



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

November 20, 1985

WM Record File

406.3.3

Dircks  
Roe  
Rehm  
Stello  
~~Davis~~  
Minogue  
Gunningham  
Docket No. 85-272 R/F  
PDR  
LPDR  
HJM  
MRK  
JTG  
SAC

MEMORANDUM FOR: Samuel J. Chilk, Secretary

FROM: Frederick M. Bernthal

SUBJECT: REAFFIRMATION OF VOTE ON SECY-85-272

Distribution:

REF MJB  
JOB JJS  
(Return to WM, 523-SS)

Upon extensive examination of the ACRS objections to the EPA standard (including their most recent comments presented in a letter of 11/14/85) and of the analysis of available Commission options presented by OGC, I reaffirm my approval of SECY-85-272.

The ACRS has criticized the EPA standard on the grounds that

1. it is overly stringent, mandating a level of protection that is far in excess of that provided by other existing environmental standards, and
2. implementation of the standard by NRC in licensing a repository will be difficult if not impossible.

My review of the question suggests that the momentary confusion over the EPA standard arose from imprecise wording on the part of EPA and Staff in attempting to explain the origin of the cumulative probability distribution function of repository release upon which the interpretation of 40 CFR 191 is based. Nevertheless, I continue to have reservations, both as to the application of the EPA standard, and as to the reasonableness and consistency of the standard when viewed in light of other societal risks (cf. comments of ACRS Members Dade Moeller and Hal Lewis).

Be that as it may, the Nuclear Waste Policy Act clearly assigns to the EPA the responsibility for establishing the environmental standard. Given that our staff has repeatedly asserted that the standards as published can be implemented, there appears to be little basis on which to challenge a policy decision that is, strictly speaking, that of EPA.

But I agree with the suggestion of ACRS Member, Dr. Dade Moeller that the Commission request the Committee on Interagency Radiation Research and Policy Coordination (CIRRPC) to develop guidelines for use by Federal agencies that would foster consistency in the risk estimates and risk management of low doses of radiation.

I also agree with Commissioner Zech and the Chairman that any remaining ACRS concerns should be addressed to the fullest extent possible in the rulemaking that will be necessary to conform Part 60 to the EPA standard. In particular, care should be taken to avoid any ambiguity in the application of probabilistic conditions placed on the post-closure containment requirements.

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PDR WASTE  
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The application of these conditions should not impose any further conservatism on an already highly conservative standard.

It is unfortunate that the ACRS comments on the EPA standards were made available at a time when Commission options to act without seriously delaying the repository program had, for the most part, been foreclosed. I would hope that in future reviews of NRC activities under the NWPA the ACRS could be involved at an earlier stage so that valuable technical advice and input could be used to timely and best advantage by the Commission.

cc: Chairman Palladino  
Commissioner Roberts  
Commissioner Asselstine  
Commissioner Zech  
OGC  
OPE  
EDO



OFFICE OF THE  
SECRETARY

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555

WM DOCKET CONTROL  
CENTER

November 27, 1985

'85 DEC -2 PM 2:25

Action: Minogue, RES/Davis,  
Cys: Dircks  
Roe  
Rehm  
Stello  
GCunningham  
Denton  
Kerr, SP  
Fehring, NMSS  
Prichard, RES  
Philips

MEMORANDUM FOR: William J. Dircks  
Executive Director for Operations

FROM: Samuel J. Chilk, Secretary

SUBJECT: STAFF REQUIREMENTS - NOTATION VOTE ON  
SECY-85-272 - REPORT ON THE ENVIRONMENTAL  
PROTECTION AGENCY'S ENVIRONMENTAL  
STANDARDS FOR HIGH-LEVEL RADIOACTIVE WASTE  
DISPOSAL

On September 19, 1985, the Commission (with all Commissioners agreeing) approved the proposed letter to EPA, as attached. Immediately following Commission approval, the ACRS requested that this matter be discussed with the Committee. On October 21, 1985, the Commission met with the staff, ACRS and others to discuss conflicting views.

Upon due consideration of the concerns expressed by the ACRS and the responses by the staff, the Commission reaffirmed releasing the letter to EPA.

