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SECY-88-51

RULEMAKING ISSUE
(Notation Vote)

For: The Commissioners

From: Victor Stello, Jr.,
Executive Director for Operations

Subject: 10 CFR 60 AND 61-- DISPOSAL OF RADIOACTIVE WASTE

Category: This paper involves a policy question of interest to other Federal agencies.

Purpose: To obtain Commission approval for a notice of proposed rulemaking to be published in the Federal Register.

Summary: On February 27, 1987 the Commission published an advance notice of proposed rulemaking (ANPR) on revising the definition of high level radioactive waste (HLW) in 10 CFR Part 60. This action was in response to the Nuclear Waste Policy Act of 1982, which contains a definition of HLW which differs from that in 10 CFR Part 60. The advance notice contained an approach to revising the definition of HLW based in part on concentrations of radionuclides rather than on source of the waste alone. After reviewing public comments on the advance notice, the staff is now recommending that a revision of the existing definition is not warranted at this time. Instead, 10 CFR Part 61 should be amended to require geologic repository disposal of all above Class C low-level waste (LLW).

Background: The Nuclear Waste Policy Act of 1982 (NWPA), Pub. L. 97-425, contains a definition of high-level radioactive waste which differs from one in 10 CFR Part 60. The current Part 60 definition is solely source-based[1]. The NWPA defines HLW as:

(a) The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

Contacts:
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D. Fehringer, NMSS x20426
J.R. Wolf, OGC x21641

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1 Part 60 defines HLW as (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted.

(b) Other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation (NWPA, Section 2 [12]).

In May, 1983 the Commission directed the staff to review the need to revise the definition of HLW in 10 CFR Part 60 to conform to that in the NWPA. The staff's response to the Commission was contained in SECY-85-309, which recommended publication of an ANPR. The Commission decided not to proceed with publication, but to await the anticipated passage of relevant legislation (The Low Level Radioactive Waste Policy Amendments Act of 1985). This legislation resolved one issue which had been involved in the revision of the definition of HLW, that of State vs. Federal responsibility for certain radioactive wastes. As a result of the legislation, States were made responsible only for wastes classed as A, B, and C low level waste (LLW) by the classification system in the Commission's LLW regulation, 10 CFR Part 61.

Subsequently, the staff prepared a revised ANPR, to reflect the implications of the new legislation (SECY-86-328), which the Commission approved for publication.

The ANPR appeared on February 27, 1987 (52 FR 5922) and the staff received 94 public comment letters. Of these, 13 were from industry, 2 from other Federal agencies, 14 from State or local government organizations, 23 from environmental groups, 4 from Indian Tribes, 2 from professional associations, and 36 from private individuals.

Discussion:

ANPR Approach

The approach presented in the ANPR for classifying material as HLW under Clause (A) of the NWPA definition contained two options. In one option, HLW from reprocessing would continue to be defined by source. In the other option, concentration limits of radionuclides would be used to determine the "sufficient concentrations" necessary to classify waste from reprocessing as HLW. Under Clause (B), concentration limits would be used to determine the "other highly radioactive material" that requires "permanent isolation." Material which contained concentrations of radionuclides which were in excess of the upper limits for Class C LLW would be considered "highly radioactive." If this material also contained sufficient concentrations of long-lived radionuclides requiring permanent isolation (such as provided by a geologic repository) it would be classified as HLW.

Public Comments

The change from a purely source-based definition for HLW, such as now exists, to one based on risk or hazard was generally supported by the public comments. However, there was a wide range of viewpoints on how this should be implemented in a waste classification system. Some comments found the approach outlined in the ANPR too simplistic; consideration of a wider variety of waste characteristics, such as heat generation and toxicity, was suggested. Many wanted HLW to include material either highly radioactive or which required permanent isolation. Comments were divided as to whether the suggested limits for HLW in the ANPR were too conservative or not. Some commentors wanted more conservative limits, even reclassification of some or all current Class-C LLW to the HLW category. In opposition were comments pointing out the excessive cost burden on the waste management system of classifying material not needing permanent isolation as HLW.

The vast majority of comments were mainly concerned with what impact waste classification would have on alternatives for waste disposal. Many comments expressed concern over how a concentration-based classification system for reprocessing wastes would impact current waste inventories, particularly the Hanford tank wastes. In general, there was opposition to reclassifying any present HLW to LLW. It was strongly urged that any system that was adopted should not leave any categories of waste undefined or with no available disposal "home." The possibility of dilution and/or fractionation of waste streams to escape classification as HLW was cited as a potential problem. The staff is now finalizing the detailed comment analysis, which will be placed in the PDR within three weeks.

The Proposed Rule

The staff's reconsideration of the issues involved in revision of the definition of HLW in light of the comments leads it to recommend a different approach. The analysis of the public comments showed that there was no widely accepted method for determining appropriate concentration limits for defining HLW. Establishment of a new set of limits for this rulemaking would be a complex and controversial task. The expenditure of the substantial resources necessary to accomplish this task does not appear to offer commensurate benefits at this time. Moreover, even if a system based solidly upon technical considerations could be developed, the classification of additional materials thereunder could give rise to legal and administrative complications (concerning, for example, DOE's ability to accept wastes from materials licensees, retroactivity of classification, etc.).

Public comments were generally against reclassification of existing HLW to the LLW category, particularly for reprocessing

waste. This, along with the recognition that reprocessing waste, regardless of concentrations, contains large total inventories of radioactivity, leads the staff to conclude that no change in the definition as it affects reprocessing waste should be made.

The only remaining issue is what, if any, non-reprocessing waste should be reclassified. States are by law responsible for management of Classes A, B, and C LLW. Any change in the definition of HLW would not affect these waste categories or responsibility for managing them. Any revision of the HLW definition would impact only a relatively small amount of above Class C waste now classified as LLW. Reclassification would not alter responsibility for managing these wastes, which by law rests with the Federal government. Moreover, it would not necessarily result in any change in the way these wastes are disposed of.

No intermediate disposal facilities for the disposal of above Class C commercial LLW have been proposed or planned by DOE. In view of the very small quantity of commercial above Class C waste and the significant economic costs for developing a separate facility for disposal of these wastes, it is very likely that, as a practical matter, above Class C waste, whether defined as HLW or LLW, would be disposed of in a geologic repository. The staff has previously noted the advantages of repository disposal of above Class C waste in its comments to DOE[2].

Instead of revising the definition of HLW, the staff is proposing that 10 CFR Part 61 be amended to require geologic repository disposal of all above Class C waste unless alternative proposals are approved by the Commission.

Requiring repository disposal for these wastes unless an alternative means of disposal is approved would accomplish essentially the same end as reclassifying some or all above Class C waste to the HLW category. It insures that all waste not suitable for routine shallow land burial is suitably disposed of.

The position proposed herein is consistent with the preponderance of comments on the ANPR that expressed concern with waste classifications only to the extent that disposal requirements were affected. This course of action would respond to this concern by clarifying disposal options for waste, while avoiding the need to develop a new set of criteria for a yet unnamed facility. Should new disposal alternatives become available, disposal of suitable above Class C waste could be considered at that time. Because the possibility of other disposal methods remains, the Commission would not now determine that the wastes ~~won't~~ require permanent isolation" and accordingly the conditions for

2 Letter to Mr. A. David Rossin, Assistant Secy. for Nuclear Energy, DOE from Hugh L. Thompson, Director, NMSS 4/30/87

classification as HLW under Clause (B) of the NWPA definition would not be met.

NRC Resource needs for implementing this rulemaking have already been factored into current budget planning.

OGC has reviewed this paper and has no legal objection.

Recommendation: That the Commission:

(1) Approve for publication in the Federal Register the proposed amendments to 10 CFR 61 which would require repository disposal for above Class C wastes unless an alternative means of disposal has been approved by the Commission.

(2) Certify that this rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. This certification is necessary in order to satisfy the requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(a).

(3) Note:

(a) That the notice of proposed rulemaking in Enclosure A will be published in the Federal Register allowing 60 days for public comment.

(b) That the Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification by the Division of Rules and Records.

(c) That the proposed amendments are corrective or minor, and do not substantially modify existing regulations; and they are accordingly eligible for categorical exclusion from the preparation of an environmental assessment.

(d) The Subcommittee on Energy and the Environment of the House Interior and Insular Affairs Committee, the Subcommittee on Nuclear Regulation of the Senate Committee on the Environment and Public Works, the Subcommittee on Energy, Nuclear Proliferation and Federal Services of the Senate Committee on Government Affairs, and the Subcommittee on Energy and Power of the House Interstate and Foreign Commerce Committee will be informed by a letter similar to Enclosure C.

(e) This rule contains no new or amended recordkeeping, reporting, or application requirement, or any other type of information collection requirement, subject to the Paperwork Reduction Act (Pub. L. 96-511).

(f) A regulatory analysis is presented in Enclosure E.

(f) A regulatory analysis is presented in Enclosure E.

(g) The Office of Public Affairs has determined that it is necessary to issue a public announcement similar to Enclosure D in connection with these proposed amendments.

(h) The changes proposed to be made in 10 CFR Part 61 are provided in comparative text as Enclosure F.

(i) The draft Federal Register Notice states that provisions of 10 CFR 50.109 on backfitting do not apply to this rulemaking because the rule is not a generic requirement applicable to production and utilization facilities licensed under 10 CFR Part 50.

(j) The detailed analysis of public comments on the ANPR issued February 27, 1987 will be placed in the Public Document Room within three weeks.

Victor Stello, Jr.
Executive Director for Operations

Enclosures

A. Federal Register Notice
B. ANPR (52 FR 5992)
C. Draft Congressional Letter
D. Draft Public Announcement
E. Regulatory Analysis
F. Comparative Text

Commissioners' comments or consent should be provided directly to the Office of the Secretary by c.o.b. Monday, March 14, 1988.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, March 4, 1988, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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ENCLOSURE A

(7590-01)

NUCLEAR REGULATORY COMMISSION

10 CFR Part 61

Disposal of Radioactive Wastes

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The NRC is publishing proposed amendments which require disposal of "greater-than-Class-C" low-level radioactive wastes in a deep geologic repository unless disposal elsewhere has been approved by the Commission. The proposed amendments obviate the need for altering existing classifications of radioactive wastes as high-level or low-level.

DATE: Comments received after [_____] will be considered if it is practical to do so, but assurance of consideration cannot be given except for comments received on or before this date.

ADDRESS: Written comments or suggestions on the proposed amendments should be sent to the Secretary of the Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Docketing and Service Branch. Copies of comments may be examined in the U. S. Nuclear Regulatory Commission Public Document Room, 1717 H Street NW, Washington, D. C., between 7:30 a.m. and 4:15 p.m.

FOR FURTHER INFORMATION CONTACT: W. Clark Prichard, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, telephone (301) 492-3884.

SUPPLEMENTARY INFORMATION:

Background

On February 27, 1987, the Nuclear Regulatory Commission published an Advance Notice of Proposed Rulemaking (ANPR) announcing its intent to revise the definition of the term "high-level radioactive waste" (HLW) that appears in 10 CFR Part 60. In the ANPR (52 FR 5992), the Commission reviewed the previous statutory and regulatory uses of the term "high-level radioactive waste," the NRC's current regulations related to waste classification and disposal, and the pertinent provisions of the Nuclear Waste Policy Act of 1982, Pub.L. 97-425, 42 U.S.C. 10101 et seq. (NWPA). As indicated in the ANPR, NWPA includes a specific definition of "high-level radioactive waste" and the Commission was considering a change to its own rules so as to conform to that definition.

In the ANPR, the Commission put forth a proposal to define HLW in a manner that in general would apply the term "high-level radioactive waste" to materials in amounts and concentrations exceeding numerical values that would be stated explicitly in the form of a table. HLW would thus be characterized by the kind of hazard that could only be guarded against by disposal in a geologic repository or equivalent facility. Those wastes that could be disposed of safely in an "intermediate" disposal facility would continue to be classified as low-level radioactive waste rather than as HLW.

COMMENTS

The Commission solicited comments on several specific issues and received letters from nearly 100 public agencies, private organizations, and individuals. Virtually all comments on the ANPR agreed with the Commission on one point: use of the term "high-level radioactive waste," at least under Clause (B) of the NWPA definition, serves to identify those wastes which require the degree of isolation afforded by a deep geologic repository. However, comments differed widely regarding the specific wastes perceived to require that degree of isolation. Some comments advocated classification of all radioactive wastes, other than the most innocuous, as HLW while other comments would prefer to reclassify as low-level large quantities of defense reprocessing wastes long regarded as HLW. Conspicuously absent from the

comments was any consensus regarding the means to be used by the Commission to distinguish HLW from non-HLW. For example, even the basic concept of a numerical definition of HLW, as suggested in the ANPR, was criticized as an invitation to dilute or fractionate wastes solely to alter their classification. In light of the comments received, the Commission's own review of available technical information related to waste classification and "intermediate" disposal facilities, and review of relevant statutory purposes, the Commission has determined that it would be best to proceed quite differently from its original suggestion put forth in the ANPR.

