on common sense and good judgment. Such flexibility must be exercised with appropriate management controls so that departures are understood, documented, and reasonably controlled. It needs to be emphasized that the staff guidance is only one way to meet the regulations and that given the performance based nature of the LTR there are likely other ways to achieve compliance with the rule. Thus, the staff should exercise caution in issuing this guidance to ensure that the guidance does not become de facto prescriptive standards. The NUREG should be modified to clearly state this philosophy. For example, the Introduction to the NUREG should contain the last paragraph of section 1.1 of NUREG-1757, Volume 1, Rev 1.

Response: The NRC staff agrees that the guidance is not and must not become de facto standards. The forewords to Volumes 1 and 2 were modified as suggested to state this.

The NRC staff also agrees that the guidance for restricted use and institutional controls can be viewed as "work in progress" because no licensee has completed the regulatory process for a restricted release site. The staff believes that guidance, particularly for this issue, should allow flexibility to licensees and staff to find solutions acceptable for site-specific cases. The staff also

expects to revise this guidance periodically as implementation experience is gained, so that all licensees will have lessons learned available for consideration.

Comment 8.4.2

Comment: [re: Page II-40, SSAB] **Procedures for SSAB should be considerations.** The LTR does not require the use of a SSAB. While advisory boards are helpful, this is an area that needs flexibility to address different communities and circumstances. Thus, I would change "Licensees should use the following guidance in establishing and convening a SSAB:" to "Licensees should consider the following guidance in establishing and convening a SSAB:"

Response: The NRC staff recognizes that the LTR does not require the use of an SSAB. Convening an SSAB is considered to be one acceptable method for seeking advice from the affected parties. The NRC staff believes that this point is clear in the guidance and has not incorporated the suggested change to the guidance.

Comment 8.4.3

Comment: [re: Page II-37, Partial Site Release] **Prohibition on sale of unrestricted use property should be removed.** The preferred approach in this section in my view attempts to rewrite the rule to require more than what the rule requires. The LTR requires sufficient financial assurance to provide long term protection to the public health and safety, i.e., sufficient financial assurance to enable a third party to assume and carry out responsibilities for any necessary control and maintenance of the site. However, the staff proposes to prohibit a licensee from releasing property that is suitable for unrestricted release because the unrestricted portion of the property which is not needed to maintain radiological protection may help ensure sustainability of owner/licensee controls where the restricted portion may not have value. Putting to one side the question of whether the staff has performed an economic analysis that supports the staff's position, the staff position appears to be inconsistent with the requirements of 10 CFR 20.1403 that requires the staff to have reasonable assurance that the financial assurances provided by the licensee are adequate. The adequacy of the financial assurance is a key issue in the decision to allow a restrictive release. It is either adequate or not. If it is adequate, unless the continued ownership of the unrestricted portion of the property was factored into the financial assurance decision, it is irrelevant that "the unrestrictive use portion of the site could have resale value that balances the lack of resale value or even perception of liability associated with the restricted use portion." Under the staff's logic, maybe the next step is for the staff to require licensees that have potential restrictive use property without unrestrictive release portions to purchase valuable property to obtain the benefits that the staff is seeking by prohibiting the sale of adjacent releasable property.

The staff recognizes that there are pros and cons to its preferred approach. This is an example where in my view it is premature to issue definitive guidance given the lack of experience in restrictive releases. Clearly it is one approach that under some circumstances may be helpful but it should not be the expected outcome. I would modify the section to have the staff's preferred approach restated as an option that a licensee might consider but not to have it as a preference that by implication suggests that it would deny a license termination that does not follow the guidance. This will preserve flexibility.

Response: The staff agrees with this comment that financial assurance is a key issue in the decision to allow a restricted use because sufficient financial assurance is needed to fund future long term control activities at any restricted use site, even one with an NRC LTC license. The NRC staff recognizes that this issue—whether to split an unrestricted portion from a restricted

use portion of a site—is challenging, with pros and cons and with the possibility that undue burdens could result. Thus, both potential benefits and burdens should be evaluated, on a case-by-case basis, considering the views of affected parties. Therefore, the NRC staff agrees with the suggestion in the comment and has removed from the guidance the preference for prohibiting the sale of unrestricted use property in order to maintain single ownership of the entire site and has restated the approach as an option to be considered by both licensees and affected parties on a case-by-case basis, given site-specific factors. The benefits, burdens, and related considerations of this issue are discussed in Section M.3.5 of Volume 1.

8.5 Comments from the New Jersey Department of Environmental Protection

Comment 8.5.1

Comment: The Division does not support the concept of the LTC license. We need look no further than NRC's own regulations to express our objections. The whole idea of the Compact system for low level radioactive waste (LLRW) disposal and the disposal of mill tailings under 10 CFR Parts 61 and 40, give us insight into NRC's reasoning for promulgating regulations regarding waste disposal. Criterion 2 of Appendix A to 10 CFR 40 regarding disposition of wastes from uranium mills sets to avoid proliferation of small waste disposal sites and thereby reduce perpetual surveillance obligations. Regarding the LLRW disposal regulations, the Commission explained that: "Although LLRW can be safely stored, NRC believes that the protection of the public health and safety and the environment is enhanced by disposal, rather than by long-term, indefinite storage of waste. Disposal of waste in a limited number of facilities licensed under 10 CFR 61 or compatible Agreement State regulations, will provide better protection of the public health and safety and the environment than long term storage at hundreds or thousands of sites around the country." Indeed, in September, 2005 the Health Physics Society recently revised its position statement on Low-Level Radioactive Waste in which it says "the goal of managing LLRW is to ensure the safety of workers and the public and to protect the environment. To achieve this goal, disposal, not long-term storage, is the best and safest long-term approach."

The Department views the LTC license as long-term storage, not permanent disposal since it would not meet the criteria that the NRC has established for disposal facilities. While we acknowledge that an LTC license is a last resort, and there will not be hundreds of these sites around the country, we are still interested in providing better protection of the public health and safety and the environment in New Jersey.

Response: An LTC license is a new form of a possession-only specific license established by the Commission for the long-term control of a restricted use decommissioning site under the LTR. Therefore, it is an NRC legal instrument that would meet the LTR requirement for a legally enforceable institutional control or for a durable institutional control for a restricted use site. Decommissioning of NRC-licensed sites with restrictions on future site use is an option available for decommissioning under the LTR, if all the requirements under 10 CFR 20.1403 are met. The LTC license option is available as a "last resort" if a licensee has not been able to arrange other acceptable institutional controls or independent third-party arrangements. If an LTC license is used as the institutional control, and if all the requirements of the LTR are met, the facility is considered to be decommissioned. Therefore, the LTC license is not considered long-term storage. Compliance with the LTR requirements for restricted use is required if an LTC license is proposed and, therefore, protection of public health and safety and the environment is ensured.