The letter has been forwarded to the Chairman for his signature.

In addition, EDO is directed to submit to the Commission the rulemaking package which conforms 10 CFR Part 60 with the EPA Standard. The Commission also stresses the importance for the staff to clearly articulate, in the changes to Part 60, how we interpret the EPA's Standards and that the ACRS' concerns be addressed by clearly defining the basis for the assurance that adequate flexibility exists in the standards for their implementation. In particular, care should be taken to avoid any ambiguity in the application of probabilistic conditions placed on the post-closure containment requirements. (RES)

(EDO Suspense: 2/15/86)

WM Record File

406.3.3

WM Project

Docket No.

PDR

LPDR

Rec'd Off. EDO

Date... 11-29-85

Time... 1:45 PM

Distribution:

REB MJB MRK JTG  
JOB HJM JIS Fehring  
JIS

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The Commission also agrees that the staff and the ACRS should interact with each other early in the process of developing the package on 10 CFR Part 60 as well as in future reviews of NRC activities under the NWPA so that valuable technical advice and input can be used in a timely manner by the Commission.

Chairman Palladino requested, in line with ACRS comments, that EDO accelerate its efforts to develop analytical methods to be used in making a determination that a licensee is complying with the EPA Standards. These methods should receive as broad an input and review as possible. (NMSS)

Attachment:  
As stated

cc: Chairman Palladino  
Commissioner Roberts  
Commissioner Asselstine  
Commissioner Bernthal  
Commissioner Zech  
OGC  
OPE  
ACRS



CHAIRMAN

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

The Honorable Lee Thomas  
Administrator  
U.S. Environmental Protection Agency  
Washington, D.C. 20460

Dear Mr. Thomas:

On May 10 and 11, 1982 the Nuclear Regulatory Commission (NRC) submitted formal comments on the Environmental Protection Agency's proposed environmental standards for management and disposal of high-level radioactive wastes. Among other things, we stated our view that the proposed "assurance requirements" and "procedural requirements" contained in those proposed standards involved matters of implementation and thus went beyond the limits of EPA's jurisdiction.

In letters dated July 19 and August 15, 1984 Acting Chairman Roberts and Former Administrator Ruckelshaus, respectively, agreed that the staffs of EPA and NRC should attempt to develop modifications to 10 CFR Part 60 to incorporate the principles of EPA's proposed assurance and procedural requirements. EPA could then delete these requirements or make them applicable only to facilities not licensed by the NRC, eliminating any potential problems of jurisdictional overlap.

The NRC staff recently reported to the Commission several proposed changes to Part 60 which have been worked out by the NRC and EPA staff (text enclosed). Consistent with the provisions of the Administrative Procedure Act, the Commission will propose these changes for incorporation into Part 60 now that the final EPA high-level waste standards have been published. The NRC staff anticipates submittal of a rulemaking package, incorporating both these wording changes and other conforming amendments, to the Commission within 120 days.

The Commission appreciates the cooperation shown by the EPA staff in working to reach this agreement.

Sincerely,

Nunzio J. Palladino

Enclosure:  
Proposed changes to  
10 CFR Part 60

8512110178

**EPA ASSURANCE REQUIREMENTS AND  
PROPOSED CHANGES TO PART 60**

**1.a. EPA Assurance Requirement:**

(a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contributions from active institutional controls for more than 100 years after disposal.

(In Working Draft No. 8 "active institutional control" means: (1) controlling access to a disposal site by any means other than passive institutional controls, (2) performing maintenance operations or remedial actions at a site, (3) controlling or cleaning up releases from a site, or (4) monitoring parameters related to disposal system performance.)

**b. Discussion:**

The Commission's existing provisions (§60.52) related to license termination will determine the length of time for which institutional controls should be maintained, and there is therefore no need to alter Part 60 based on the first part of this assurance requirement.