REPROCESSING WASTES

The NWPA first labels as HLW, under Clause (A), the "highly radioactive material" resulting from the reprocessing of spent fuel, including not only the liquid wastes but also any solid material derived from such liquid waste that contains fission products "in sufficient concentrations." Clause (A) wastes have little significance for purposes of NWPA, since the Federal Government was already responsible for the disposal of all reprocessing wastes at the time the statute was passed. (The only commercially-generated reprocessing wastes were made a Federal Government responsibility in 1980 pursuant to the West Valley Demonstration Project Act. Pub.L. 96-368, 42 U.S.C. 2021a note.) In light of this fact, the Commission believes that the preferable construction of the statute is to conform to the traditional definition. Under this approach, materials that are HLW for purposes of the licensing-jurisdiction provisions of the Energy Reorganization Act of 1974 (ERA) will also be regarded as HLW under NWPA. This would include the primary reprocessing waste streams at DOE facilities, though not the incidental wastes produced in reprocessing.

OTHER WASTES

In the ANPR, the Commission proposed to classify wastes as HLW or non-HLW by examining the disposal capability of hypothetical, "intermediate" disposal

facilities less secure than a deep geologic repository. Wastes which could not be safely disposed of in such facilities would be classified as HLW.

Following publication of the ANPR, a technical report (Kocher, D. C. and A. G. Croff, A Proposed Classification System for High-Level and Other Radioactive Wastes, ORNL/TM-10289, Oak Ridge National Laboratory, 1987) was published which attempted to provide a technical basis for classification of wastes as HLW or non-HLW. This report described a number of conceptual "intermediate" disposal facilities which would use either engineered barriers or deeper burial to provide a degree of waste isolation intermediate between that of shallow land burial and a deep geologic repository. The authors attempted an analysis of the waste isolation capability of such facilities but, emphasizing the site-specific nature of such analyses and the very large uncertainties involved, concluded that "[a]t the present time . . . [such facilities are] not sufficiently developed to provide a basis for defining waste classes, and disposal of any wastes using [such facilities] must be considered on a case-by-case basis." Kocher and Croff then presented an alternative approach for defining HLW which, in essence, is based solely on the short-term storage and handling risks associated with the heat and external radiation levels generated by a waste. The Commission could not accept this alternative approach since it bears no correlation to the degree of waste isolation required following disposal.

The Commission's review of Kocher and Croff's study leads it to the same conclusion regarding the impracticability of waste classification based on analyses of the performance of intermediate disposal facilities. If waste classification is to be at all realistic, additional disposal facility development must be completed which will provide a supportable basis for such classification. Such disposal facility development is more properly the responsibility of DOE rather than NRC. However, the very small volume (about 2,000 m^3 through the year 2020) of commercially-generated, greater-than-Class-C (GTCC) wastes may make an intermediate disposal facility economically unattractive. Because no such facility now exists for disposal of commercially-generated wastes, and because there is no assurance that one will ever be constructed, the Commission believes that an alternative, technically conservative approach should be taken.

The Commission proposes to require disposal of all GTCC wastes in a deep geologic repository unless disposal elsewhere has been explicitly approved by the Commission. This proposal reflects the Commission's view that intermediate disposal facilities may never be available, in which case a repository would be the only type of facility generally capable of providing safe disposal for GTCC wastes. At the same time, the Commission wishes to avoid foreclosing possible use of intermediate disposal facilities by the Department of Energy (DOE). If DOE chooses to develop one or more intermediate disposal facilities, the Commission anticipates that the acceptability of such facilities would be evaluated in the light of the particular circumstances, considering for example the existing performance objectives of 10 CFR Part 61 and any generally applicable environmental radiation protection standards that might have been established by the U. S. Environmental Protection Agency. Technical criteria to implement the performance objectives and environmental standards would be developed by the Commission after DOE had completed its conceptual design and selected a site for a specific type of facility.

The Commission considers that the proposal presented in this notice would obviate any need to reclassify certain GTCC wastes as HLW. The proposal follows the alternative approach alluded to in the ANPR, that the Commission "need not exercise NWPA Clause (B) authority in order to assure that radioactive wastes from licensed activities are disposed of properly" (52 FR 5998). Many comments on the ANPR advocated classification of all GTCC wastes as HLW in order to ensure availability of a safe disposal "home" for those wastes, but this proposal achieves the same purpose while leaving open the prospect that an intermediate disposal facility may prove attractive at some time in the future. (Since the possibility of using such a facility is left open, the Commission is not now determining that the wastes, even if highly radioactive, do in fact "require permanent isolation"; accordingly, the NWPA definition of HLW does not apply). Moreover, this proposal avoids the problem of trying to distinguish HLW from non-HLW without an adequate technical basis for doing so. And the legal and administrative complications identified in the ANPR, as well as questions as to the retroactive application of any new classification, would be avoided or reduced. However, additional legislation

may be needed by DOE to provide for payment of disposal costs for above Class C wastes, or to authorize receipt of such wastes for disposal at a repository.

The Commission also observes that the statutory framework for nuclear waste matters has changed greatly since enactment of NWPA. When that law was passed, it placed a responsibility on the Federal government to receive, manage, and dispose of certain wastes (HLW as well as spent nuclear fuel) in geologic repositories. In that context, the definition of the term "high-level radioactive waste" assumed importance because it provided a basis for differentiating between State and Federal responsibilities. This concern was subsequently mooted by adoption of the Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub.L. 99-240, 42 U.S.C. 2021b et seq. This later statute established a Federal Government responsibility for the disposal of commercially generated wastes with radionuclide concentrations exceeding the limits established in 10 CFR Part 61 for Class C radioactive waste. In view of this development, the Commission perceives little practical importance or significance in proceeding with a precise definition of HLW: to do so would not advance the objectives of NWPA.

PROPOSED AMENDMENTS

In line with the foregoing discussion, therefore, the Commission is proposing two changes to its existing rules. First, by amending 10 CFR §61.55, it would henceforth require all greater-than-Class-C waste to be disposed of in a geologic repository unless an alternative proposal is approved by the Commission. Second, the jurisdictional reach of 10 CFR Part 61 would be extended to cover all activities of the Department of Energy that may be subject to the licensing and regulatory authority of the Commission. This is intended to reflect the policy of the Low-Level Radioactive Waste Policy Amendments Act, which provides that all commercially-generated waste with concentrations exceeding Class C limits shall be disposed of in a facility licensed by the Commission that the Commission determines is adequate to protect the public health and safety. This change would take the form of eliminating the more restrictive language regarding the Department of Energy that appears in the definition of the term "Person" in §61.2.

Environmental Impact

The amendments to Part 61 proposed herein are corrective or of a minor nature and do not substantially modify existing regulations. Accordingly, under 10 CFR §§51.22(a) and 51.22(c)(2), they are eligible for categorical exclusion from the preparation of an environmental assessment.

The first change, pertaining to the definition of "person," is corrective in that it merely reflects the broader jurisdiction of the Commission under the Low-Level Radioactive Waste Policy Amendments Act. The modification is not substantial.

The second change, pertaining to the disposal of greater-than-Class-C radioactive wastes in a geologic repository, is minor. The existing regulations in 10 CFR Part 61 already preclude disposal of GTCC in a Part 61 licensed disposal facility without further review and approval. This amendment does no more than state the Commission's conclusion that, in the absence of such an approved alternative, a geologic repository is the only currently authorized facility acceptable for GTCC disposal without further review by the Commission. It is thus a minor change to specify that the "more stringent" methods are to include disposal in a repository, where it is also expressly provided that, as before, proposals for other methods of disposal may still be submitted to the Commission for approval. No substantial modification of existing regulations is involved.

Paperwork Reduction Act Statement

The information collection requirements contained in this proposed rule, of limited applicability, affect fewer than ten respondents. Therefore, Office of Management and Budget clearance is not required pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.).

Regulatory Flexibility Act Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)) and NRC Size Standards (December 9, 1985, 50 FR 50241), the Commission certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities. The only entity subject to regulation under this proposed rule would be the U.S. Department of Energy,

which does not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act. All waste generators, some of which might be classified as small entities, must pay the costs associated with management and disposal of the wastes they generate. This proposed rule would not affect those costs since it preserves all options currently available for waste disposal. Only DOE's selection of a specific disposal technology from the full range of alternatives available would potentially have an economic impact on small entities.

List of Subjects in 10 CFR Part 61

Low-level waste, Nuclear materials, Penalty, Radioactive waste, Reporting and recordkeeping requirements, Waste classification, Waste treatment and disposal.

Backfitting Requirements

The provisions of 10 CFR 50.109 on backfitting do not apply to this rulemaking because the rule is not applicable to production and utilization facilities licensed under 10 CFR Part 50.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, and 5 U.S.C. 553, notice is hereby given that adoption of the following amendments to Title 10, Chapter I, Part 61, Code of Federal Regulations is contemplated.

PART 61 -- LICENSING REQUIREMENTS

FOR LAND DISPOSAL OF RADIOACTIVE WASTE

1. The authority citation for Part 61 continues to read as follows: Secs. 53, 57, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246, (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub.L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851).

For the purposes of Sec. 223, 68 Stat. 958, as amended, (42 U.S.C. 2273): Tables 1 and 2, §§61.3, 61.24, 61.25, 61.27(a) 61.41 through 61.43, 61.52, 61.53, 61.55, 61.56, and 61.61 through 61.63 issued under Sec. 161b, 68 Stat. 948 as amended (42 U.S.C. 2201(b)); §§61.10 through 61.16, 61.24, and 61.80 issued under Sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. Section 61.2 is revised to read as follows:

§ 61.2 Definitions.

As used in this part:

* * * * *

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to law), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

* * * * *

2. Section 61.55 is revised to read as follows:

§ 61.55 Waste classification.

(a) Classification of waste for near surface disposal.

* * * * *

(2) Classes of waste. * * *

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposals for

disposal of such waste in a disposal site licensed pursuant to this part are submitted to the Commission for approval.

Dated at Washington, D.C. this _____ day of _____, 1988.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.

ENCLOSURE B

Maintaining this requirement was an oversight since the revised standard indirectly controls the use of all added substances. Thus, specific restrictions on the use of these added substances is unnecessary, and the Agency proposes to rescind § 319.105(d) of the regulations.

A second change would amend § 319.104(b) of the regulations (9 CFR 319.104(b)). Under the present regulations, cured pork products for which a qualifying statement is required (e.g., "water added" or "with natural juices") must bear that statement in lettering at least ⅛ inch in height. The Administrator, however, may approve smaller lettering for labels of packages of 1 pound or less, provided the lettering is at least one-third the size and of the same color and style as the product name.

The meat processing industry has advised FSIS that processors are experiencing problems in printing labels to comply with the ⅛-inch type size requirement for qualifying statements. This requirement appears impractical, in some cases, because of the length of some of the qualifying statements required under § 319.104(a) of the regulations (9 CFR 319.104(a)). Additionally, some product packages cannot easily accommodate labeling statements of the size now required. Thus, it appears appropriate to provide an alternative to the ⅛-inch lettering required for qualifying statements. It is proposed that qualifying statements may be in lettering not less than one-third the size of the largest letter in the product name if they are in the same color and style of print and on the same color background as the product name. This option would assure that the qualifying statements are sufficiently prominent and conspicuous to clearly indicate the nature of products. The approach being proposed is consistent with the size of many qualifying statements found presently on labels and reflects general Agency policy as set forth in Policy Memo 087A for words within a product name.[1]

Another problem encountered by industry is the requirement that cured pork products be labeled the full length of the product. Cured pork products not placed in consumer-size packages must be marked repeatedly with any qualifying statement on the full length of the product. This requirement was imposed to assure continued identification of product at the retail level when the product is subdivided. However, the usefulness of this requirement is questionable. Often, these products do not remain in their original, fully labeled packages when offered for sale. Some products are sliced and repackaged while others are placed in delicatessen cases with no packaging. Additionally, other similar delicatessen products (e.g., cured beef products with additional moisture) are not subject to the requirement of repeating the qualifying statement the full length of the product. By deleting the full length requirement, cured pork products would remain accurately labeled and their marking would be comparable to that of other products. The third proposed change would delete the requirement that qualifying statements be marked the full length of the product in § 319.104(b) of the regulations (9 CFR 319.104(b)).

[1] This policy memo is available for public inspection in the office of the FSIS Hearing Clerk. Copies of the memo may be obtained free upon request from the Standards and Labeling Division, Meat and Poultry Inspection Technical Services, Food Safety and Inspection Service, U.S. Department of Agriculture, Washington, DC 20250.

Proposed Rule

List of Subjects in 9 CFR Part 319

Meat and meat food products, Standards of identity, Food labeling.