The staff agrees with the comment that proliferation of sites with perpetual surveillance obligations should be avoided. For this reason, the Commission prefers decommissioning of sites with unrestricted use, but does provide the option for decommissioning with restrictions on future use under limited conditions. The staff does not believe that the use of the LTC license would lead to proliferation of restricted use sites. The LTC license itself would not encourage future use of the restricted decommissioning option, but is available only as a last resort and if it meets the stringent eligibility requirements as well as all the other restricted use requirements in the LTR. Furthermore, the staff is aware of only a few existing decommissioning sites that are considering restricted use.

The staff has revised its guidance to clarify that the LTC license is not for storage, that the LTC license should not lead to proliferation of restricted use sites, and that all the LTR restricted use requirements must be met, even with the use of the LTC license, to ensure protection of public health and safety and the environment.

Comment 8.5.2

Comment: [re: Section 17.7.1, Overview] Why is the LTC option discussed under license termination since the license is not being terminated? Under the normal restricted use, alternate criteria, or Legal Agreement/Restricted Covenant (LA/RC) options, the license is terminated.

Response: Although an existing license could be terminated and a new LTC license established at the end of the decommissioning process (if all the restricted use requirements in 10 CFR 20.1403 have been met), the staff believes that amending the license is administratively more efficient and helps preserve a single Agency record for the site. Through the license amendment process, the operational or decommissioning conditions in the license would be removed and new conditions for long-term control added. Both SECY-03-0069 and SECY-06-0143 indicate that the NRC may implement the LTC license through amendment of an existing decommissioning license, and the Commission has approved this approach. Additional detailed discussion is provided in Section M.3.11 of Volume 2.

Comment 8.5.3

Comment: [re: Section 17.7.1, Overview] In step 1 on page II-7 for selecting an option for restricted use or alternate criteria, the dose assessment is required to be performed without taking credit for institutional controls to restrict future site use. This should be reworded to say "without institutional controls and/or engineered barriers to restrict future site use."

Step 2 should reference the relevant volume and sections in NUREG-1757 on how to do the ALARA analysis. Is the dose assessment that is used in the ALARA analysis the one without institutional and engineering barriers, using the resident farmer scenario? This should be made clear.

Step 4. Lower Hazard Level: calculated dose is less than the public dose limit of 1.0 mSv/y (100 mrem/y) assuming institutional controls and/or engineered barriers are not in place. Higher hazard level: calculated dose is 1.0-5.0 mSv/y (100-500 mrem/y) assuming institutional controls and/or engineered barriers are not in place.

If it is determined that the site is higher risk, does this mean that if the dose is greater than 500 mrem/y without institutional or engineered barriers, then the LTC license is not an option? The

Department believes that this would be prudent policy on the part of the NRC. This should be incorporated into the steps and the flowchart.

Response: Step 1. The staff disagrees with this comment. The guidance in Section 17.7.1 of Volume 1 and the Commission's West Valley Policy Statement discuss the terms “institutional control” and “engineered barrier” and clarify that engineered barriers are not institutional controls. As a result, for the dose assessments that assume institutional controls are not in effect, monitoring and maintenance of engineered barriers are also assumed not to be in effect because they depend on an entity functioning under institutional controls.

One of the NRC staff's goals in decommissioning is to use more realistic scenarios. The staff believes that analysis of engineered barrier degradation without active maintenance, rather than immediate and complete failure, is a realistic approach. As a result, decommissioning guidance in Volume 2, Section 3.5, states that degradation of engineered barriers without maintenance should be analyzed and incorporated into dose assessments when institutional controls are not in effect. Therefore, the timing and extent of an assumed cap degradation would depend on the design of the cap, reasonably foreseeable future natural processes at the site, and reasonably foreseeable land uses. Therefore, no changes have been made to the guidance on Step 1 for this comment.

Step 2. In Section 17.7.1 of Volume 1, the descriptions of each step, including Step 2, are intended to be a simple outline of the process. As suggested by this comment, the NRC staff has added to this section references to the location of relevant detailed guidance in NUREG-1757.

The dose assessment used in the ALARA analysis for the “eligibility” demonstration would use the reasonably foreseeable land use assuming institutional controls are not in effect, which may or may not be the resident farmer depending on the specific site and if a resident farmer is considered a reasonable foreseeable land use. Chapter 6 and Appendix N of Volume 2 have been revised to clarify the appropriate use of scenarios for the ALARA analysis.

Step 4. The staff revised the final guidance text and Figure 17.1 to clarify that licensees proposing restricted use termination must comply with all LTR requirements in 10 CFR 20.1403, which includes the 100 mrem/y and 500 mrem/y dose caps. For the same reasons discussed in the response to Step 1 above, engineered barriers have not been included in the wording of Step 4.

Comment 8.5.4

Comment: [re: Section 17.7.2.2, Institutional Controls and Engineered Barriers] Paragraph 4 on page II-13 discusses an LTC license where there are both restricted and unrestricted use areas. The first sentence is not clear. Does the NRC want the entire site under the LTC license or not? The discussion on the value of the property is optimistic and presumptuous. Will there be a buyer for the unrestricted portion of a “decommissioned” site which still requires that the property be licensed by the NRC? The Department agrees that maintaining single ownership of a site with both restricted use and unrestricted use areas is warranted to sustain future ownership and long-term protection.

Response: On a case-by-case basis for privately owned sites, licensees, together with affected parties, should evaluate the option of keeping the entire site, including both the unrestricted and restricted use parts, under the LTC license, including benefits to sustaining future ownership as

well as potential detriments. The staff has revised the guidance (now in Section M.3.5 of Volume 1) to remove the preference for this approach.

Comment 8.5.5

Comment: [re: Duration of Institutional Controls] What is the justification for the NRC to allow institutional controls (the LTC license) to be durable indefinitely, especially in light of the LLRW facility regulations which state that institutional controls cannot be relied on for more than 100 years (10 CFR 61.59)? Please do not respond that the LTC license is not regulated under 10 CFR 61. The end result is a LLRW disposal facility that contains waste from a single generator. Unfortunately, this disposal facility (SMC) will not have to abide by the regulations for siting or operating LLRW facilities.

Response: The staff does not agree with the comment. The Shieldalloy Metallurgical Corporation (SMC) site has not been and would not be an LLRW disposal facility under the LTC license. The SMC site has an NRC materials license that is required to be decommissioned under the LTR, which includes the option of decommissioning with restrictions on future site use if the LTR restricted use requirements can be met.

The LTR and the regulations for low-level radioactive waste (LLRW) disposal facilities, in 10 CFR Part 61, were developed at different times, and thus have different regulatory approaches to the use of institutional controls. Similarities and differences of the approaches to institutional controls are discussed in the response to Comment 2.6.1 and in the appendix. The regulatory approach of the LLRW regulation of 10 CFR 61.59 does limit the use of institutional controls to a period of 100 years. However, this does not mean that institutional controls cannot remain in place for longer periods. It only means that longer periods may not be used for compliance with 10 CFR 61.59.