The second part of this assurance requirement would require that "active" institutional controls be excluded from consideration (after 100 years) when the Commission assesses the isolation characteristics of a repository. The NRC staff understands that remedial actions (or other active institutional controls) would not be relied upon under Part 60 to compensate for a poor site or inadequate engineered barriers. However, in the definition of "unanticipated events and processes," Part 60 expressly contemplates that, in assessing human intrusion scenarios, the Commission would assume that "institutions are able to assess risk and to take remedial action at a level of social organization and technological competence equivalent to, or superior to, that which was applied in initiating the processes or events concerned" (emphasis added). Therefore, it might appear at first blush that Part 60 is at odds with the draft EPA standards.

**2.a. EPA Assurance Requirement:**

(b) Disposal systems shall be monitored after disposal to detect any substantial and detrimental deviations from expected performance. This monitoring shall be done with techniques that do not jeopardize the isolation of the wastes and shall be conducted until there are no significant concerns to be addressed by further monitoring.

**b. Discussion:**

Part 60 currently requires completion of a performance confirmation program prior to repository closure, but does not require monitoring during the period following closure but prior to license termination. The Commission chose not to require post-closure monitoring because of doubts about the usefulness of such monitoring and because of fears that monitoring in or near a repository after closure could degrade repository performance. The type of monitoring envisioned by EPA does not involve direct monitoring of the repository itself (which might degrade repository performance). Rather, EPA proposes monitoring of such parameters as regional groundwater flow characteristics. The NRC agrees that such monitoring may, in some cases, provide desirable information beyond that which would be obtained in the performance confirmation program which Part 60 now requires to be continued until permanent closure. The NRC therefore proposes to require monitoring as an extension of performance confirmation, as appropriate, when such monitoring can be conducted without degrading repository performance.

**c. Proposed Changes to Part 60:**

Add to §60.21(c) a new ¶ (9) as follows:

(9) A general description of the program for post-permanent closure monitoring of the geologic repository.

Renumber the current ¶ (9) through (15) accordingly.

Revise §60.51(a)(1) to read:

(1) A detailed description of the program for post-permanent closure monitoring of the geologic repository in accordance with §60.144. As a minimum, this description shall:

- (i) identify those parameters that will be monitored;
- (ii) indicate how each parameter will be used to evaluate the expected performance of the repository; and
- (iii) discuss the length of time over which each parameter should be monitored to adequately confirm the expected performance of the repository.

**3.a. EPA Assurance Requirement:**

(c) Disposal sites shall be designated by the most permanent markers, records, and other passive institutional controls practicable to indicate the dangers of the wastes and their location.

**b. Discussion:**

No revisions to Part 60 are needed. §60.21(c)(8), 60.51(a)(2), and 60.121 contain equivalent provisions.



**5.a. EPA Assurance Requirement:**

(e) Places where there has been mining for resources, or where there is a reasonable expectation of exploration for scarce or easily accessible resources, or where there is a significant concentration of any material that is not widely available from other sources, should be avoided in selecting disposal sites. Resources to be considered shall include minerals, petroleum or natural gas, valuable geologic formations, and ground waters that are either irreplaceable because there is no reasonable alternative source of drinking water available for substantial populations or that are vital to the preservation of unique and sensitive ecosystems. Such places shall not be used for disposal of the wastes covered by this Part unless the favorable characteristics of such places compensate for their greater likelihood of being disturbed in the future.

**b. Discussion:**

Part 60 contains provisions equivalent to this assurance requirement in §60.122(c)(17), (18) and (19). Part 60 does not, however, address "a significant concentration of any material that is not widely available from other sources."

It is possible that the economic value of materials could change in the future in a way which might attract future exploration or development detrimental to repository performance. The NRC proposes to add an additional potentially adverse condition to Part 60 related to significant concentrations of material that is not widely available from other sources. As with the other potentially adverse conditions, the presence of such a condition would require an evaluation of the effect of the condition on repository performance as specified in §60.122(a)(2)(ii), but would not preclude selection of a site for repository construction. (It should be noted that DOE's siting guidelines contain an identical provision in 10 CFR 960.4-2-8-1.)

**c. Proposed Changes to Part 60:**

Add a new ¶ (18) to §60.122(c) as follows:

(18) The presence of significant concentrations of any naturally-occurring material that is not widely available from other sources.