1. The authority citation for Part 319 continues to read as follows:

Authority: 34 Stat. 1260, 81 Stat. 584, as amended (21 U.S.C. 601 *et seq.*); 72 Stat. 862, 92 Stat. 1069, as amended (7 U.S.C. 1901 *et seq.*); 76 Stat. 663 (7 U.S.C. 450 *et seq.*), unless otherwise noted.

2. Section 319.104 (9 CFR 319.104) would be amended by revising paragraph (b) to read as follows:

§ 319.104 Cured pork products.

* * * * *

(b) Cured pork products for which there is a qualifying statement required in paragraph (a) of this section shall bear that statement as part of the product name in lettering not less than ⅛ inch in height, or in lettering not less than one-third the size of the largest letter in the product name if it is in the same color and style of print and on the same color background as the product name. However, the Administrator may approve smaller lettering for labeling of packages of 1 pounnd or less, provided such lettering is at least one-third the size and of the same color and style as the product name.

* * * * *

§ 319.105 [Amended]

3. Section 319.105 (9 CFR 319.105) would be amended by removing paragraph (d) and redesignating paragraph (e) as (d).

Done at Washington DC, on February 24, 1987.

Donald L. Houston,

Administrator, Food Safety and Inspection Service.

[FR Doc. 87-4185 Filed 2-26-87; 8:45 am]

BILLING CODE 3410-DM-M

NUCLEAR REGULATORY COMMISSION

10 CFR Part 60

Definition of "High-Level Radioactive Waste"

AGENCY: Nuclear Regulatory Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Commission has previously adopted regulations for disposal of high-level radioactive wastes (HLW) in geologic repositories (10 CFR Part 60). The Commission intends to modify the definition of HLW in those regulations so as to follow more closely the statutory definition in the Nuclear Waste Policy Act of 1982 (NWPA). In this advance notice of proposed rulemaking (notice), the Commission identifies legal and technical considerations that are pertinent to the definition of HLW and solicits public comment on alternative approaches for developing a revised definition.

DATES: Comment period expires April 29, 1987. Comments received after this date will be considered if it is practical to do so, but assurance of consideration can be given only for comments received on or before this date.

ADDRESSES: Send comments or suggestions to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Copies of comments received and of documents referenced in this notice may be examined at the NRC Public Document Room, 1717 H Street NW., Washington, DC. Copies of NUREG documents may be purchased through the U.S. Government Printing Office by calling (202) 275-2060 or by writing to the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies of NUREG and DOE documents may also be purchased from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

FOR FURTHER INFORMATION CONTACT: W. Clark Prichard, Division of Engineering Safety, Office of Nuclear Regulatory

...n. U.S. Nuclear Regulatory ...ssion, Washington, DC 20555, ...none (301) 443-7608.

SUPPLEMENTARY INFORMATION:

Introduction and Background

Radioactive wastes contain a wide ...iety of radionuclides, each with its ...n half-life and other radiological ...racteristics. These radionuclides are ...sent in concentrations varying from ...remely high to barely detectable. One ...pe of waste, generated by processing spent nuclear fuel, contains ...th long-lived radionuclides which ...se a long-term hazard to human ...alth and other, shorter-lived nuclides ...hich produce intense levels of ...diation. This combination of highly-...oncentrated, short-lived nuclides ...gether with other very long-lived ...uclides has historically been described ...y the term "high-level radioactive ...wastes" (HLW). There has long been a recognition that such waste materials require long-term isolation from man's biological environment and that, in view of public health and safety considerations, disposal of such wastes should be accomplished by the Federal government on Federally owned land. This policy was codified by the Atomic Energy Commission (AEC) in 1970 in Appendix F to 10 CFR Part 50.

A. *Previous use of the term "HLW."* In Appendix F, HLW was defined in terms of the source of the material rather than its hazardous characteristics. Specifically, HLW was defined as "those aqueous wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuels." As used in Appendix F, "high-level waste" thus refers to the highly concentrated (and hazardous) waste containing virtually all the fission product and transuranic elements (except plutonium) present in irradiated reactor fuel. The term does not include incidental wastes resulting from reprocessing plant operations such as ion exchange beds, sludges, and contaminated laboratory items, clothing, tools, and equipment. Neither are radioactive hulls and other irradiated and contaminated fuel structural hardware within the Appendix F definition.[1]

The first statutory use of the term "high-level radioactive waste" occurs in the Marine Protection, Research, and Sanctuaries Act of 1972 (Marine Sanctuaries Act). Congress adopted the Appendix F definition, but broadened it to include unreprocessed spent fuel as well.[2] Two years later, the AEC was abolished and its functions were divided between the Energy Research and Development Administration (ERDA, now the Department of Energy, DOE) and the Nuclear Regulatory Commission (NRC or Commission) by the Energy Reorganization Act of 1974, Pub. L. 93-438, 42 U.S.C. 5811. Under this legislation, certain activities of ERDA were to be subject to the Commission's licensing and regulatory authority. Specifically, NRC was to exercise licensing authority as to certain nuclear reactors and the following waste facilities:

(1) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under the [Atomic Energy] Act.

(2) Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration [now DOE], which are not used for, or are part of, research and development activities.[3]

Although neither the statute nor the legislative history defines the term "high-level radioactive waste," earlier usage of the term in Appendix F and the Marine Sanctuaries Act is indicative of the meaning. The Commission so construed the statute when it declared spent nuclear fuel to be a form of HLW and, by the same token, when it found transuranic-contaminated wastes not to be HLW.[4]

A different statutory formula appears in the West Valley Demonstration Project Act (West Valley Act), enacted in 1980. This legislation authorizes the Department of Energy (DOE) to carry out a high-level radioactive waste management demonstration project for the purpose of demonstrating solidification techniques which can be used for preparing HLW for disposal. It includes the following definition:

> The term "high level radioactive waste" means the high level radioactive waste which was produced by the reprocessing at the Center of spent nuclear fuel. Such term includes both liquid wastes which are produced directly in reprocessing, dry solid material derived from such liquid waste and such other material as the Commission designates as high level radioactive waste for purposes of protecting the public health and safety.[5]

The Commission has not yet designated any "other material" as HLW under the West Valley Act. Rather, it has construed the term in a manner equivalent to the 10 CFR 50, Appendix F definition. That is, it is the liquid wastes in storage at West Valley and the dry solid material derived from solidification activities that are regarded as HLW, and it is DOE's plans with respect to such wastes that are subject to the Commission's review.

B. *Current NRC regulations.* The Commission has adopted regulations that govern the licensing of DOE activities at geologic repositories for the disposal of HLW. The regulations define HLW in the jurisdictional sense. That is, if the facility is for the "storage" of "HLW" as contemplated by the Energy Reorganization Act, the prescribed procedures and criteria would apply.[6] The appropriate definition for this purpose draws upon the understanding in 1974, as reflected in Appendix F and the Marine Sanctuaries Act, rather than the words of the West Valley Act of more limited purpose and scope.

It should be emphasized that NRC's existing regulations in Part 60 do not require that any radioactive materials, whether HLW or not, be stored or disposed of in a geologic repository.[7]

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[1] See 34 FR 8712, June 3, 1969 (notice of proposed rulemaking), 35 FR 17530 at 17532, November 14, 1970 (final rule). Incidental wastes generated in further treatment of HLW (e.g., decontaminated salt with residual activities on the order of 1,500 nCi/g Cs-137, 30 nCi/g Sr-90, 2 nCi/g Pu, as described in the Department of Energy's FEIS on long-term management of defense HLW at the Savannah River Plant, DOE/EIS-0023, 1979) would also, under the same reasoning, be outside the Appendix F definition.

[2] Sec. 3, Pub. L. 92-532, as amended by Pub. L. 93-254 (1974), 33 U.S.C. 1402.

[3] Sec. 202, Pub. L. 93-438, 42 U.S.C. 5842. Nuclear waste management responsibilities were subsequently transferred to the Department of Energy. Secs. 203(a)(6), 301(a), Pub. L. 95-91, 42 U.S.C. 7133(a)(6), 7151(a).

[4] Proposed General Statement of Policy, "Licensing Procedures for Geologic Repositories for High-Level Radioactive Wastes," 43 FR 53660, 53670, November 17, 1978; Report to Congress, "Regulation of Federal Radioactive Waste Activities," NUREG-0527 (1979), 2-1, 2-2, Appendix C.

[5] Sec. 6(4), Pub. L. 96-368, 42 U.S.C. 2021a note.

[6] NRC regulations are codified in 10 CFR Part 60 (Part 60). DOE is required to have a license to receive source, special nuclear or byproduct material at a geologic repository operations area. § 60.3. A geologic repository operations area is defined to refer to a "HLW facility" which in turn is defined as a facility subject to NRC licensing authority under the Energy Reorganization Act of 1974, note 3, *supra*. § 60.2 The Part 60 definition of HLW, *ibid.*, is as follows:

"High-level radioactive waste" or "HLW" means: (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted.

[7] In the event that commercial reprocessing of irradiated reactor fuel is pursued, Appendix F of 10 CFR Part 50 would require that the resulting reprocessing wastes be transferred to a Federal repository.

Nor do they provide that radioactive materials must be HLW in order to be eligible for disposal in a geologic repository. Part 60 expressly provides for NRC review and licensing with respect to any radioactive materials that may be emplaced in a geologic repository authorized for disposal of HLW. The term "high-level radioactive waste" in Part 60 identifies the class of facilities subject to NRC jurisdiction.

The Commission has also adopted regulations related to land disposal of low-level radioactive wastes (10 CFR Part 61). Based on analyses of potential human health hazards, these regulations identify three classes of low-level radioactive wastes which are routinely acceptable for near-surface disposal, with "Class C" denoting the highest radionuclide concentrations of the three. Class C does not, however, denote a maximum concentration limit for low-level wastes. The low-level waste category includes all wastes not otherwise classified, while HLW is currently defined by source (rather than concentration or hazard) and is limited to reprocessing wastes and spent fuel. Thus, there is no regulatory limit on the concentrations of LLW, and some LLW (exceeding Class C concentrations) may have concentrations approaching those of HLW. These are the wastes which the Commission wishes to evaluate for possible classification as HLW. The Appendix to this notice presents information on the volumes and characteristics of wastes with radionuclide concentrations exceeding the Class C concentration limits. (This Appendix was prepared in 1985. DOE is currently carrying out a study of "above Class C" wastes which will update the information presented here.)

C. *Nuclear Waste Policy Act of 1982.* The Nuclear Waste Policy Act of 1982 (NWPA), Pub. L. 97-425, provides for the development of repositories for the disposal of high-level radioactive waste and establishes a program of research, development, and demonstration regarding the disposal of high-level radioactive waste.[8] The NWPA follows, with some modification, the text of the West Valley Act. For purposes of the NWPA, the term "high-level radioactive waste" means:

(A) The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

(B) Other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.[9]

It should be noted that the NWPA does not require that materials regarded as HLW pursuant to this definition be disposed of in a geologic repository. Indeed, the NWPA directs the Secretary (of DOE) to continue and accelerate a program of research, development and investigation of alternative means and technologies for the permanent disposal of HLW.[10] Part 60 and the changes discussed in this notice would allow for consideration of such alternatives by the Commission. Nevertheless, the NWPA does not specifically authorize DOE to construct or operate facilities for disposal by alternative means, and new legislative authorization might be needed in order to dispose of HLW by means other than emplacement in a deep geologic repository.

II. Considerations for Defining "High-Level Radioactive Waste"

Wastes which have historically been referred to as HLW (i.e., reprocessing wastes) are initially both intensely radioactive and long-lived. These wastes contain a wide variety of radionuclides. Some (principally Sr-90 and Cs-137) are relatively short-lived and represent a large fraction of the radioactivity for the first few centuries after the wastes are produced. These nuclides produce significant amounts of heat and radiation, both of which are of concern when disposing of such wastes. Other nuclides, including C-14, Tc-99, I-129 and transuranic nuclides, have very long half-lives and thus constitute the longer-term hazard of the wastes. Some of these nuclides pose a hazard for sufficiently long periods of time that the term "permanent isolation" is used to describe the type of disposal required to isolate them from man's environment. The Commission considers that these two characteristics, intense radioactivity for a few centuries followed by a long-term hazard requiring permanent isolation, are key features which can be used to distinguish high-level wastes from other waste categories.

The NWPA identifies two sources of HLW, each of which is discussed separately in the following sections.

A. Clause (A)

Clause (A) of the NWPA definition of HLW refers to wastes produced by reprocessing spent nuclear fuel and thus is essentially identical to the Commission's current HLW definition in 10 CFR Part 60. Clause (A) is, however, different in one respect. The NWPA wording would classify solidified reprocessing waste as HLW only if such waste "contains fission products in sufficient concentrations"—a phrase that may reflect the possibility that liquid reprocessing wastes may be partitioned or otherwise treated so that some of the solidified products will contain substantially reduced concentrations of radionuclides.