The NRC staff believes that certain types of institutional controls, if properly developed, can be durable for up to 1000 years, the compliance period for the LTR. However, the staff does not rely only on institutional controls remaining durable indefinitely, and the NRC's regulations recognize that failure of institutional controls cannot be prevented. Facilities decommissioning under restricted use conditions must comply with the 100 or 500 mrem/y dose “caps,” for the condition of institutional controls not in effect (10 CFR 20.1403(e)). This provides another level of protection in case institutional controls do fail.

Comment 8.5.6

Comment: [re: Detriments Associated with Institutional Controls] How are potential impacts on sale of the property or value of the property due to the NRC license, or perceptions that the NRC could potentially require further cleanup in the future (i.e. lack of finality), going to be determined by the licensee? Obviously the licensee will present an optimistic appraisal of the situation. Can some guidance be given or can the NRC provide advice to the licensee on how they can obtain guidance on determining this? Would the NRC ever disapprove an LTC license because of this kind of detriment? What would it take for the NRC to rule out an LTC license due to this detriment? Does the town planning board have an opportunity to weigh in with their vision for the future use of the site? Can the elected members of a town government represent their citizen's wishes and determine the end use of the site?

Response: Evaluating impacts on the sale of property or value of property due to the NRC LTC license is subjective and specific to the local community. Thus, general guidance is not provided. Such impacts should be evaluated by the licensee based on discussions with the

local community, including experts familiar with trends and factors affecting local property values. Such impacts also would be considered as part of the licensee's cost benefit analysis for the eligibility determination under the LTR (10 CFR 20.1403(a)), as well as the NRC's environmental review. The NRC would not approve an LTC license option for a site that did not comply with the eligibility requirements in 10 CFR 20.1403(a).

Regarding finality, the Commission has determined in SRM-SECY-06-0143 that because a site with an LTC license would have met all the applicable LTR requirements for restricted use, the provision of 10 CFR 20.1401(c) is relevant to the site (i.e., the NRC would require additional cleanup only if, based on new information, it determined that the LTR criteria were not met and residual radioactivity could result in a significant threat to public health and safety).

As already explained in Section 17.8 (now Section 17.7.5 and Section M.6 of Volume 1) of the guidance, the licensee is required by the LTR to obtain advice from affected parties on various institutional control questions that could include views on the future use of the site. Affected parties may include the town planning board and elected members of a town government.

Comment 8.5.7

Comment: [re: Section 17.7.2.3, Site Maintenance and Long-Term Monitoring] Cannot locate Section 17.7.3.2.1 or Section 17.7.3.3.2 in Vol. 1.

Response: The guidance has been corrected to refer to the proper sections (now different sections because of reorganization).

Comment 8.5.8

Comment: [re: Enforcing Institutional Controls] What if a State is currently not an Agreement State, does not approve of the LTC license option, but later becomes an Agreement State? Will the NRC continue to monitor and enforce the LTC license? Since the LTC license is not in the NRC regulations, it would seem that it could not be used as a compatibility issue in determining eligibility for Agreement State status.

Response: The answer to the first two questions will necessarily depend on the scope of the State's § 274b. Agreement ("Agreement"). Section 274b. of the Atomic Energy Act of 1954 (AEA), as amended, authorizes the Commission "to enter into agreements with the Governor of any state, with respect to any one or more of the following materials within the state—

(1) Byproduct materials (as defined in section 11e.).

(2) Source materials.

(3) Special nuclear materials in quantities not sufficient to form a critical mass."

Currently, a State may request authority to regulate all activities associated with one or more of these three categories of materials, or may limit the scope of its regulatory authority by requesting a limited Agreement. Such limited Agreements involve the discontinuance by the NRC, and assumption by a State, of regulatory authority over "subcategories" of the three categories of materials listed in § 274b. For example, in the past, Agreements have been limited by providing regulatory authority to an Agreement State over a subcategory of source material and returning authority for regulation of uranium mills and sealed sources and devices to the NRC.

However, there are constraints on the NRC's ability to enter into limited Agreements. When analyzing requests for limited Agreements, the NRC will consider whether the proposed agreement would jeopardize the "orderly regulatory pattern between the Commission and the State governments." See § 274a.(3) of the AEA. Specifically, requests for limited Agreements should identify discrete categories of material or classes of licensed activity that (1) could be reserved to NRC authority without undue confusion to the regulated community or burden to NRC resources and (2) can be applied logically and consistently to existing and future licensees. Along these lines, the NRC has denied a request for a limited Agreement specifically designed to transfer authority to regulate a single licensee, as well as a limited Agreement that would have specifically excluded several licensees that were undergoing decommissioning. Potential Agreement States should note that, while limited Agreements covering discrete categories of material or classes of licensed activity may have the practical effect of including or excluding certain licensees, limited Agreements proposing to specifically include or exclude particular licensees are generally considered unacceptable.

With this background information in mind, if a State requests regulatory authority over a category or subcategory of materials, then all existing specific licenses governing activities involving that material, including LTC licenses, would transfer to the State upon finalization of its Agreement. If a State enters into an Agreement, but does not request regulatory authority over a category of materials covered by an existing LTC license, or enters into a limited Agreement and does not request regulatory authority over a subcategory of materials covered by an existing LTC license, then the NRC would continue to exercise its regulatory authority over that category or subcategory of materials. In such a case, the NRC's exercise of regulatory authority would include monitoring and enforcing the existing LTC license.

The answer to the third question is informed by the nature of the LTC license. Specifically, an LTC license is one way a licensee may provide legally enforceable institutional controls, as required in 10 CFR 20.1403(b). Provision of legally enforceable institutional controls is one of the requirements that must be met in order to terminate a license under restricted conditions. The LTC license is merely one possible method of complying with the NRC's license termination regulations; it is not a regulatory requirement and is not currently referenced in the NRC's license termination regulations. Therefore, failure of a State to specifically provide for use of LTC licenses in its license termination regulations would not be a compatibility issue.

In conclusion, if a State enters into an Agreement transferring regulatory authority over a category or subcategory of materials covered by an existing LTC license, such license would transfer to the State. Therefore, upon finalization of the Agreement, the State would be required to recognize the LTC license in the same way it would be required to recognize any other relevant specific license. However, the validity of the LTC license as a means to comply with the State's license termination rules would be a policy matter to be resolved by the State.

Comment 8.5.9

Comment: [re: Enforcing Institutional Controls] The difference between the Legal Agreement/Restricted Covenant (LA/RC) option and the LTC option regarding enforcement is difficult to discern. If NRC is going to perform periodic inspections and be the enforcing party for the LA/RC, why not continue the license? NRC needs to be more clear as to when a site would be allowed to fall under the LA/RC option vs. the LTC license. Also incorporate this decision-making into Figure 17.1.

[re: Sufficient Financial Assurance] Again, since the LA/RC option has to include the same costs of the LTC license option, it is difficult to differentiate between the two.

Response: The NRC staff has clarified the guidance on the criteria for determining whether the LTC license vs. the LA/RC could be used as an institutional control. This discussion is in Section 17.7.1 of Volume 1, in the discussion of the steps of Figure 17.1.