Renumber the current ¶ (18) through (21) accordingly.



CHAIRMAN

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

WM DOCKET CONTROL  
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December 2, 1985

'85 DEC -3 P3:13

The Honorable Lee Thomas  
Administrator  
U.S. Environmental Protection Agency  
Washington, D.C. 20460

Cys: Dircks  
Roe  
Rehm  
Stello  
Davis  
Minogue  
Denton  
GCunningham  
Kerr, SP  
Fehringer, NMSS  
EDO R/F

Dear Mr. Thomas:

On May 10 and 11, 1982 the Nuclear Regulatory Commission (NRC) submitted formal comments on the Environmental Protection Agency's proposed environmental standards for management and disposal of high-level radioactive wastes. Among other things, we stated our view that the proposed "assurance requirements" and "procedural requirements" contained in those proposed standards involved matters of implementation and thus went beyond the limits of EPA's jurisdiction.

In letters dated July 19 and August 15, 1984 Acting Chairman Roberts and Former Administrator Ruckelshaus, respectively, agreed that the staffs of EPA and NRC should attempt to develop modifications to 10 CFR Part 60 to incorporate the principles of EPA's proposed assurance and procedural requirements. EPA could then delete these requirements or make them applicable only to facilities not licensed by the NRC, eliminating any potential problems of jurisdictional overlap. -

The NRC staff recently reported to the Commission several proposed changes to Part 60 which have been worked out by the NRC and EPA staff (text enclosed). Consistent with the provisions of the Administrative Procedure Act, the Commission will propose these changes for incorporation into Part 60 now that the final EPA high-level waste standards have been published. The NRC staff anticipates submittal of a rulemaking package, incorporating both these wording changes and other conforming amendments, to the Commission within 120 days.

The Commission appreciates the cooperation shown by the EPA staff in working to reach this agreement.

Sincerely,

*Nunzio J. Palladino*  
Nunzio J. Palladino

Enclosure:  
Proposed changes to  
10 CFR Part 60

(Originated by NMSS)

WM Record File  
406.3.3

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Docket No. \_\_\_\_\_

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Distribution:

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(Return to W.M. 623-SS) *Sac*

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EPA ASSURANCE REQUIREMENTS AND  
PROPOSED CHANGES TO PART 60

1.a. EPA Assurance Requirement:

(a) Active institutional controls over disposal sites should be maintained for as long a period of time as is practicable after disposal; however, performance assessments that assess isolation of the wastes from the accessible environment shall not consider any contributions from active institutional controls for more than 100 years after disposal.

(In Working Draft No. 8 "active institutional control" means: (1) controlling access to a disposal site by any means other than passive institutional controls, (2) performing maintenance operations or remedial actions at a site, (3) controlling or cleaning up releases from a site, or (4) monitoring parameters related to disposal system performance.)

b. Discussion:

The Commission's existing provisions (§60.52) related to license termination will determine the length of time for which institutional controls should be maintained, and there is therefore no need to alter Part 60 based on the first part of this assurance requirement.

The second part of this assurance requirement would require that "active" institutional controls be excluded from consideration (after 100 years) when the Commission assesses the isolation characteristics of a repository. The staff understands that remedial actions (or other active institutional controls) would not be relied upon under Part 60 to compensate for a poor site or inadequate engineered barriers. However, in the definition of "unanticipated events and processes," Part 60 expressly contemplates that, in assessing human intrusion scenarios, the Commission would assume that "institutions are able to assess risk and to take remedial action at a level of social organization and technological competence equivalent to, or superior to, that which was applied in initiating the processes or events concerned" (emphasis added). Therefore, it might appear at first blush that Part 60 is at odds with the draft EPA standards.

The "remedial action" is not, however, the same in the two documents. The EPA standards have in mind a planned capability to maintain a site and, if necessary, to take remedial action at a site in order to assure that isolation is achieved. The staff agrees that such a capability should not be relied upon. The extent to which corrective action may be taken after an unanticipated intrusion occurs is an entirely different matter. The Commission may wish to consider, for example, the extent to which the application of the limited societal response capability assumed by the rule (e.g., sealing boreholes consistent with current petroleum industry practice) could reduce the likelihood of releases exceeding the values specified in the EPA standards, or could eliminate certain hypothetical scenarios such as systematic and persistent intrusions into a site.