The question, then, is whether Commission should (1) numerically specify the concentrations of fission products which it would consider "sufficient" to distinguish HLW from non-HLW under Clause (A); or (2) define HLW so as to equate the Clause (A) wastes with those which have traditionally been regarded as HLW.

1. Numerically Specifying Concentrations of Fission Products

The first option considered is to numerically define "sufficient concentrations" of fission products. Liquid reprocessing wastes may contain significant amounts of non-radioactive salts, and removal of these salts prior to waste solidification may be desirable for both economic and public health and safety reasons. Removal of salts in this way would result in a smaller volume of highly radioactive wastes, which might reduce the cost and radiological impacts associated with transportation and occupational handling of those wastes. Nevertheless, any salts removed from liquid HLW would retain residual amounts of radioactive contaminants. By establishing numerical limits on the concentrations of fission products, the Commission would be identifying those wastes from reprocessing that require disposal in a deep geologic repository or its equivalent. The proper classification of the salts discussed above would then be made on the basis of the numerical limits on radionuclide concentrations and the salts would be disposed of accordingly. In other cases, certain radionuclides may be removed from the bulk liquid reprocessing waste (as has been done in removing cesium and strontium from wastes at Hanford), raising similar questions about the classification of the remaining waste and acceptable methods of disposal. For these reasons, there would be merit in numerically specifying the

[8] For purposes of the NWPA, "spent nuclear fuel" is distinguished from "high-level radioactive waste," but the provisions of the statute dealing with such spent nuclear fuel are not of present concern.

[9] Sec. 2(12), Pub. L. 97-425, 42 U.S.C. 10101(12). Sec. 2(16) also authorizes the Commission to classify certain radioactive material as low-level radioactive waste.

[10] Sec. 222, Pub. L. 97-425, 42 U.S.C. 10202.

concentrations of radionuclides in solidified reprocessing wastes which would distinguish HLW from non-HLW. Clause (A) refers to solidified waste that contains fission products in sufficient concentrations." No mention is made of the long-lived transuranic radionuclides which are also present in liquid reprocessing wastes but, since the transuranics constitute the predominant long-term hazard of reprocessing wastes, such nuclides must be considered as well in defining reprocessing wastes that should be regarded as HLW. With this view, a numerical classification of solidified wastes under Clause (A) could be derived in the same manner, and contain the same concentration limits, as the numerical definitions developed under Clause (B). Derivation of concentration limits under Clause (B) is discussed in the following section of this notice.)

2. Traditional Definition

The alternate approach is to define HLW so as to equate the category of Clause (A) wastes with those wastes which have traditionally been regarded as HLW under Appendix F to 10 CFR Part 50 and the Energy Reorganization Act. The advantage of this option is that the term HLW retains its utility in defining the facilities that are subject to NRC licensing. That is, all materials that have traditionally been considered HLW for purposes of the Energy Reorganization Act would also be regarded as HLW under the Nuclear Waste Policy Act. The disadvantage is that some materials might continue to fall within the HLW classification even though they do not require the degree of isolation afforded by a repository. They would be called "HLW" even though the technical community might not so regard them.

3. Other Considerations Regarding Clause (A) Options

The Commission would add two observations regarding the options discussed above.

a. Development of a definition under Clause (A), as suggested by the first option, would not alter the Commission's existing authority to license DOE waste facilities, including defense wastes facilities, under the Energy Reorganization Act of 1974 (ERA). Any classification of wastes as non-HLW on the basis that they do not contain "sufficient concentrations" of fission products would be irrelevant in determining whether such wastes must be disposed of in licensed disposal facilities. For example, if DOE were to pursue its proposal for in-place stabilization of the Hanford "tank" wastes (see DOE/EIS-0113, March, 1986), most or all of the disposal "facilities" for those wastes would need to be licensed by the NRC.

b. Retaining the traditional definition for purposes of Clause (A) does not limit the Commission's ability to establish at some later date criteria to define wastes that require the isolation afforded by a deep geologic repository or its equivalent. That is, wastes requiring such isolation could be identified by terms other than "high-level".

B. Clause (B)

Clause (B) of the NWPA authorizes the Commission to classify "other highly radioactive material" (other than reprocessing wastes) as HLW if that material "requires permanent isolation." The Commission considers that both characteristics (highly radioactive and requiring permanent isolation) must be present simultaneously in order to classify a material as HLW.[11] Each of these characteristics is discussed in turn in the following sections.

1. Highly Radioactive

The Commission proposes [12] to consider a material "highly radioactive" if it contains concentrations of short-lived radionuclides in excess of the Class C limits of Table 2 of 10 CFR Part 61. Such concentrations are sufficient to produce significant radiation levels and to generate substantial amounts of heat. Moreover, the Class C concentration limits for short-lived nuclides approximate the actual concentrations of those nuclides present in some existing reprocessing wastes (see NUREG-0940, Table 4).

2. Permanent Isolation

The phrase "permanent isolation" in NWPA is much less subjective than is "highly radioactive." Within the context of NWPA, "permanent isolation" clearly implies the degree of isolation afforded by a deep geologic repository.[13] Thus, a waste "requires permanent isolation" if it cannot be safely disposed of in a facility less secure than a repository. The Commission will determine which wastes require permanent isolation by evaluating the disposal capabilities of alternative, less secure, disposal facilities.[14] Any wastes which cannot be safely disposed of in such facilities will be deemed to require permanent isolation and, if also highly radioactive, would be classified as high-level wastes.

The approach which the Commission proposes to pursue to determine which wastes requires permanent isolation will be an extension of the 10 CFR Part 61 waste classification analyses and will consist of the following steps.

a. *Establish acceptance criteria.* 10 CFR Part 61 currently contains performance objectives for disposal of radioactive wastes in a land disposal facility. These performance objectives will serve as acceptance criteria for waste classification analyses, but might need to be supplemented for specific types of facilities or wastes. The Part 61 performance objectives may also need to be supplemented to accommodate any environmental standards for non-HLW which may be promulgated by the U.S. Environmental Protection Agency pursuant to its authority under the Atomic Energy Act of 1954, as amended.

b. *Define disposal facility.* The hazard which a radioactive waste poses to public health depends, in part, on the nature of the facility used for its disposal. Thus, a reference disposal facility, less secure than a repository, needs to be defined in terms of the characteristics which contribute to isolation of wastes from the environment. For land disposal facilities, such characteristics might include depth of disposal, use of engineered barriers, and the geologic, hydrologic and geochemical features of a disposal site.

c. *Characterize wastes.* Wastes will be characterized in terms of the factors which determine their hazard and behavior after disposal, including

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[11] The Commission would not find tenable the argument that a material requires permanent isolation *because* it is highly radioactive. The need for permanent isolation correlates with the length of time a material will remain hazardous. Long half-lives, in turn, correlate with low rather than high levels of radioactivity.

[12] All references to "proposals" by the Commission refer only to its tentative views. No formal proposals will be developed until comments are received in response to this notice.

[13] The NWPA includes the following definitions:

The term "disposal" means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.

The term "repository" means any system licensed by the Commission that is intended to be used for, or may be used for, the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel, whether or not such system is designed to permit the recovery, for a limited period during initial operation, of any materials placed in such system. Such term includes both surface and subsurface areas at which high-level radioactive waste and spent nuclear fuel handling activities are conducted.

[14] These facilities might make use of intermediate depth burial or various engineering measures, such as intruder barriers, to accommodate wastes with radionuclide concentrations unsuitable for disposal by shallow land burial.

physical and chemical forms of the ste, the radionuclide concentrations associated radiological racteristics, the waste volumes, and the heat generation rates. The wide range of types and characteristics of wastes arising from industrial, biomedical and nuclear fuel cycle sources makes this a particularly critical step in the waste classification process—especially for wastes to be generated in the future (e.g., decommissioning wastes).

d. *Develop assessment methodology.* Analytical methods (including mathematical models and computer codes) for projecting disposal system performance will be acquired or developed. For land disposal facilities, such methods include models of groundwater flow and contaminant transport. An assessment methodology also includes descriptions of the natural and human-initiated disruptive events or processes which could significantly affect disposal system performance as well as the analytical means for evaluating the impacts of such events or processes.

e. *Evaluate disposal system performance.* The performance of the alternative disposal facility will be evaluated to estimate the public health hazards from disposal of various types nd concentrations of wastes. Hazards elow the acceptance criteria of item (a) above indicate an acceptable match of waste type and disposal option. Wastes which cannot be safely disposed of in the alternative facility will be classified as requiring permanent isolation.

A practical difficulty with classifying wastes as described here is that alternative disposal facilities are currently unavailable. Thus, classification of wastes in this manner requires many assumptions about the performance of nonexistent disposal facilities. Such analyses will inevitably involve substantial uncertainties.

It is also possible that no alternative disposal facility will ever be needed for commercially-generated "above Class C" wastes. (Disposal of such wastes is a Federal, rather than State, responsibility.) Because of the overhead costs of developing and licensing new facilities, the relatively small volumes of such wastes, and the low heat generation rates of some of these wastes, it might prove most economical to dispose of all such wastes in a repository. Nevertheless, the Commission recognizes a "chicken-and-egg" problem here. Until wastes are classified as HLW or non-HLW, it may be difficult for the DOE to make decisions regarding appropriate types of disposal facilities. Therefore, despite the uncertainties involved, the Commission proposes to select a hypothetical alternative disposal facility which will serve as the basis for carrying out waste classification analyses.

Previous analyses by the NRC (NUREG–0782, draft EIS for 10 CFR Part 61) suggest that disposal facilities with characteristics intermediate between shallow land burial and geologic repository disposal may be most effective in protecting against short-term radiological impacts associated with inadvertent intrusion into a disposal facility. These "intermediate" facilities may be much less effective in providing enhanced long-term isolation of very long-lived radionuclides. If this preliminary view is supported by subsequent analyses, wastes with concentrations above the Commission's current Class C limits for long-lived nuclides (Table 1 of 10 CFR Part 61) would require permanent isolation. In the following sections, the Commission will assume, for the sake of illustration, that Table 1 is an appropriate interpretation of the term "requires permanent isolation."

3. Conceptual Definition of "High-Level Waste

The Commission proposes to Classify wastes as HLW under Clause (B) of the NWPA definition only if they are both highly radioactive and in need of permanent isolation. As discussed above, the Commission considers that wastes should be considered to be highly radioactive if they contain concentrations of short-lived radionuclides which exceed the Class C limits of Table 2 of 10 CFR Part 61. The Commission also assumes, for illustrative purposes, that the radionuclide concentrations of Table 1 of Part 61 are appropriate for identifying the concentrations of long-lived radionuclides requiring permanent isolation. Solidified reprocessing wastes would similarly be classified as HLW only if they contain both short- and long-lived radionuclides in concentrations exceeding Tables 2 and 1, respectively.

It is assumed that a revised definition of HLW would appear in the definitions section of Part 60, and that the materials encompassed by the definition would be subject to the containment requirements of that regulation. It would also serve incidentally to define the materials covered by DOE's waste disposal contracts. This definition would apply only to wastes disposed of in a facility licensed under Part 60. As discussed elsewhere in this notice, there would be no alteration of the Commission's authority to license disposal of HLW under provisions of the Energy Reorganization Act. Some technical amendments would be needed to preserve the jurisdictional provisions of existing Part 60—i.e., to indicate that Part 60 applies to the DOE facilities described in sections 202(3) and (4) of the Energy Reorganization Act, and for that purpose the proposed definition of HLW would not be controlling.

A conceptual, revised definition of HLW could be stated as follows:

"High-level radioactive waste" or "HLW" means: (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, (3) solids into which such liquid wastes have been converted, and solid radioactive wastes from other sources, provided such solid materials contain both long-lived radionuclides in concentrations exceeding the values of Table 1 and short-lived radionuclides with concentrations exceeding the values of Table 2.

TABLE 1

Radionuclide	Concentration[1] (Ci/m³)
C-14	8
C-14 in act. metal	80
Ni-59 in act. metal	220
Nb-94 in act. metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting TRU, $t_{1/2}$ > 5 yr	[2]100
Pu-241	[2]3,500
Cm-242	[2]20,000

[1] If a mixture of radionuclides is present, a sum of the fractions rule is to be applied for each table. The concentration of each nuclide is to be divided by its limit, and the resulting fractions are to be summed. If the sum exceeds one for both tables, the waste is classified as HLW.

[2] Units are nanocuries per gram.

TABLE 2

Radionuclide	Concentration[1] (Ci/m³)
Ni-63	700
Ni-63 in act. metal	7,000
Sr-90	7,000
Cs-137	4,600

[1] If a mixture of radionuclides is present, a sum of the fractions rule is to be applied for each table. The concentration of each nuclide is to be divided by its limit, and the resulting fractions are to be summed. If the sum exceeds one for both tables, the waste is classified as HLW.