Comment 8.5.10

Comment: The last paragraph of this section explains that the licensee is allowed flexibility to request approval for removing the residual material, terminating the license, and releasing the site for unrestricted use. Does this mean that the NRC will not allow a request to terminate the LTC license and release the site under restricted use standards?

Response: The NRC would also allow a request to terminate the LTC license and release the site with restrictions using another acceptable type of legally enforceable and, if needed, durable institutional control and independent third-party arrangement, if approved by the NRC. The guidance has been revised to clarify this flexibility.

Comment 8.5.11

Comment: The second paragraph of page II-26 discusses the duration of the monitoring. For long-lived radioactive materials (half-lives in the millions or billions of years), how long should monitoring be performed?

Response: The guidance on page II-21 (now in Section 17.7.4 of Volume 1) describes a general approach for a licensee to develop a monitoring program, including the duration of monitoring, using a risk-informed approach. Therefore, the duration of monitoring for long-lived radioactive material should not be simply determined by half-life. Instead, the type and duration of monitoring should be based on many factors such as site disruptive processes, barriers, mobility of the radioactive material, or uncertainties that are important to compliance and indications of the system performance. Monitoring, for a site with long-lived radionuclides, might be needed only for a limited time period to confirm compliance modeling assumptions or to reduce uncertainty, or might be needed for up to 1000 years.

Comment 8.5.12

Comment: [re: Section 17.7.2.4, Obtaining Public Advice] After being a part of a Site Specific Advisory Board (SSAB) on obtaining a LTC license, it becomes apparent that the current guidance is not adequate. While the licensee should gather members of the community and other affected parties, these members may not be qualified to answer questions on total effective dose equivalent, financial assurance, and enforcement issues. It seems that the public is at a disadvantage, simply because they lack expertise to really analyze these specific charges. It would seem appropriate, given the burden that an LTC places on a community for an indefinite period of time, for the NRC or licensee to be required to fund independent advisors, such as health physicists, lawyers, and/or financial advisors. These advisors would be selected by the members of the SSAB, and tasked with providing an independent review and analysis of the proposed actions.

Response: The NRC staff disagrees with this comment. The NRC regulations do not include requirements for licensees or the NRC to fund independent advisors to assist the affected parties in providing their advice on restricted use decommissioning and institutional controls. In addition, the guidance notes that “affected parties” could include any State, local, or Federal Government agency (other than the NRC) that has jurisdiction or responsibilities with respect to the site to be decommissioned. This could include the State's governmental organizations or

departments that focus on public health or environmental protection, which would have expertise related to radiological, decommissioning, and regulatory issues. The guidance of Section M.6 of Volume 1 has been revised to note this.

Comment 8.5.13

Comment: [re: Section 17.7.2.5, Information to Be Submitted] What happens when the dose to the average member of the critical group could exceed 500 mrem/y? Will the NRC make sure this doesn't happen by simulating degradation of engineered barriers for only 100 years?

Response: The NRC would not approve a licensee's approach for restricted use if the 500 mrem/y dose cap requirement of the LTR, in 10 CFR 20.1403(e), is exceeded. In such a case, the licensee would need to modify its approach in some way, such as removing some radioactive material or changing the design of an engineered barrier so that the dose cap is not exceeded. The degradation of engineered barriers is not limited to 100 years. For analyzing the case of institutional controls not in effect, the licensee must evaluate degradation of engineered barriers for the time period that is important to the compliance calculation, up to 1000 years. The degradation of an engineered barrier would be based on the design and the projected service environment.

Comment 8.5.14

Comment: [re: 17.8 Obtaining Public Advice on Institutional Controls] The last bullet on page II-37 states that “the licensee is not required to reach consensus with the affected parties on the various aspects of the proposed institutional controls.” What happens when there is consensus from the entire SSAB against various aspects of the institutional controls? Does that affect the NRC's decision as to whether to issue an LTC license or an LA/RC?

Response: The LTR requires licensees to seek advice from affected parties on various issues regarding institutional controls. The LTR also requires licensees to document in their DPs how the advice of affected parties was sought and incorporated, as appropriate, following analysis of that advice. The statements of consideration for the LTR state that the licensee should provide, in the DP, the technical basis for addressing the recommendations received from affected parties. The NRC would review the DP and the licensee's analysis and would draw conclusions about whether the licensee fulfilled this requirement of the LTR. All information (including a summary of the input from the affected parties or SSAB, which could include a consensus on a particular aspect of the ICs, as noted in this comment) would be considered by the NRC staff in deciding whether the licensee's proposed use of the institutional controls (including an LTC license or LA/RC) in the DP is in accordance with the LTR, and is thus protective of public health and safety. The NRC staff made no revisions to guidance in response to this comment.

Comment 8.5.15

Comment: [re: Suggestions for Effective Public Involvement] The first paragraph suggests that the stakeholders of affected parties can define the term “undue burden.” What happens if these individuals determine that there is an undue burden on the community? Will the NRC deny the LTC license? What are the constraints that are placed on the NRC's decision-making ability given that they are not members of the community and were not duly elected to represent the citizens?

Response: The LTR requires licensees to seek advice from affected parties on various issues regarding ICs, including whether provisions for ICs proposed by the licensee will not impose

undue burdens on the local community or other affected parties. In providing advice on whether the ICs proposed by the licensee impose an undue burden on the local community, it is important for the affected parties to state their basis for determining what they consider an "undue burden." The licensee would need to consider and incorporate as appropriate, this information into its decommissioning plans. The statements of consideration for the LTR state that the licensee should provide in the DP the technical basis for addressing the recommendations received from affected parties. The NRC would consider this information in its review of the DP to determine if the licensee has demonstrated compliance with all of the appropriate LTR requirements. This information would also be considered in the NRC's environmental review, under NEPA, as part of the NRC's decommissioning process for a restricted use site.

The NRC works within the constraints of the statutory authority afforded to it through legislation. The NRC's "decision-making ability" in relation to the licensing and regulation of the civilian use of radioactive material, is authorized through the Atomic Energy Act of 1954, as amended. The AEA authorizes the NRC to establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property. Through this authority, the NRC established regulations that provide the radiological criteria for license termination (10 CFR 20, Subpart E). The NRC staff makes decisions related to decommissioning and license termination based on compliance with 10 CFR 20, Subpart E.

Comment 8.5.16

Comment: [re: Suggestions for Effective Public Involvement] The third paragraph on page II-43 states that preliminary results of dose assessments could be discussed. How can the SSAB be expected to determine whether institutional controls are adequate to provide reasonable assurance that the doses will be less than 25 mrem/y if only preliminary results are available?