The NRC and EPA staffs are in substantive agreement that planned remedial capabilities should not be relied upon for repository safety, and agree that the wording below should be proposed for public comment. The EPA staff may provide comment on this wording to help clarify the distinction between expected societal responses versus planned capabilities for remedial actions.

c. Proposed Changes to Part 60:

Add definitions to §60.2 as follows:

"Active institutional control" means: (1) controlling access to a site by any means other than passive institutional controls, (2) performing maintenance operations or remedial actions at a site, (3) controlling or cleaning up releases from a site, or (4) monitoring parameters related to geologic repository performance.

"Passive institutional control" means: (1) permanent markers placed at a site, (2) public records and archives, (3) government ownership and regulations regarding land or resource use, and (4) other methods of preserving knowledge about the location, design, and contents of a geologic repository.

Add a new §60.114 as follows:

§60.114 Institutional Controls

Neither active nor passive institutional controls shall be deemed to assure compliance with the overall performance objective set out at § 60.112 for more than 100 years after disposal. However, the effects of institutional controls may be considered in assessing, for purposes of that section, the likelihood and consequences of processes and events affecting the geologic setting.

**2.a. EPA Assurance Requirement:**

(b) Disposal systems shall be monitored after disposal to detect any substantial and detrimental deviations from expected performance. This monitoring shall be done with techniques that do not jeopardize the isolation of the wastes and shall be conducted until there are no significant concerns to be addressed by further monitoring.

**b. Discussion:**

Part 60 currently requires completion of a performance confirmation program prior to repository closure, but does not require monitoring during the period following closure but prior to license termination. The Commission chose not to require post-closure monitoring because of doubts about the usefulness of such monitoring and because of fears that monitoring in or near a repository after closure could degrade repository performance. The type of monitoring envisioned by EPA does not involve direct monitoring of the repository itself (which might degrade repository performance). Rather, EPA proposes monitoring of such parameters as regional groundwater flow characteristics. The staff agrees that such monitoring may, in some cases, provide desirable information beyond that which would be obtained in the performance confirmation program which Part 60 now requires to be continued until permanent closure. The staff therefore proposes to require monitoring as an extension of performance confirmation, as appropriate, when such monitoring can be conducted without degrading repository performance.

**c. Proposed Changes to Part 60:**

Add to §60.21(c) a new ¶ (9) as follows:

(9) A general description of the program for post-permanent closure monitoring of the geologic repository.

Renumber the current ¶ (9) through (15) accordingly.

Revise §60.51(a)(1) to read:

(1) A detailed description of the program for post-permanent closure monitoring of the geologic repository in accordance with §60.144. As a minimum, this description shall:

- (i) identify those parameters that will be monitored;
- (ii) indicate how each parameter will be used to evaluate the expected performance of the repository; and
- (iii) discuss the length of time over which each parameter should be monitored to adequately confirm the expected performance of the repository.

Add to §60.52(c) a new ¶ (3) as follows:

(3) That the results available from the post-permanent closure monitoring program confirm the expectation that the repository will comply with the performance objectives set out at §60.112 and §60.113; and

Renumber the current ¶ (3) as ¶ (4).

Add a new §60.144 as follows:

§60.144 Monitoring After Permanent Closure

A program of monitoring shall be conducted after permanent closure to monitor all repository characteristics which can reasonably be expected to provide material confirmatory information regarding long-term repository performance, provided that the means for conducting such monitoring will not degrade repository performance. This program shall be continued until termination of a license.