4. Status of wastes not classified as HLW

The NWPA, the Low-Level Radioactive Waste Policy Act, and the Commission's regulations in 10 CFR Part 61 currently classify wastes as "low-level" if they are not otherwise classified as high-level wastes or certain other types of materials (e.g., uranium mill tailings). Classification of certain wastes as HLW, under Clause (B) of the NWPA definition, would reduce the amount of waste classified (by default) as LLW and, more importantly, would establish a distinct, concentration-based boundary between the two classes of waste.

If this conceptual definition of Clause (B) were adopted, certain wastes with radionuclide concentrations above the Class C limits of 10 CFR Part 61 would not be classified as HLW because they do not contain the requisite combination of short- and long-lived nuclides. These wastes would continue to be classified as special types of low-level wastes analogous to DOE's "transuranic" waste category. Any such wastes generated by defense programs would continue to fall under DOE's responsibility for disposal, and no NRC licensing of facilities intended solely for their disposal, such as the Waste Isolation Pilot Plant (WIPP), would be authorized.

As provided by the amendments to the Low-Level Radioactive Waste Policy Act,[15] the Federal government is responsible for disposal of all commercially-generated "above Class C" wastes; it is contemplated, under the amendments, that the NRC would be responsible for licensing the facilities for their disposal. The Commission would continue to permit disposal of wastes containing naturally-occurring or accelerator-produced materials in licensed facilities provided there was no unreasonable risk to public health and safety.

III. Legal Considerations Related to the Nuclear Waste Policy Act

The exercise of NWPA Clause (B) authority may give rise to a number of legal questions which are discussed below.

A. *Disposal of waste generated by materials licensees.* The NWPA established a Nuclear Waste Fund composed of payments made by the generators and owners of "high-level radioactive waste" (including spent fuel) that will ensure that the costs of disposal will be borne by the persons responsible for generating such waste. The Nuclear Waste Fund is to be funded with moneys obtained pursuant to contracts entered into between the Secretary of Energy and persons who generate or hold title to high-level radioactive waste.

The statute addresses the particulars of contracts with respect to spent nuclear fuel and solidified high-level radioactive waste derived from spent nuclear fuel used to generate electricity in a civilian nuclear power reactor. It further limits the authority of the Commission to issue or renew licenses for utilization and production facilities—i.e., for present purposes, nuclear reactors and reprocessing plants—unless the persons using such facilities have entered into contracts with the Secretary of Energy.

The absence of any reference to materials licensees (e.g., fuel fabricators, some research laboratories) suggests that the Nuclear Waste Fund was not intended to apply to their activities. As as result, there could be a question if the Commission were to define materials licensees' waste as high-level waste, because the waste might thereby become ineligible for disposal in a repository. The reason is that the law prohibits disposal of HLW in a repository unless such waste was covered by a contract entered into by June 30, 1983 (or the date the generator or owner commences generation of or takes title to the waste, if later). Few contracts have been entered into with materials licensees except those who are also facility licensees. Thus, it can be argued that the Commission should refrain from designating as HLW, under Clause (B),[16] materials generated by materials licensees.

The Commission is not persuaded by such an argument. The statutory language dealing with the Commission's classification of materials as HLW refers solely to considerations relating to the nature of the wastes, and the character of the licensee generating or owning the waste is simply not relevant. If there are good reasons to treat that waste from materials licensees as HLW, the Commission regards it as likely that any statutory impediment to the acceptance of such waste at a geologic repository could be modified.

B. *Confidence regarding disposal capacity for power reactors.* The availability of waste disposal facilities for wastes generated at commercial power reactors has been the subject of controversy and litigation. The NWPA addresses these concerns by establishing a Federal responsibility to provide for the construction and operation of a geologic repository, leaving undefined (i.e., to the discretion of the Commission) the classes of materials that require permanent isolation in such a facility. Whatever materials they may be, however, they must be transferred to DOE for disposal; and the presons responsible for generating the waste must enter into contracts with DOE which provide for payment of fees sufficient to offset DOE's costs of disposal. Existing facility licensees were required to enter into such contracts by June 30, 1983.

The Commission believes that the purpose of the NWPA can best be accomplished if all the highly radioactive wastes generated by facility licensees (reactors and reprocessing plants) which require permanent isolation are covered by waste disposal contracts with DOE. This would assure that DOE can and will accept possession of such wastes when necessary. Further, in the absence of such assurance, the basis for Commission confidence that these wastes will be safely stored and disposed of would be subject to question even if concerns about the disposal of the licensees' spent nuclear fuel had been laid to rest. Accordingly, if there are any highly radioactive materials (other than those previously regarded as HLW) that are generated by facility licensees and that require permanent isolation, the Commission believes that, for purposes of the NWPA, they should be regarded as "high-level waste." The Commission has reviewed the terms of DOE's standard waste disposal contract and believes that classifying such additional materials as HLW would require no changes to the contract terms.

C. *Implications with respect to disposal methods.* Under the Atomic Energy Act of 1954, the Commission is authorized to establish such standards to govern the possession of licensed nuclear materials as it may deem necessary or desirable to protect health.[17] Under this authority, the Commission may classify materials according to their hazards and may prescribe requirements for the long-term management or disposal thereof. It is not necessary to label materials as HLW under the NWPA in order to require their disposal in a geologic repository or other suitably permanent facility.

The Commission exercised this authority with respect to concentrated

[15] Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. 99-240, Sec. 2, 42 U.S.C. 2021c.

[16] The Nuclear Waste Fund is governed by Sec. 302, Pub. L. 97-425, 42 U.S.C. 10222. The prohibition of disposal of HLW not covered by timely contracts is set out in sec. 302(b)(2).

[17] Sec. 161b., Pub. L. 83-703, 42 U.S.C. 2201(b).

reprocessing wastes by specifying, in Appendix F to 10 CFR Part 50, that any such wastes generated at licensed facilities are to be transferred to a Federal repository for disposal. More recently, the Commission classified certain low-level wastes as being generally acceptable for near-surface disposal (10 CFR Part 61). On the basis of further consideration, the Commission could specify appropriate disposal means for wastes exhibiting radionuclide concentrations greater that those defined in Part 61. Thus, the Commission need not exercise NWPA Clause (B) authority in order to assure that radioactive wastes from licensed activities are disposed of properly. Moreover, the identification of material as HLW under Clause (B) would not by itself mandate that such material must be disposed of in a geologic repository. Since the NWPA authorizes only a single method of permanently isolating HLW—geologic repositories—classification of materials as HLW may effectively preclude disposal of such wastes by other means. Nevertheless, the Commission's regulations will continue to leave open the prospect of disposal by other means if Congress should so authorize.

D. *Relationship to State role.* Section 3 of the Low-level Radioactive Waste Policy Act (LLRWPA), Pub. L. 96-573, 42 U.S.C. 2021b., enacted in 1980, defines a State responsibility to provide, pursuant to regional compacts, for the disposal of "low-level radioactive waste" (LLW).[16] Such waste is defined to mean "radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in section 11.e.(2) of the Atomic Energy Act of 1954."

The Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. 99-240, 42 U.S.C. 2021c., limited the range of LLW for which the States must provide disposal capacity. Specifically, the States are not responsible for wastes with radionuclide concentrations in excess of the Class C limits of 10 CFR Part 61. Instead, the Federal government now assumes responsibility for providing disposal capacity for such wastes. Thus, classification of "above Class C" wastes as HLW or non-HLW will have no impact on State government responsibilities.

E. *Impact on existing technical criteria.* NRC's regulations in Part 60 include technical criteria to be applied in licensing DOE's receipt and possession of source, special nuclear, and byproduct material at a geological repository. The regulations would accommodate the disposal of any radioactive materials, including spent fuel, reprocessing wastes, or any other materials which could be disposed of in accordance with the specified performance objectives.

Materials categorized as high-level waste are subject to a containment requirement (§ 60.113(a)(1)(i)(A)) and to specified waste package design criteria and waste form criteria (§ 60.135 (a-c)). These criteria apply to wastes characterized by the presence of fission products generating substantial amounts of heat at the time of emplacement, but with much reduced heat generation after decades or a few centuries.[17] The rule also explicitly provides that design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository (§ 60.135(d)).

If additional materials were to be designated as high-level waste, the Commission would need to consider whether the existing repository design criteria are appropriate with respect to such materials.

F. *Applicability of HLW definition to naturally-occurring and accelerator-produced radioactive materials.* Clause (B) of the NWPA provides that the Commission may extend the definition of the term "high-level radioactive waste" to include material requiring permanent isolation only where this is "consistent with existing law." The applicable existing law is the Atomic Energy Act of 1954, under which the Commission has authority to regulate the possession and use of "source material," "special nuclear material," and "byproduct material." There are other radioactive materials, however: naturally-occurring radionuclides, such as radium, and accelerator-produced radionuclides. These are not covered by the Atomic Energy Act and hence there would be no statutory basis, consistent with existing law, for the Commission to require that they be disposed of at facilities licensed by the Commission or otherwise to regulate their possession or use. Accordingly, no legal basis exists for the Commission to classify such materials as HLW or non-HLW.

Nevertheless, as already noted, 10 CFR Part 60 contemplates that "other radioactive materials other than HLW" may be received for emplacement in a geologic repository. This provision of Part 60 would not be altered by expanding the definition of HLW. Part 60 provides that waste package requirements for such wastes will be determined on a case-by-case basis when these wastes are proposed for disposal. Thus, it might be determined, on the basis of technical considerations, that certain naturally-occurring or accelerator-produced radioactive waste materials present hazards similar to licensed materials that are defined as high-level waste and that such material should be disposed of in a geologic repository developed under NWPA. If so, plans for such disposal can be reviewed under Part 60 and the Commission could impose such packaging or other requirements as appropriate to protect public health and safety.

IV. Issues on Which Public Comments are Particularly Sought.

The Commission invites comments on all the issues identified in this notice and any other issues that might be identified. However, comments (with supportive rationale) in response to the following would be particularly helpful.

1. Two options are presented for defining reprocessing wastes under Clause (A) of NWPA. The first option proposes to define the "sufficiency" of fission product concentrations in solidified reprocessing wastes in a manner analogous to its treatment of "highly radioactive" and "requires permanent isolation" under Clause (B) (i.e., by examining the hazards posed by wastes if disposed of in facilities other than a repository). The second option interprets Clause (A) as encompassing all those wastes which have heretofore been considered high-level waste under Appendix F to 10 CFR Part 50 and the Energy Reorganization Act. Which of these two approaches is preferable?

2. The Commission proposes that the current Class C concentration limits of 10 CFR Part 61 serve to identify radionuclide concentrations which are "highly radioactive" for purposes of Clause (B) of the NWPA definition. Would an alternative set of concentration limits be preferable? If so, how should such limits be derived?

3. The Commission proposes to equate the "requires permanent isolation" wording of the NWPA definition with a level of long-term radiological hazard requiring disposal in a geologic repository. Are the Commission's

[16] States are not responsible for disposal of LLW from atomic energy defense activities or Federal research and development activities.

[17] The Commission's expectation that HLW would generate significant amounts of heat is reflected in the discussion of transuranic waste in the notice of proposed rulemaking on the Part 60 technical criteria. 46 FR 35284, July 8, 1981. Reduction of the heat load, for example by removal of cesium-137 and strontium-90, could result in different containment requirements. 48 FR 28196, June 21, 1983 (final rule).

proposed analyses appropriate for identification of concentrations requiring permanent isolation?

4. Although, under section 121 of NWPA, no environmental review is required with respect to the definition of HLW, the Commission would welcome identification of any environmental consequences associated with the matters discussed in this notice.

5. Some waste materials, such as certain laboratory wastes or some sealed sources, may be highly concentrated, yet contain only relatively small total quantities of radioactive materials. Is there a need for a special provision (e.g., a minimum total quantity of activity) before a waste should be classified as HLW?

6. What difficulties (legal, administrative, financial, or other) would an expanded definition of HLW cause in implementing the provisions of the NWPA?

7. The Commission's regulations do not generally require that any particular type of waste be disposed of in any specified type of facility. Would such a requirement be appropriate?

8. As discussed in this notice, the Commission has no legal authority to classify naturally-occurring or accelerator-produced radioactive materials (NARM) as HLW or non-HLW. Nevertheless, such materials may be presented for disposal at facilities licensed by the Commission. When the Commission carries out its proposed analyses to identify "other highly radioactive material that . . . requires permanent isolation," should NARM be included in the analyses?

9. Are there issues other than those identified in this notice which the Commission should consider in developing approaches to implement its authority?