Response: The LTR requires licensees to seek advice on whether the proposed ICs will provide reasonable assurance that the dose will not exceed 25 mrem/y. This requirement is directed towards seeking advice on the actual institutional control (e.g., LTC license) and whether it would be an effective tool to limit uses of the site that could lead to an average member of the critical group receiving a dose exceeding 25 mrem/y. It is expected that the affected parties provide advice on the future uses of or activities on the site and, if the licensee's preliminary assessment shows that some of these uses/activities could lead to the average member of the critical group receiving a dose in excess of the LTR criteria, how those uses/activities could be limited, and whether the proposed ICs will effectively limit these uses/activities (and provide reasonable assurance that the average member of the critical group will not receive a dose exceeding 25 mrem/y). It is not expected that the affected parties would review the technical acceptability of the licensee's dose assessment before it is submitted to the NRC as part of the licensee's DP. The NRC will notice receipt of the licensee's DP and solicit comments on it (see Comment 8.5.14), and stakeholders will have the opportunity to comment on all aspects of the licensee's DP, including the dose assessment. The NRC staff made no revisions to guidance in response to this comment.

Comment 8.5.17

Comment: [re: Appendix M] The deleted text on page II-48 should be replaced with "Also note that there is some potential that a LA/RC could be revisited as a result of the Memorandum of Understanding with the Environmental Protection Agency."

Response: The NRC staff disagrees with this comment. The referenced deleted text was obsolete text from an earlier version of the guidance when the EPA was considering a general rulemaking for cleanup of radioactively contaminated sites, and the text should be deleted. The proposed replacement text is not necessary. The potential for EPA revisiting a site with an LA/RC (or any restricted use site) would be reduced by the consultation process under the EPA/NRC MOU, which includes NRC consultation with EPA if a licensee is proposing restricted use of the property. The guidance already includes the MOU (Appendix H of Volume 1) and provides guidance to the NRC staff regarding EPA consultation in relation to the MOU.

Comment 8.5.18

Comment: [re: Section M.1.4, Institutional Control Implementation Issues] The NRC states that the long-term effectiveness of institutional controls is recognized as a significant challenge given many examples of institutional control failures even after short periods of time. Why then is an NRC license considered a fail safe institutional control? There is no evidence to suggest that an NRC license will be a durable institutional control considering the NRC's track record regarding lost sources. While a "site" cannot be lost, the point is that even NRC licenses are not faultless.

Response: The NRC considers an LTC license to be a durable institutional control because it is a legally enforceable Federal Government control.

Comment 8.5.19

Comment: The policy for sites where the dose results in over 500 mrem/y assuming no institutional controls or engineered barriers in place should be stated. Neither the LTC license option nor the LA/RC option should be allowed in those cases.

Response: As stated in the response to Comment 8.5.13, for either the LTC license or LA/RC options, the licensee must demonstrate compliance with all the applicable LTR requirements, which includes compliance with the 500 mrem/y dose cap for the case when institutional controls are not in effect. This policy is stated in Figure 17.1 and Section M.3.3 (and other locations) of Volume 1. Therefore, no changes were made to the guidance.

Comment 8.5.20

Comment: [re: Section M.3.1, Purpose of the LTC License] A site with an LTC license should not be considered "decommissioned." MARSSIM defines decommissioning as follows: To remove a facility or site safely from service and reduce residual radioactivity to a level that permits release of the property and termination of the license and other authorization or site operation.

Response: As discussed in the response to Comment 8.5.2, the NRC staff believes that if all requirements for restricted use have been met, and the license amended to create an LTC license, then the site is considered decommissioned. Both SECY-03-0069 and SECY-06-0143 indicate that the NRC may implement the LTC license through amendment of an existing

decommissioning license, and the Commission has approved this approach. Additional detailed discussion is provided in Section M.3.11 of Volume 2.

Comment 8.5.21

Comment: [re: Section M.3.4, Eligibility for Restricted Release and the LTC License Option] Letter c. states that the LTC option would be acceptable if the site would need long-term monitoring or maintenance requiring technical skills to conduct. This sounds more like a reason why the LTC option would not be acceptable. Was this a mistake?

Response: The NRC staff believes the referenced passage was correct. Long-term monitoring or maintenance could be conducted under an LTC license, and the NRC would require (through conditions in the license) the licensee to have the appropriate technical expertise to carry out these monitoring or maintenance activities.

Comment 8.5.22

Comment: [re: Section M.3.5, Partial Restricted Release under an LTC License and Maintaining Single Ownership of the Site] The NRC states that government-owned sites could be subdivided and the unrestricted use portions could be released from the license for reuse. For private sites, however, the license boundaries must be maintained and sale of the unrestricted portions of the site, separate from the restricted portions, is not allowed. If state or federal ownership is considered as durable as an LTC license, as indicated in Table M.1, why would government-owned sites be allowed to sell unrestricted portions? Either they should not be allowed to sell the unrestricted portions, or Table M.1 should be changed to show that State or federal ownership is more durable than an LTC license.

Response: See the response to Comment 8.4.3.

Comment 8.5.23

Comment: [re: Section M.3.5, Partial Restricted Release under an LTC License and Maintaining Single Ownership of the Site] The first “Pro” listed on page II-58 states that permitted uses on the unrestricted portions of the property should enhance future resale of the site (with both restricted and unrestricted use portions) as a whole. What justification does the NRC have for this statement? What entity would ever want to purchase a property with a $60 million liability? Clearly it is unrealistic to expect that the site would ever be sold, which demonstrates that there is an undue burden on the community, in the Newfield case.

Response: Under an LTC license that complies with all the LTR restricted use requirements, the finality provision under 10 CFR 20.1401(c) would apply, thus removing the potential for requiring additional cleanup to unrestricted use levels in the future (unless new information is discovered; see also the response to Comment 8.5.27) and the associated liability. The guidance has been clarified as noted in the response to Comment 8.5.20.

Comment 8.5.24

Comment: [re: Section M.3.5, Partial Restricted Release under an LTC License and Maintaining Single Ownership of the Site] The second listed “Pro” states that this approach is intended to allow reuse of the site while enhancing the long-term protection. How does allowing access to unrestricted portions of the site enhance the long-term protection? One could view

this as a detriment to long-term protection because more activity at a site could result in more trespassers.

Response: As noted in the first "Pro" access to the unrestricted use part of the site might allow reuse of preexisting industrial facilities or development of new facilities which should enhance future resale of the site as a whole and help ensure sustaining ownership and licensee controls, and thus protection of public health and safety, where numerous ownership changes are expected over the long term. With proper access controls on the restricted use part of the site, more activity on the unrestricted use part should not result in more trespassers as the comment suggests. See also the response to Comment 8.4.3.

Comment 8.5.25

Comment: [re: Section M.3.5, Partial Restricted Release under an LTC License and Maintaining Single Ownership of the Site] The Department agrees that maintaining ownership of the complete site would help ensure monitoring over the long-term.

Response: The NRC staff notes the comment.

Comment 8.5.26

Comment: [re: Section M.3.5, Partial Restricted Release under an LTC License and Maintaining Single Ownership of the Site] The first "Con" also demonstrates that there is an undue burden on the community. The second "Con" gives the impression that the NRC is being more lenient with spent nuclear fuel than with material that is being allowed to remain under the LTC license. This should be expanded to explain any required buffer zones around the stored spent fuel. The third "Con" speaks for itself.