Include in the Supplementary Information of the Federal Register notice proposing these changes the following paragraph:

Part 60 currently requires DOE to carry out a performance confirmation program which is to continue until repository closure. Part 60 does not now require monitoring after repository closure because of the likelihood that post-closure monitoring of the underground facility would degrade repository performance. The Commission recognizes, however, that monitoring such parameters as regional groundwater flow characteristics may, in some cases, provide desirable information beyond that which would be obtained in the performance confirmation program. The proposed requirement for post-permanent closure monitoring requires that such monitoring be continued until termination of a license. The Commission intends that a repository license not be terminated until such time as the Commission is convinced that there is no significant additional information to be obtained from such monitoring which would be material to a finding of reasonable assurance that long-term repository performance would be in accordance with the established performance objectives.

**3.a. EPA Assurance Requirement:**

(c) Disposal sites shall be designated by the most permanent markers, records, and other passive institutional controls practicable to indicate the dangers of the wastes and their location.

**b. Discussion:**

No revisions to Part 60 are needed. §60.21(c)(8), 60.51(a)(2), and 60.121 contain equivalent provisions.

**4.a. EPA Assurance Requirement:**

(d) Disposal systems shall use several different types of barriers to isolate the wastes from the environment. Both engineered and natural barriers shall be included.

**b. Discussion:**

The staff considers that Part 60 already requires use of both engineered and natural barriers. Nevertheless, in order to avoid any possible confusion regarding the provisions of §60.113(b), the staff proposes to add additional clarifying language to §60.113.

**c. Proposed Changes to Part 60:**

Add a new ¶ (d) to §60.113 as follows:

(d) Notwithstanding the provisions of (b) above, the geologic repository shall incorporate a system of multiple barriers, both engineered and natural.

In the Supplementary Information of the Federal Register notice proposing these changes include the following:

Questions might arise regarding the types of engineered or natural materials or structures which would be considered to constitute barriers. The Commission notes that §60.2 now contains the definition: "'Barrier' means any material or structure that prevents or substantially delays movement of water or radionuclides." Thus, the Commission considers that the new paragraph to be added to §60.113 will confirm the Commission's commitment to a multiple barrier approach as contemplated by Section 121(b)(1)(B) of the Nuclear Waste Policy Act.



**5.a. EPA Assurance Requirement:**

(e) Places where there has been mining for resources, or where there is a reasonable expectation of exploration for scarce or easily accessible resources, or where there is a significant concentration of any material that is not widely available from other sources, should be avoided in selecting disposal sites. Resources to be considered shall include minerals, petroleum or natural gas, valuable geologic formations, and ground waters that are either irreplaceable because there is no reasonable alternative source of drinking water available for substantial populations or that are vital to the preservation of unique and sensitive ecosystems. Such places shall not be used for disposal of the wastes covered by this Part unless the favorable characteristics of such places compensate for their greater likelihood of being disturbed in the future.

**b. Discussion:**

Part 60 contains provisions equivalent to this assurance requirement in §60.122(c)(17), (18), and (19). Part 60 does not, however, address "a significant concentration of any material that is not widely available from other sources."

It is possible that the economic value of materials could change in the future in a way which might attract future exploration or development detrimental to repository performance. The staff proposes to add an additional potentially adverse condition to Part 60 related to significant concentrations of material that is not widely available from other sources. As with the other potentially adverse conditions, the presence of such a condition would require an evaluation of the effect of the condition on repository performance as specified in §60.122(a)(2)(ii), but would not preclude selection of a site for repository construction. (It should be noted that DOE's sizing guidelines contain an identical provision in 10 CFR 960.4-2-8-1.)

**c. Proposed Changes to Part 60:**

Add a new ¶ (18) to §60.122(c) as follows:

(18) The presence of significant concentrations of any naturally-occurring material that is not widely available from other sources.

Renumber the current ¶ (18) through (21) accordingly.

**6.a. EPA Assurance Requirement:**

(f) Disposal systems shall be selected so that removal of most of the wastes is not precluded for a reasonable period of time after disposal.

**b. Discussion:**

EPA's concept of "removal" is significantly different from "retrieval" in Part 60. EPA wants to preclude disposal concepts such as deep well injection for which it would be virtually impossible to remove or recover wastes regardless of the time and resources employed. For a mined geologic repository wastes could be located and recovered, albeit at great cost, even after repository closure. EPA therefore considers that a repository complies with this assurance requirement, and no revision to Part 60 is needed.