Separate Views of Commissioner Asselstine

Commissioner Asselstine is concerned about the potential for creating a confusing situation if the Commission were to adopt the first option under Clause (A). The first option is to numerically specify concentrations of fission products in defining high-level wastes. Under this approach, it is conceivable that material considered high-level waste for the purposes of licensing under the Energy Reorganization Act of 1974 will also be considered low-level waste for the purposes of the Nuclear Waste Policy Act (NWPA) of 1982. Wastes presently being stored at the Hanford waste tanks, which have traditionally been classified as high-level wastes, would likely be classified as above Class C low-level waste under the first option. Commissioner Asselstine requests public comment on how this reclassification would affect the NRC's licensing authority over the long-term storage or *in situ* disposal of the Hanford waste tanks. Commissioner Asselstine also requests comments on whether there are alternative approaches to achieving the stated purpose of this advanced notice of proposed rulemaking of identifying wastes subject to the provisions of the NWPA without altering the traditional definition of high-level waste and thus creating this potential for confusion.

List of Subjects in 10 CFR Part 60

High-level waste, Nuclear power plants and reactors, Nuclear materials, Penalty, Reporting requirements, Waste treatment and disposal.

Authority: The authority citation for this document is Sec. 161, Pub. L. 83-703, 68 Stat. 948, as amended (42 U.S.C. 2201).

Dated at Washington, DC, this 20th day of February 1987.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

Appendix—Volumes and Characteristics of Wastes Exceeding Class C Concentration Limits

For a number of years NRC has had an ongoing program to develop regulations and criteria for disposal of low-level radioactive waste. At the time this program was initiated, there was a well-documented need for comprehensive national standards and technical criteria for the disposal of low-level waste. The absence of sufficient technical standards and criteria was seen to be a major deterrent to the siting of new disposal facilities by states and compacts.

A significant milestone in this program was the promulgation of the regulation 10 CFR Part 61 ("Licensing Requirements for Land Disposal of Radioactive Waste") on December 27, 1982 (47 FR 57446). This regulation establishes procedural requirements, institutional and financial requirements, and overall performance objectives for land disposal of radioactive waste, where land disposal may include a number of possible disposal methods such as mined cavities, engineered bunkers, or shallow land burial. This regulation also contains technical criteria (on site suitability, design, operation, closure, and waste form) which are applicable to near-surface disposal, which is a subset of the broader range of land disposal methods. Near-surface disposal is defined as disposal in or within the upper 30 meters of the earth's surface, and may include a range of possible techniques such as concrete bunkers or shallow land burial. The Part 61 regulation is intended to be performance-oriented rather than prescriptive, with the result that the Part 61 technical criteria are written in relatively general terms, allowing applicants to demonstrate how their proposals meet these criteria for various specific near-surface disposal methods.

A waste classification system was also instituted in the regulation which establishes three classes of waste suitable for near-surface disposal: Class A, Class B, and Class C. Limiting concentrations for particular radionuclides were established for each waste class, with the highest limits being for Class C. The concentration limits were established based on NRC's understanding (at the time of the rulemaking) of the characteristics and volumes of low-level waste that would be reasonably expected to the year 2000, as well as potential disposal methods.

The Class C concentration limits are applicable to all potential near-surface disposal systems; however, the calculations performed to establish the limits are based on postulated use of one near-surface disposal method: shallow land burial. The Class C limits are therefore conservative since there may be other near-surface disposal methods that have greater confinement capability (and higher costs) than shallow land burial.

The regulation states that waste exceeding Class C concentration limits is considered to be "not generally acceptable for near-surface disposal," where this is defined in § 61.55(a) as "waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste." Thus, waste exceeding Part 61 concentrations generally has been excluded from near-surface disposal and is being held in storage by licensees. (This amounts to less than 1% of the approximately 3,000,000 ft^3 of commercial low-level waste annually being generated.) Given the current absence of prescriptive requirements for disposal of waste exceeding Class C concentration limits, the regulation allows for evaluation of specific proposals for disposal of such waste on a case-by-case basis. The general criteria to be used in evaluating specific proposals are the Part 61 performance objectives contained in Subpart C of the regulation.

Current NRC activities include analyses of low-level waste that exceeds Class C concentration limits to determine the extent to which alternative near-surface disposal systems (e.g. concrete bunkers, augered holes, deeper disposal) may be suitable for safe disposal of such waste. These analyses include a more detailed characterization of physical, chemical, and radiological characteristics of wastes that may be close to or exceed Class C concentration limits as well as development of improved methods for modeling the radiological and economic impact of disposal of these wastes. A related activity is development of more specific guidance for design and operation of alternative near-surface and other land disposal systems. These activities represent a continuation of the Part 61 rulemaking process as discussed in the December 27, 1982 notice of the final Part 61 regulation (47 FR 57446).

Wastes exceeding Class C concentrations are projected to be generated by nuclear power reactors and other supporting nuclear fuel cycle facilities, and also generated by

radioisotope product manufacturers and other facilities and licensees outside of the nuclear fuel cycle. Such wastes can be grouped as follows:

—Plutonium-contaminated nuclear fuel cycle wastes
—Activated metals
—Sealed sources
—Radioisotope product manufacturing wastes
—Other waste

Plutonium-contaminated nuclear fuel cycle wastes. These wastes are being generated from two principal sources. One source of waste arises from operations supporting the nuclear fuel cycle—i.e., post-irradiation radiochemical and other performance analyses of spent fuel rods from nuclear reactors (e.g., "burnup" studies). These operations generate about 200 ft^3 of plutonium-contaminated waste per year, much of which is believed to exceed Class C concentration limits. This waste consists of solidified liquids and other solid material, such as scrap, trash, and contaminated equipment. Eventual decommissioning of the three facilities currently performing these analyses is expected to generate additional waste volumes, a portion of which is expected to exceed Class C concentration limits.

The second source of waste arises from fuel cycle licensees who have previously been authorized to use plutonium in research and development of advanced reactor fuels. None of these licensees is using plutonium now, and there is no prospect in the foreseeable future for such activities. In fact, each of the licensees in this category has either decommissioned, or is in the process of decommissioning, its facility. Some of the licensees have made contractual arrangements to transfer their decommissioning waste to DOE for retrievable storage. Approximately 5,000 to 10,000 ft^3 of waste, however, is projected to be generated on a one-time basis that will not be covered by contract.

Activated metals. Activated metals are typically generated as a result of long-term neutron bombardment of metals forming the structure or internal components of a nuclear reactor used for power production, radioisotope production, or other purpose (e.g., education, testing, research). Activated metal wastes are unlike most other wastes being generated in that the radionuclides form part of the actual metal matrix rather than being mixed with large volumes of other, nonradioactive material such as paper, cloth or resins. Radionuclide release is principally governed by the material corrosion rate, and for most reactor metals of concern (e.g., stainless steel), the corrosion rate is quite low.

To date, only a small fraction (about 200 ft^3/yr) of the activated metal waste currently being generated by nuclear power reactors has been identified as exceeding Class C concentration limits. Such waste appears to primarily consist of in-core instrumentation which is no longer serviceable. An example of this waste is a reactor flux wire which is physically small but may be high in activity. (A flux wire is a wire that is inserted into a tube running the length of the reactor core and used to make neutron flux measurements.)

Large quantities of activated metal wastes are projected to be generated in the future as a part of reactor decommissioning. Studies by NRC (NUREG/CR-0130, addendum 3 and NUREG/CR-0672, addendum 2) indicate that over 99% of the waste volume that is projected to result from nucler power reactor decommissioning will not exceed class C concentration limits and the 1% that is projected to exceed these limits will be almost all activated metals from core structure. Conservative estimates presented in these studies indicate that packaged quantities of decommissioning wastes exceeding Class C concentration limits will total about 4700 ft^3 for a large (1175 MWe) pressurized water reactor (PWR) and about 1660 ft^3 for a large (1155 MWe) boiling water reactor (BWR). Much smaller quantities of wastes exceeding Class C concentration limits may also be generated from future decommissioning of test, research, and education reactors.

Another source of activated metal waste is expected to arise as part of consolidation of spent fuel assemblies for storage and/or disposal. Spent fuel assemblies now being periodically discharged from nuclear power reactors are stored in on-site fuel storage pools. Each assembly is composed of a large number of fuel rods arranged in a rectangular array, and held in place by spacer grids, tie rods, metal end fittings, and other miscellaneous hardware. One option under consideration, for long-term waste storage and eventual disposal is to remove this hardware form the fuel rods. This allows the fuel rods, which contain the fission products which are of primary interest in terms of geologic repository disposal, to be consolidated into a smaller volume. This enables more economical storage and easier handling for transport and disposal. The hardware, which is composed of various types of corrosion-resistant metal such as Inconel or zircalloy, becomes a second waste stream which could potentially be safely disposed by a less expensive method than a geologic repository.

Based on information from DOE (DOE/RW-0006, September, 1984) about 12 kg of waste hardware would be generated per BWR fuel assembly, and about 26 kg per PWR fuel assembly. Assuming 200 fuel assemblies are replaced per year per large 1000 NWe) BWR, roughly 2400 kg of activated metal hardware would be generated per year per large BWR, and about 1700 kg per PWR. An approximate compacted volume is on the order of 50 ft^3/yr per large reactor, or about 4,000 ft^3/yr over the entire industry. Depending upon parameters such as the fuel irradiation history and the hardware elemental composition, particular pieces of separated hardware may or may not exceed Class C concentration limits.

Other than perhaps a few isolated cases, all of the spent fuel assemblies are being stored by licensees with the hardware still attached. Under the provisions of the NWPA, operators of nuclear power plants have entered into contracts with DOE for acceptance by DOE of the spent fuel for storage and eventual disposal. (See 48 FR 16590, April 18, 1983 for the terms of the contract.) Acceptance of the spent fuel by DOE implies acceptance of the activated hardware along with the fuel rods, with the result that disposal of the hardware would intrinsically be a Federal rather than a State responsibility. Disposal responsibility becomes less clear if licensees, seeking more efficient onsite storage, consolidated fuel themselves.

Sealed sources. A number of discrete sealed sources have been fabricated for a variety of medical and industrial applications, including irradiation devices, moisture and density gauges, and well-logging gauges. Each source contains only one or a limted number of radioisotopes. Sealed sources can range in activity from a few millionths of a curie for sources used in home smoke detectors to several thousand curies for sources used in radiotherapy irradiators. Sealed sources are produced in several physical forms, including metal foils, metal spheres, and metal cylinders clamped onto cables. The larger activity sealed sources typically consist of granules of radioactive materials encapsulated in a metal such as stainless steel.

Sealed sources are generally quite small physically. Even sources containing several curies of activity have physical dimensions which are normally less than an inch or two in diameter and 6 inches in length. These dimensions are such that, like activated metals, sealed sources may be considered to be a unique form of low-level waste. Characterizing sealed sources in terms of radionuclide concentration certainly appears to be of less utility than characterizing sealed sources in terms of source activity.

Depending upon the application, sealed sources may be manufactured using a variety of different radioisotopes. A review of the NRC sealed source registry was conducted to identify those source designs which may contain radioisotopes in quantities that might exceed Class C concentration limits. The principal possibilities appear to be those containing cesium-137, plutonium-238, plutonium-239, and americium-241. Large cesium-137 sources are generally used in irradiators, and while some large sources can range up to a few thousand curies, most which are sold appear to contain in the neighborhood of 500 curies. Cesium-137 is a beta/gamma emitter having a half-life of 30 years, which suggests that special packaging and disposal techniques can be readily developed for safe near-surface disposal of sources containing this isotope.

The remaining three isotopes are alpha emitters and are longer lived. Sources manufactured using these isotopes can range up to a few tens of curies, although most that have been sold appear to be much less than one curie in strength. Plutonium-239 sources are not commonly manufactured. Plutonium-238 sources have been manufactured for use as nuclear batteries for applications such as heart pacemakers. Plutonium-238 has also been used in neutron sources, although neutron sources currently being manufactured generally contain americium-241. Americium-241 is also used in a wide

variety of other industrial applications such as fill level gauges.

Neutron sources produce neutrons for applications such as reactor startup, well logging, mineral exploration, and clinical calcium measurements. These sources contain alpha-emitting radionuclides such as americium-241 plus a target material (generally beryllium) which generates neutrons when bombarded by alpha particles. Neutron sources can contain up to approximately 20 curies of activity.

It is difficult to project potential waste sealed source quantities and activities, since sealed sources as wastes are not routinely generated as part of licensed operations. In addition, sealed sources only become waste when a decision is made by a licensee to treat them as such. In many instances sources held by licensees may be recycled back to the manufacturer when they are no longer usable, and the radioactive material recovered and fabricated into new sources. Finally, source manufacturers are licensed by the NRC and NRC Agreement States to manufacture a particular source design up to a specified radioisotope curie limit. Most actual sources, however, contain activities considerably less than the design limit.