Response: For the first "Con" the draft guidance explained how the potential sensitivity to an NRC license and potential impact on reuse of the site could be reduced or eliminated and possibly avoid an undue burden on the community. For the second "Con," again, the draft guidance explained why the two approaches are considered by the staff to be appropriate. The NRC staff made no changes to the final guidance.

Comment 8.5.27

Comment: [re: Section M.3.7, Flexibility to Seek Unrestricted Release in the Future] The NRC should also have flexibility to require that the licensee dispose of the material under certain circumstances. For example, if a new inexpensive disposal option becomes available, the NRC should require the licensee to show that leaving the material under the LTC license is still ALARA. To be fair to the community, this demonstration should exclude the cost of dismantling any engineered barriers. The starting point should be pre-LTC license. Other circumstances that would require cleanup might be consistent problems with maintaining the integrity of engineered barriers, or enforcement actions against the licensee. The title of section M.3.7 should be "Flexibility to Seek/<u>Require</u> Unrestricted Release in the Future."

Response: The NRC staff disagrees with the comment. As the draft guidance indicated, additional cleanup of a site under the LTC license would not be required, unless new information were to indicate a significant threat to public health and safety, per the finality statement in 10 CFR 20.1401(c). However, if an inexpensive method becomes available, an LTC licensee would have the flexibility to propose remediation to unrestricted release levels for NRC approval under this circumstance.

Consistent problems with maintaining the integrity of engineered barriers (that were unexpected when the barrier design was approved) could be considered new information and evaluated to determine if degradation could result in noncompliance and a significant threat to public health and safety. Enforcement actions regarding licensee performance would be resolved with the NRC's existing enforcement processes. The final guidance has been revised to clarify licensees' flexibility.

Comment 8.5.28

Comment: [re: Section M.3.11, Finality of Decommissioning Decisions] This section illustrates the whole problem with the LTC license option. There is no finality in the NRC decisions. There would always be the possibility of requiring a cleanup, and therefore it is highly unlikely that the site would ever be able to be put into productive use. This is an undue burden on the community.

Response: As discussed in the response to Comment 8.5.2, the NRC staff believes that if all requirements for restricted use have been met, and the license amended to create an LTC license, then the site is considered decommissioned. Both SECY-03-0069 and SECY-06-0143 indicate that the NRC may implement the LTC license through amendment of an existing decommissioning license, and the Commission has approved this approach. Additional detailed discussion is provided in Section M.3.11 of Volume 2.

Comment 8.5.29

Comment: It seems that the only way an LTC license would not be an undue burden to the community is if the material had a short half life.

Response: Determining if the use of an LTC license is an undue burden to the community would be evaluated by the staff in its decommissioning plan review and environmental review for a specific site and would not be based simply on half life.

Comment 8.5.30

Comment: [re: Section M.4, Legal Agreement and Restrictive Covenant (LA/RC)] This section shows that the NRC should remove this option from the guidance. There is no reason to allow this option other than the fact that the licensee may want to terminate the license or that a new owner does not want a license. Since the LA/RC is only a durable institutional control versus the NRC license, which is listed as the most durable institutional control, what is the advantage of this option for the NRC and the public?

Response: The NRC staff disagrees with this comment. The NRC manages some decommissioning sites that are not currently licensed but were formerly licensed (by either the AEC or NRC), where the former license was not properly terminated. For these sites, the current site owners are cooperating to properly decommission the site, and therefore are not required to obtain an NRC license. The LA/RC, instead of the LTC license, could be an acceptable institutional control option for this type of site. The NRC staff notes that the licensee or site owner proposing to use the LA/RC option for institutional controls would need to demonstrate that the LA/RC was legally enforceable in the jurisdiction where the site is located and demonstrate compliance with all applicable LTR requirements.

Comment 8.5.31

Comment: [re: Section M.5.1, Legally Enforceable Institutional Controls] In New Jersey regulations, institutional controls do not refer to any physical kind of control such as fences, signs, markers, or vegetation. The Department's definition of institutional controls includes use restrictions, well restriction areas, classification exception areas, deed notices, and declarations of environmental restrictions. An NRC license would be considered an institutional control, but not a fence. The Department's definition of engineering controls includes caps, covers, dikes, trenches, leachate collection systems, radon remediation systems, signs, fences and physical access controls.

Response: The staff notes that New Jersey regulations describe institutional controls differently than does the NRC. Although not formally defined in the LTR, the Commission clarified the terms institutional controls and engineered barriers in its Final Policy Statement for the decommissioning criteria for the West Valley Demonstration Project. This clarification was included in Section 3.5 of Volume 2. In short, institutional controls are designed to restrict intruder access and/or use of the site by using administrative/legal mechanisms (land use restrictions) as well as physical controls such as signs, markers, landscaping, and fences. Engineered barriers, on the other hand, are usually designed to inhibit water from contacting waste, limit releases, or mitigate doses to intruders. The discussion of the terms institutional controls and engineered barriers was also included in Section 17.7.3 of Volume 1.

Comment 8.5.32

Comment: [re: Section M.5.6, Maximum Limits on Dose if Institutional Controls Fail] Because it is not possible to preclude the failure of controls, the NRC should make it clear that the dose caps act as a safety net if institutional controls or engineered barriers fail.

Response: The NRC staff disagrees with adding failure of engineered barriers, as suggested by the comment. The dose caps limits of 10 CFR 20.1403(e) apply to the case of institutional controls (not engineered barriers) not being in effect. Additional detail is given in the response to Comment 8.5.3.

Comment 8.5.33

Comment: What does “over the time period of compliance” mean for radionuclides with half-lives in the billions of years?

Response: The LTR in 10 CFR 20.1401(d) established the compliance period for decommissioning to be the first 1000 years after decommissioning.

8.6 Comments from the New York State Department of Environmental Conservation

Comment 8.6.1

Comment: We concur with the concept of a long-term control license (LTC license), described on page II-6 and elsewhere in this document. Properly implemented, a LTC license can provide greater assurance that the necessary land use and other controls will remain effective at sites that are released for restricted use. In addition, we agree that the LTC license is preferred over the legal agreement and restrictive covenant option.

Response: The NRC staff notes the comment.

Comment 8.6.2

Comment: On Page II-7, it is stated, "The LA/RC option provides flexibility for a formerly licensed site where the current owner does not want to become a licensee or for current licensees where the owner may want license termination." This gives the impression that it is merely a matter of the licensee's preference. However, on page II-8 and elsewhere, certain conditions are described that must be met for the LA/RC option to be used. We suggest revising the statement on page II-7, to note that certain conditions apply.

Response: The NRC staff has made various changes to the guidance in Section 17.7.3 of Volume 1, to clarify the criteria for determining whether the LTC license vs. the LA/RC could be used as an institutional control. Also, see the responses to Comments 8.5.9 and 8.5.30.