NRC staff estimates that licensees currently possess approximately 10,000 encapsulated sources having activities above a few thousandths of a curie and containing americium-241 or plutonium-238. Given the hypothetical case that all these sources were candidates for disposal, the total consolidated source volume would be only about 35 ft^3. After packaging for shipment, however, the total disposed waste volume would be significantly increased. The total activity contained in the sources is estimated to be approximately 70,000 curies.

Radioisotope product manufacturing wastes. Wastes exceeding Class C concentration limits are occasionally generated as part of manufacture of sealed sources, radiopharmaceutical products, and other materials used for industrial, educational, and medical applications. Volumes and characteristics of such wastes are difficult to project. However, it is believed that the largest volume of this waste consists of sealed sources which cannot be recycled, plutonium-238 and americium-241 source manufacturing scrap, and waste contaminated with carbon-14.

Sealed sources as a waste form are discussed above. Manufacture of large plutonium-238 and americium-241 sources is concentrated in only a few facilities, from which the generation of waste exceeding Class C concentration limits is believed to total only a few hundred ft^3 per year. Approximately 10 ft^3 per year of carbon-14 waste is generated as a result of radiopharmaceutical manufacturing.

Other wastes. Although the above discussed wastes are believed to be the principal wastes that are expected to exceed Class C concentration limits, other wastes may occasionally also be generated. For example, relatively small quantities of such wastes are currently being generated as part of decontamination of the Three Mile Island, Unit 2, nuclear power plant. However, these wastes are being generated as a result of an accident, are therefore considered abnormal, and are being transferred to DOE under a memorandum of understanding with NRC. Wastes exceeding Class C concentration limits and generated as part of the West Valley Demonstration Project are also being transferred to DOE for storage pending disposal.

Sealed sources and other waste containing discrete quantities of radium-226 may also exceed Class C concentration limits. Products containing radium-226 have been manufactured in the past for a variety of industrial and medical applications. Such wastes are not regulated by NRC but occasionally have been disposed at licensed low-level waste disposal facilities. NRC is currently investigating the impacts of disposal of such waste in order to provide guidance to States and other interested parties on safe disposal methods and any concentration limitations.

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BILLING CODE 7590-01-M

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 86-CE-10-AD]

Airworthiness Directives; Cessna Model T303 Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: This Notice proposes to amend Airworthiness Directive (AD) 86-01-01R1, Amendment 39-5316, published in the Federal Register on May 21, 1986 (51 FR 18573), applicable to Cessna Model T303 airplanes. The AD removed approval for flight into known icing conditions for those Model T303 airplanes with flight is known icing approval. The manufacturer has developed a modification for the airplane which eliminates the unsafe condition when operating in icing conditions. This proposed amendment restores approval for flight in known icing conditions for those airplanes which install the modification.

DATE: Comments must be received on or before April 15, 1987.

ADDRESS: Cessna Service Bulletins MEB86-17, dated October 1, 1986, and MEB86-16, dated October 1, 1986, applicable to this AD may be obtained from Cessna Aircraft Company, Customer Services, P.O. Box 1521, Wichita, Kansas 67201; or may be examined in the Rules Docket at the address below. Send comments on the proposal in duplicate to Federal Aviation Administration, Central Region, Office of the Regional Counsel, Attention: Rules Docket No. 86-CE-10-AD, Room 1558, 601 East 12th Street, Kansas City, Missouri 64106. Comments may be inspected at this location between 8 a.m. and 4 p.m., Monday through Friday, holidays excepted.

FOR FURTHER INFORMATION CONTACT: Mr. Bennett L. Sorensen, Aerospace Engineer, Wichita Aircraft Certification Office, ACE-160W, FAA Central Region, 1801 Airport Road, Room 100, Mid-Continent Airport, Wichita, Kansas; Telephone (316) 946-4433.

SUPPLEMENTARY INFORMATION:

Comments Invited

Interested persons are invited to participate in the making of the proposed rule by submitting such written data, views or arguments as they may desire. Communications should identify the regulatory docket or notice number and be submitted in duplicate to the address specified above. All communications received on or before the closing date for comments specified above will be considered by the Director before taking action on the proposed rule. The proposals contained in this notice may be changed in the light of comments received. Comments are specifically invited on the overall regulatory, economic, environmental and energy aspects of the proposed rule. All comments submitted will be available both before and after the closing date for comments in the Rules Docket for examination by interested persons. A report summarizing each FAA public contact concerned with the substance of this proposal will be filed in the Rules Docket.

Availability of NPRMs

Any person may obtain a copy of this Notice of Proposed Rulemaking (NPRM) by submitting a request to the Federal Aviation Administration, Central Region, Office of the Regional Counsel, Attention: Airworthiness Rules Docket No. 86-CE-10-AD, Room 1558, 601 East 12th Street, Kansas City, Missouri 64106.

Discussion

AD 86-01-01R1, Amendment 39-5316, was published in the Federal Register (51 FR 18573) on May 21, 1986. The AD removed approval for flight into known icing conditions for Cessna Model T303 airplanes. The AD was written because there were several reported occurrences of rudder/rudder pedal oscillations, pitch oscillations and uncommanded nose down pitch changes when conducting flight in icing conditions. AD 86-01-01 and AD 86-01-01R1 were sent

ENCLOSURE C

DRAFT CONGRESSIONAL LETTER

Dear Mr. Chairman:

Enclosed for your information is a copy of a notice of proposed rulemaking to be published in the Federal Register.

The enactment of the Nuclear Waste Policy Act of 1982, Pub. L. 97-425, led the Commission to reexamine some of the provisions of 10 CFR 60 in order to conform with the new law. As a result of this review, the Commission had planned to revise the definition of high-level radioactive wastes in Part 60. An advance notice of proposed rulemaking was published on February 27, 1987 (52 FR 5992). After consideration of the public comments on that notice, the Commission has decided not to make any revision. Instead, the Commission is proposing to amend Part 61 to require geologic repository disposal for all low-level waste not routinely acceptable for shallow land burial, unless alternative proposals are approved by the Commission.

Sincerely,

Eric S. Beckjord, Director
Office of Nuclear Regulatory Research

Enclosure: As stated

ENCLOSURE D

DRAFT

NRC PROPOSES CHANGES TO REGULATIONS ON DISPOSAL OF RADIOACTIVE WASTE

The Nuclear Regulatory Commission is considering amending its regulations to require that additional types of radioactive waste be disposed of in a high-level waste repository.

The proposed amendments state that wastes "greater than Class C," as defined in the Commission's current regulations, must be disposed of in a deep, excavated repository to be built by the Department of Energy, unless disposal elsewhere has been approved by the Commission.

Generally speaking, greater-than-Class-C waste is radioactive waste that is less toxic than high-level waste, but more toxic than ordinary low-level waste.

More specifically, radioactive waste is greater than Class C if it contains more than 8 curies per cubic meter of Carbon-14; 80 curies per cubic meter of Carbon-14 in activated metal; 220 curies per cubic meter of Nickel-59 in activated metal; 0.2 curies per cubic meter of Niobium-94 in activated metal; 3 curies per cubic meter of Technetium-99; 0.08 curies per cubic meter of Iodine-129; 100 nanocuries per gram of alpha-emitting transuranics with a high-life greater than five years; 3,500 nanocuries per gram of Plutonium-241; or 20,000 nanocuries per gram of Curium-242.

Waste is also greater than Class C if it contains more than 700 curies per cubic meter of Nickel-63; 7000 curies per cubic meter of Nickel-63 in activated metal; 7000 curies per cubic meter of Strontium-90; or 4600curies per cubic meter of Cesium-137.

If waste contains a mixture of these radioactive materials, the determination as to whether it is greater than Class C is made by use of a formula, as described in Part 61 of the Commission's regulations.

Most of the greater-than-Class-C wastes are expected to come from the decommissioning of nuclear power plants. Examples are certain instruments, sludges and reactor internals such as control rods.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 gave the federal government responsibility for disposal of greater-than-Class-C radioactive waste. Wastes that are Class C or lower may be disposed of in commercially operated low-level waste facilities.

If DOE decides in the future to build an intermediate disposal facility for greater-than-Class-C wastes, the Commission would evaluate its acceptability at that time. However, the very small volume (about 2,000 cubic meters through the year 2020) of commercially generated, greater-than-Class-C wastes may make an intermediate disposal facility unattractive. Requiring that these wastes be disposed of in a high-level waste repository ensures that they will have a safe disposal "home," while leaving open the prospect that an intermediate disposal facility may prove attractive at some time in the future.

DRAFT

In an advance notice of proposed rulemaking published in the Federal Register on February 27, 1987, the Commission announced its intent; to revise its definition of high-level waste to include greater-than-Class-C waste. The proposed modifications to the regulations announced today would be in lieu of that redefinition.

Interested persons are invited to submit written comments on the proposed amendments, which are to Part 61 of the Commission's regulations, by _____ (_____ days after publication in the Federal Register on _____). The comments should be addressed to the Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

ENCLOSURE E

REGULATORY ANALYSIS
PROPOSED PART 61 AMENDMENTS
IN LIEU OF REVISION OF THE HLW DEFINITION

I. STATEMENT OF THE PROBLEM

10 CFR Part 60 is the basis for NRC regulation of high level radioactive waste (HLW) in geologic repositories. Part 60 contains a definition of what constitutes high level waste for the purposes of the rule. The Nuclear Waste Policy Act of 1982 (NWPA) also contains a definition of high level waste, one that differs from the Part 60 definition. The NWPA definition is as follows;

a. The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

b. Other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.

The issue at hand is whether or not to revise the definition in Part 60 to conform with that in the NWPA, and if not, what other action should be taken. Adoption of the NWPA definition would involve Commission action to decide if and how "sufficient concentrations" in clause a. of the NWPA definition should be interpreted; and in regard to clause b., how to determine what "other highly radioactive material" requires "permanent isolation."

The waste classification system presently defines HLW by source; HLW includes spent nuclear fuel and waste generated from reprocessing spent fuel. Low level radioactive waste (LLW) is defined as any waste not considered HLW. There is no upper limit to what constitutes LLW. The Commission's regulations for disposal of waste in 10 CFR 61 classify some LLW as either Class A, Class

B, or Class C. However, some LLW has radionuclide concentrations which are greater than the upper limits of Class C LLW. These wastes are referred to as "above Class C waste." Above Class C wastes currently consist of a variety of waste streams generated by industrial, medical, and utility operations. The majority of future above Class C waste is expected to come from the decommissioning of nuclear power plants. By volume, the amount of above Class C LLW is not now, and is not expected to be, more than a few percent of total LLW. By activity however, it is significant.

On February 27, 1987 the Commission published an advance notice of proposed rulemaking on the definition of HLW (52 FR 5992). The advance notice (ANPR) outlined a tentative approach to defining HLW, and requested public comment on this approach and the general issues involved in revising the definition of HLW. NRC received 94 public comment letters from a wide range of commentors; States and Indian Tribes, other Federal agencies, utility groups, environmental and public interest groups, and others. The comments were such that the NRC staff has modified the approach outlined in the ANPR.

Public comments on the 8 specific questions posed in the ANPR, and on other issues, were very extensive, involving complex technical and legal issues. Many commentors expressed concern that a revision would allow some wastes which are now classified as HLW to be classified as LLW under a revised definition. Another issue receiving heavy comment was the proposed criterion for classifying material as HLW under Clause (b) of the NWPA. The Commission proposed to define waste as high level if it was both highly radioactive and required permanent isolation. Specific concentration limits for radionuclides were proposed to define highly radioactive material, and a set of risk based analyses was proposed to determine which highly radioactive waste required permanent isolation.

Commentors offered a wide range of alternative criteria for defining HLW, some of which were more conservative than that proposed in the ANPR, and some less conservative. Many comments argued that waste which was <u>either</u> highly radioactive or long lived should be HLW. On the other hand, some comments supported the view that the proposed concentration limits were too

conservative, and would result in material not really needing permanent isolation going to the geologic repository.

II. OBJECTIVE

This rulemaking would clarify the system of radioactive waste management. It would ensure that disposal options for radioactive waste are consistent with public health and safety.

Revision of the definition of HLW or of Part 61 would not affect the responsibilities of States for managing radioactive waste. The Low Level Radioactive Waste Policy Amendments Act of 1985 established the responsibilities of States and the Federal government for waste management. States are only responsible for commercially generated Class A, B, and C low level waste, as defined in Part 61. With the exception of NARM, the Federal government is responsible for all other wastes, whether they are classified as high level waste or low level waste. Revision of the definition of HLW would also not alter the authority, previously established by the Energy Reorganization Act of 1974, for NRC licensing of DOE waste facilities. As NRC is not presently authorized to regulate naturally occurring or accelerator produced materials (NARM), there would be no effect on these wastes.