Comment 8.6.3

Comment: The conditions necessary for using LA/RC include a demonstration "that the LA/RC would be a significant benefit to the licensee/owner and affected parties." Given that the LA/RC option would not entail the fees associated with the LTC license option, demonstrating that this option is a benefit to the licensee is hardly necessary. Rather, the licensee should demonstrate that the LA/RC option is justified and provides the same level of protection for the public and the environment as the LTC license option. Therefore, we suggest revising the wording of the bullet on pages II-8 and 9, and elsewhere, to read (changed language underlined):

> LA/RC option may be used if:
>
> - Current licensee or formerly licensed site owner requests use of the LA/RC rather than the LTC license, demonstrates that the LA/RC option would be as effective <u>as the LTC license option</u> and legally enforceable by NRC in the jurisdiction where the site is located, and demonstrates that <u>the LTC licensee option would impose an unreasonable economic, technological, or safety burden on the person or the public</u>.

Response: The staff agrees that the condition to demonstrate the benefit of the LA/RC to the licensee or owner and to affected parties is unnecessary. The staff has revised the guidance to reflect that an LA/RC, instead of an LTC license, may be an acceptable institutional control option if there are no monitoring or maintenance activities that would require a site owner to have special expertise or knowledge to carry them out. For a site to use either option, it must meet the LTR criteria for restricted use in 10 CFR 20.1403, including that the institutional control must be legally enforceable (for the LA/RC, enforceable in the jurisdiction where the site is located). Also, see the response to Comments 8.5.9 and 8.5.30.

8.7 Comment from Save the Valley, Inc.

Comment: [re: Section 17.7.2, Restricted Use] Circumstances existing at various "legacy sites" brought about by past uses require special considerations including "restricted use." The development of regulations and guidance such as those proposed here have become necessary to protect public health and the environment.

We believe that the creation of such sites should be avoided up-front. For example, more thought and care should be taken in granting a license when it is obvious that the future remediation of the area will be exceedingly difficult due to conditions existing at that site.

While we approve of the NRC's efforts to deal with such sites already created we would caution the NRC not to allow new and improved regs and guidance to promote creation of more sites

that would eventually require restricted use. Many see these restricted use sites as sacrifice zones and should be avoided.

Response: The NRC staff generally agrees with this comment. However, the staff is concerned with existing legacy sites and with reducing future legacy sites. For existing legacy sites, the staff has provided guidance that provides alternate approaches to demonstrating compliance with the LTR criteria, especially for restricted use. The goal for these existing legacy sites is to complete decommissioning that is protective of public health and safety. The staff also has a preference for sites to be decommissioned for unrestricted use.

For current and future operating sites, the staff is taking other regulatory actions, based on the lessons learned from existing sites, to reduce the potential for future restricted use sites. This includes a rulemaking and associated guidance, inspection procedures, and enforcement guidance to help prevent future decommissioning problems and ensure sufficient funding for cleanup. In addition, the requirement of 10 CFR 20.1406, for license applicants to describe how facility design and procedures will facilitate eventual decommissioning, should reduce the likelihood of future license termination under restricted use conditions.

The NRC staff believes that its efforts to address the existing legacy sites (and sites that may decommission under restricted use) would not result in more future legacy sites (and restricted use sites).

APPENDIX: COMPARISON OF INSTITUTIONAL CONTROLS UNDER THE NRC'S REGULATIONS

This section provides a summary of the regulatory approaches for the use of institutional controls (ICs) under the NRC's regulations relevant to three categories of NRC-licensed sites: (1) decommissioning of restricted use sites under 10 CFR Part 20, Subpart E (referred to in this summary as Part 20 Subpart E); (2) reclamation of uranium recovery sites under 10 CFR Part 40, Appendix A (referred to in this summary as Part 40 Appendix A); and (3) licensing of low-level waste disposal sites under 10 CFR Part 61 (referred to in this summary as Part 61). These approaches are compared and the differences and similarities discussed. This information is based on the NRC's regulations and supporting guidance, a comparison of regulatory approaches prepared by the Interagency Steering Committee on Radiation Standards (ISCORS, 1999), and an analysis by the staff of ICs in SECY-03-0069. In part, this comparison was prepared in response to comments from the NRC's Advisory Committee on Nuclear Waste and other stakeholders regarding differences among the three regulatory approaches.

A.1 Approach under Part 20 Subpart E for Decommissioning NRC-Licensed Sites with Restricted Use

- Requirements for ICs are included in Part 20 Subpart E which was finalized in 1997.

- Part 20 Subpart E is a risk-informed and performance-based regulation specifically developed to be flexible for the decommissioning of a wide variety of NRC-licensed sites, excluding uranium recovery and low-level waste disposal sites regulated separately under Part 40 and Part 61 respectively.

- Requirements for restricted use in 10 CFR 20.1403 are flexible and include general requirements for legally enforceable ICs and for durable ICs (e.g., government ownership or control) for certain sites with higher risk.

- Guidance in NUREG-1757 provides flexibility with a risk-informed graded approach to select the appropriate type of IC, duration, specific restrictions on adverse access and land uses, and specific permitted land uses (e.g., low-risk sites could use conventional deed restrictions, whereas a high-risk site would need government ownership or control). Duration is for as long as needed to allow decay of radionuclides to unrestricted use levels.

- Guidance also provides two new NRC options for ICs if no other acceptable ICs can be arranged. These options include an NRC long-term control (LTC) license and an NRC legal agreement and restrictive covenant.

- Specific restrictions and activities would be tailored to a specific site and identified in a Long-Term Control Plan prepared by the licensee for NRC review.

- ICs are one element of a defense-in-depth approach for long-term protection of restricted use sites consisting of: legally enforceable ICs or durable ICs with 5-year reviews; robust engineered barriers designed not to rely on active ongoing maintenance; sufficient financial assurance; and maximum limits on dose if ICs fail (dose "caps").

- Requirements for compliance with dose criteria for two cases:

  - (1) ICs in effect (25 mrem/y).

  - (2) ICs not in effect. Required dose criteria, often referred to as dose "caps", are either 100 mrem/y (public dose limit) or 500 mrem/y if limiting requirements are met (i.e., further removal of radioactivity is not technically achievable, is prohibitively expensive, or would result in net public harm; durable ICs; and sufficient financial assurance for 5-year rechecks).

- Requirements for sufficient financial assurance for independent third-party oversight to assure custodian maintenance of restrictions, monitoring, and maintenance and to act as a backup to custodian. The NRC IC options would also provide regulatory oversight.

- Guidance that encourages the use of a robust engineered barrier for high-risk sites that would reduce reliance on active ongoing maintenance.

- Requirement for the licensee to seek advice from affected parties on specific questions about the use of ICs and document incorporation of the advice in the decommissioning plan. Requirement for the NRC staff to seek public comment on the decommissioning plan.

A.2 Approach under Part 40 Appendix A for Reclamation of Uranium Recovery Sites

- Requirements for government long-term care (considered in this comparison as an IC) established in the NRC's 1980 regulation, 10 CFR Part 40, Appendix A, which implements the statutory requirements in the Uranium Mill Tailing Radiation Control Act (UMTRCA) of 1978. UMTRCA and Part 40 Appendix A are applied only to reclamation of uranium recovery sites.

- Part 40 Appendix A is a prescriptive regulation, including State or Federal Government ownership and control under an NRC license. The NRC decided on using a general license approach that would be efficient for the over 40 UMTRCA Title I and II sites expected.

- Specific restrictions and activities are identified in a Long-Term Surveillance Plan implemented under the NRC general license. Duration of ICs is in perpetuity.

- ICs are one element of a defense-in-depth approach to long-term protection consisting of ICs/government ownership/control; NRC licensing that provides independent oversight; robust engineered barriers for long-term stability; and financial assurance.

- Requirement for compliance with EPA standards under 40 CFR 192 that assumes ICs are in effect. No requirement for ICs not in effect.

- Requirement for funding long-term care with a one-time payment from the licensee to the U.S. Treasury.

- Requirement for engineered barriers to be designed to provide stability for up to 1000 years without reliance on active ongoing maintenance.

A.3 Approach under Part 61 for Licensing Low-Level Waste Disposal Sites

- Requirements for ICs established in the NRC's 1982 regulation, 10 CFR Part 61.

- Part 61 is a prescriptive regulation for ICs, including State or Federal Government ownership and control under an NRC license. At the time of license application, the site must be owned by a State or Federal Government that agrees to eventually provide the necessary long-term care.

- ICs are one element of a defense-in-depth approach for long-term protection consisting of ICs/government ownership/control; NRC licensing that provides independent oversight; robust engineered barriers for up to 500 years; and financial assurance.

- Requirements for compliance with performance objectives for two cases:

    - (1) Protection of the public with active and passive ICs to restrict public access to the site (25 mrem/y). Active ICs include government ownership and restrictions under an NRC license for the first 100 years, and compliance is determined at the site boundary. Passive ICs continue after 100 years, and compliance is determined at the buffer zone boundary within the site. Passive ICs include government ownership, records, and markers.

    - (2) Protection of the inadvertent intruder with active ICs to restrict access for only the first 100 years (500 mrem/y for Class A and B waste at 100 years). Note that the intruder barrier provides intruder protection for Class C waste between 100 and 500 years. Also note that the 500 mrem/y criterion is not a requirement in Part 61, but was used by the staff for determining the waste classification and has been used in conducting the NRC reviews.)

- The NRC license provides independent third-party oversight to assure the continuation of restrictions, monitoring, and maintenance during the 100-year period of active IC.

- No reliance on active ongoing maintenance after the 100-year period of active IC.

- The Commission would approve the funding arrangement between the licensee and the Government owner. Sufficient funds would be available to cover the costs of monitoring and any required maintenance during the IC period.

- Requirement for a formal request for State and Tribal participation in the review of the application for a disposal facility.

A.4 Observations and Conclusions

The three approaches have many similarities that are important to achieving long-term protection. They include use of a defense-in-depth approach to achieve protection; use of legally enforceable and durable ICs (e.g., government ownership and control); and use of robust engineered barrier designs to minimize the reliance on active ongoing maintenance, which would depend on the ICs.

Part 20 Subpart E and Part 61 apply dose criteria for two general cases: (1) ICs in effect, for protection of the public; and (2) ICs not in effect, for protection of the inadvertent intruder on the site. Though different terminology and methods are used, these intruder criteria both provide a

"safety net" if ICs fail. Part 40 Appendix A does not require an analysis or compliance with dose criteria for the case of ICs not in effect (intruder) because this method was not required by UMTRCA or the EPA standard.

Some other differences are the result of different terminology and methods that often represent the same or similar concepts that achieve the same or similar outcomes. A key, often-noted example is the methods used for analysis of the inadvertent intruder case. Under Part 61, there is reliance on ICs for 100 years for this case, whereas under Part 20 Subpart E, for ICs not in effect, there is no reliance on ICs—failure is assumed to occur immediately and not after 100 years. Both approaches recognize that failure of ICs cannot be prevented. Furthermore, both approaches use a maximum dose criterion of 500 mrem/y for this case, but the criterion is a Part 20 Subpart E requirement, whereas the criterion under Part 61 was used by the staff for determining the waste classification and has been used in conducting the NRC reviews.

Another example of different terminology is for the defense-in-depth approach and the independent third-party oversight requirement. While Part 20 Subpart E includes a requirement for an independent third party, Part 40 Appendix A and Part 61 do not have such a specific requirement because the required NRC licensing oversight fulfills this function. Therefore, while the terms and methods are different, the net outcome of the need for oversight and backup is the same.

Another key difference is the result of different statutory and regulatory approaches. Part 40 Appendix A and Part 61 are prescriptive regulations for single types of NRC-licensed facilities, while Part 20 Subpart E is more flexible and was developed with a risk-informed, performance-based approach suitable for the decommissioning of a wide variety of facilities. Furthermore, the Part 61 regulatory structure and reliance on ICs and engineering control for the inadvertent intruder reflects the unique waste classification scheme (Class A, B, and C waste) developed for low-level radioactive waste.

Flexibility in selecting an appropriate type of IC is different among the regulations. Government ownership and control under an NRC license is required for facilities under Part 40 Appendix A and Part 61. These requirements provide a clear, unambiguous solution to the long-term control of sites with long-lived radionuclides. This approach can be viewed as more stringent than the flexibility of the Part 20 Subpart E risk-informed graded approach for ICs that has a general requirement and guidance for selecting IC methods for both lower risk and higher risk sites. Flexibility under Part 20 Subpart E allows the use of simpler IC methods for simpler, lower risk sites or the use of a more stringent IC method, such as government ownership and control or even an NRC license, for higher-risk sites.

Another difference is in the certainty or uncertainty associated with implementing the IC requirements. The clear path to ICs prescribed by statutory requirements for Part 40 Appendix A and regulatory requirements for Part 61 makes resolution more certain and efficient. In contrast, although government ownership and control is an option under Part 20 Subpart E, the lack of willingness by State governments and the DOE to voluntarily accept this role has resulted in difficulty implementing the restricted use option of Part 20 Subpart E. This difference has led to uncertainty for both licensees and the NRC staff that has caused delays in completing decommissioning of sites proposing restricted use.

In conclusion, Part 40 Appendix A and Part 61 are more prescriptive and have little flexibility provided by their requirements, but have resulted in implementation certainty and efficiency. In contrast, the Part 20 Subpart E approach provides greater flexibility with a risk-informed graded approach, but this approach has resulted in difficulties and uncertainty with implementation. In

general, the approaches have many similarities and few differences important to long-term protection. Thus, the key differences are related primarily to clear and efficient implementation.

A.5 References

ISCORS, “1999 Annual Report,” NUREG-1707, Vol 2.

NRC, 2003, “Results of the License Termination Rule Analysis”, SECY-03-0069, Attachment 1, May 2, 2003.