III. ALTERNATIVES

(1) MAKE NO CHANGE IN THE DEFINITION OF HLW BUT REQUIRE DISPOSAL OF ALL ABOVE CLASS C WASTE IN A GEOLOGIC REPOSITORY OR APPROVED ALTERNATIVE

This alternative would continue the status quo, so that Part 60 kept the original definition of HLW. This definition would differ from the definition of HLW in the Nuclear Waste Policy Act (NWPA). There would be no Commission guidance given as to Clause B of the NWPA definition, which empowers the Commission to add to reprocessing waste and spent fuel such other highly radioactive waste which requires permanent isolation. Rather, all above Class C waste would remain classified as LLW.

The Federal government would have responsibility for management and disposal of all HLW in the Part 60 definition plus all above Class C waste. It would have to develop special facilities to dispose of this above Class C LLW, or decide to place it in the geologic repository along with HLW. DOE has stated in its recent report to Congress on management of above Class C LLW that it needs an NRC decision on how much of this above Class C waste, if any, will be classified as HLW. DOE maintains that its plans for management of radioactive wastes cannot proceed apace without an NRC decision on this point.

Given the current institutional setup of the waste management system, establishing a precise numerical definition of HLW now would not solve any pressing problem. Given the complexities of developing a concentration-based classification system, this would be a major commitment of resources. It does not seem worthwhile to carry out this task, the outcome of which would affect only a relatively small volume of waste. However, in the absence of any revision, the Commission could require that all above Class C waste be sent to a geologic repository, unless alternative proposals are approved by the Commission. Requiring repository disposal would allow the DOE program for disposal of above Class C waste to proceed. Additional legislation may be needed to provide a funding mechanism for covering the costs of disposal of these wastes.

The argument can be made that this alternative would result in some waste not needing permanent isolation to be disposed of in a repository. This may be true, but would not necessarily result in an additional cost burden. The total volume of above Class C LLW is expected to be approximately 2,000 cubic meters from now through the year 2020, an amount of waste which is very small relative to the total volume of LLW generated. The choice to be made among disposal options is between emplacing above Class C material in a geologic repository, or developing a new facility to dispose of these wastes. The latter could be very costly. For the present and immediate future, it seems most effective from the viewpoint of public policy to utilize geologic repository disposal.

This alternative is the recommended one.

(2) PROCEED WITH DEFINING HLW USING THE APPROACH OUTLINED IN THE ANPR

This alternative would involve completion of NRC staff activities to establish a waste classification system like that advanced in the ANPR. NRC staff would continue to carry out technical studies to determine concentration limits for radionuclides in other non-reprocessing highly radioactive wastes that require permanent isolation. Highly radioactive would be defined by the Commission's Part 61 upper limits for Class C LLW. The technical studies to determine which of these wastes needs permanent isolation would assume reference with a hypothetical "intermediate" waste facility, and consist of performance modeling of this facility combined with a variety of waste streams. Waste types which were determined to exceed postulated release limits through performance assessment modeling would be classified as HLW. Disposal of these wastes would be in a geologic repository or equivalent in terms of permanently isolating the waste from the environment.

Waste types which, through the same type of modeling, were determined not to exceed the postulated release limits would be classified as LLW. However, as the Federal government is responsible for management of above Class C LLW, DOE would have to dispose of this above Class C LLW in an appropriate facility.

For reprocessing waste, the ANPR offered two options; (1) Treat Clause A of the NWPA definition as if it referred to all reprocessing wastes which have historically been considered HLW (a so-called "source based" definition), or (2) interpret the language of Clause A to call for Commission determination of what concentrations reprocessing waste must have to be determined to be HLW.

The advantage of this alternative is that, when option (2) for Clause A is chosen, waste classification across the board would be based on risk. This type of definition reflects the preferred methodology of waste classification when viewed from a theoretical approach.

A major disadvantage, when this alternative is considered in the context of the waste management system, is the lack of any currently available disposal facility for disposal of above Class C LLW. This raises a number of concerns. Performance assessment modeling referred to above would have to be based upon some arbitrary theoretical "intermediate" facility, which may never be built. Any facility that is developed may have completely different characteristics,

invalidating the results of the modeling. The waste classification question would thus be reopened.

Another disadvantage would be the complexity of the task and the necessary commitment of NRC resouces.

(3) DEFINE HLW AS ALL REPROCESSING WASTE, AND ALL NON-REPROCESSING WASTE ABOVE CLASS C, BUT RETAINING FLEXIBILITY FOR FUTURE RECLASSIFICATION

Alternative (3) is to consider all non-reprocessing waste with concentrations greater than Class C LLW as HLW. All reprocessing waste now classified as HLW would remain HLW. However, this alternative would retain the flexibility to reclassify some of this waste in the face of future developments.

For reprocessing waste, keep all waste presently considered HLW in the HLW category. Incidental wastes from reprocessing, now considered non-HLW, would remain in that category. For non-reprocessing waste, waste presently classified as above Class C LLW would be HLW. The Commission's regulations would allow for case-by-case reclassification of some waste. Those seeking reclassification to dispose of wastes using technologies which are newly developed would have to justify their requests with technical studies which clearly demonstrate that the isolation capability of the chosen technology is adequate.

The major drawback to this alternative is that labeling above Class C waste as HLW would make it subject to a number of regulations really meant for much more hazardous waste.

IV. IMPACTS OF THE RECOMMENDED ALTERNATIVE

The recommended approach would have essentially no major impacts on the management of reprocessing wastes as it retains the status quo. Some positive impacts on the public and DOE could accrue from promulgating the rulemaking, as it should reduce uncertainty as to classification of reprocessing wastes.

For non-reprocessing wastes there would be no impact on State responsibilities. For DOE, some additional amount of above Class C LLW would go to a repository for disposal(assuming no alternative proposal is approved by the Commission). The cost of this, relative to alternatives should not be significant.

ENCLOSURE F

COMPARATIVE TEXT

1. Section 61.2 is revised to read as follows:

§ 61.2 Definitions.

As used in this part:

* * * * *

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to [~~section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244)~~] law, any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

* * * * *

2. Section 61.55 is revised to read as follows:

§ 61.55 Waste classification.

(a) Classification of waste for near surface disposal.

* * * * *

(2) Classes of waste. * * *

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposals for disposal of [~~this~~] such waste in a disposal site licensed pursuant to this part [~~may be~~] are submitted to the Commission for approval [~~pursuant to § 61.58 of this part~~].

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

ARC
JPK

MAR 30 1989

Dr. Dade W. Moeller, Chairman
Advisory Committee on Nuclear Waste
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Moeller:

Your February 24, 1989 letter to Chairman Zech on final rulemaking relative to disposal of Greater Than Class C Wastes (GTCC), 10 CFR 61, requested the staff to address two points: (1) Explicitly state that DOE can exercise a range of options in selecting methods for disposing of GTCC wastes in NRC-licensed facilities, and (2) Specify the performance requirements for the waste package in order to assist DOE in selecting an appropriate option.

Regarding the first point, Enclosure A contains highlighted text showing where DOE flexibility is explicitly stated in the draft Federal Register notice.

Enclosure B contains text which will be included in the draft Federal Register notice to accommodate the second point.

The staff believes this is responsive to the ACNW comments. Please let me know if I can provide the ACNW with any additional information.

Sincerely,

Victor Stello, Jr.
Executive Director
for Operations

Enclosures:
As stated

cc: Chairman Zech
Commissioner Roberts
Commissioner Carr
Commissioner Rogers
Commissioner Curtiss
SECY

RECEIVED
1989 MAR 30 PM 2:31

ENCLOSURE A

- page 2 of Federal Register notice)

Background

On May 18, 1988, the Nuclear Regulatory Commission published proposed amendments to Part 61 to require geologic repository disposal of greater-than-Class-C (GTCC) low level radioactive waste (LLW) unless an alternative means of disposal was approved by the Commission (53 FR 17709). The [proposal to require geologic repository disposal, or an approved alternative,] was aimed at insuring that GTCC waste would be disposed of in a manner consistent with the protection of public health and safety. This action was taken in lieu of a revision of the definition of high level radioactive waste (HLW). In proposing the amendments the Commission outlined its rationale for not proceeding with a revision of the definition of HLW along the lines proposed in the advance notice of proposed rulemaking (ANPRM) published on February 27, 1987 (51 FR 5992).

It is the Commission's view that intermediate disposal facilities may never be available, in which case a repository would be the only type of facility generally capable of providing safe disposal for GTCC wastes. [At the same time, the Commission wishes to avoid foreclosing possible use of intermediate disposal facilities by the Department of Energy (DOE).] If DOE chooses to develop one or more intermediate disposal facilities, the Commission anticipates that the acceptability of such facilities would be evaluated in the light of the particular circumstances, considering for example the existing performance objectives of 10 CFR Part 61 and any generally applicable environmental radiation protection standards that might have been established by the U. S. Environmental Protection Agency. Technical criteria to implement the performance objectives and environmental standards would be developed by the Commission after DOE had selected a specific disposal technology and decided to pursue development of an intermediate facility.

- page 6) of Federal Register notice

(c) Effects on Repository Program

There were a number of comments, including those of DOE, that expressed concern over the possible impacts on the geologic repository program of emplacement of GTCC waste along with HLW in the repository. Specific concerns were over the potential for additional costs, GTCC waste taking up valuable repository space, and the burden for DOE of having to include GTCC waste in its performance assessment of the repository.

The Commission believes that these impacts would be negligible. [First, the proposed amendments allow for a range of GTCC disposal methods to be used by DOE.] Under present regulations on land disposal of LLW (10 CFR Part 61), GTCC waste is specifically identified as "not generally acceptable" for near-surface disposal. Disposal methods for GTCC waste must generally be "more stringent" than near-surface disposal. The proposed amendments to Part 61 specified that one "more stringent" method would be geologic repository disposal. [Other methods are not specified but are also left open to DOE, subject to Commission approval.] The proposed amendments were not what prevented DOE from routinely using near-surface disposal; that is already prohibited by 10 CFR Part 61. Thus, relevant cost impacts of the amendments do not involve a comparison between costs of geologic repository disposal vs. costs of near-surface disposal. Cost comparisons involve geologic repository disposal vs. other

- page 8 of Federal Register notice

considerations are involved. However, if DOE found that it did pose such an obstacle,
[these amendments would permit DOE to choose an acceptable alternative disposal method.]

- page 12 of Federal Register notice

Final Rule

Following its review and analysis of the public comments, the Commission believes that the course of action it had proposed [--requiring geologic repository disposal of GTCC waste, or approved alternative]-- should be adopted. Therefore, these final amendments to Part 61 deviate little from those proposed. By them, the Commission is providing DOE with the regulatory framework DOE needs to proceed with plans for management of GTCC waste. The

[rule identifies one approved method of disposal for GTCC waste, but allows DOE to plan and develop an alternative method if DOE so desires,] subject to Commission approval. It is now up to DOE to evaluate its options for GTCC waste disposal, and to proceed with GTCC disposal.

- proposed §61.55

§ 61.55 Waste classification.

(a) * * *
(2) * * *
(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are approved by the Commission.

* * * * * *

ENCLOSURE B

(to be inserted in draft Federal Register Notice)

For all wastes disposed of in a repository, Part 60 now requires:

(1) waste disposal operations shall be conducted in compliance with the radiation protection requirements of Part 20 of the NRC's regulations (section 60.111(a).

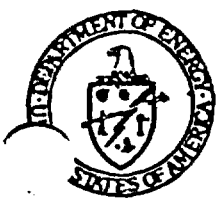
(2) the option of waste retrieval shall be maintained for a period up to 50 years after the start of waste emplacement operations (section 60.111(b), and

(3) "... any release of radionuclides from the engineered barrier system shall be a gradual process which results in small fractional releases to the geologic setting over long times ... The release rate of any radionuclide from the engineered barrier system following the containment period shall not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure ... (section 60.113).

Also implicit in Part 60 is a requirement that any GTCC wastes disposed of in a repository not prevent HLW or spent fuel from meeting the specific performance objectives for those types of wastes.

These general objectives can be achieved in various ways for different wastes. For example, containment within a durable waste canister might be appropriate for short-lived wastes (half-lives about 30 years or less), while processing of wastes to reduce leachability of use of retardant backfill materials might be more appropriate for longer-lived wastes. The NRC is initiating an effort, as contemplated by section 60.135(d) of Part 60, to specify in more detail the waste form and packaging criteria appropriate for specific types of GTCC wastes. The Commission anticipates that DOE will develop specific waste form and packaging alternatives for consideration by the NRC in that rulemaking, and the Commission would welcome similar suggestions from other interested parties.

HLW/GTCC
LRC



Department of Energy
Washington, DC 20585

MAR 7 1989

Mr. Robert M. Bernero, Director
Office of Nuclear Materials Safety
and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Bernero:

On August 30, 1988, the Department of Energy (DOE) submitted its comments on the proposed amendment to 10 CFR Part 61, published on May 18, 1988, concerning the definition of high-level waste (HLW) and disposal of greater-than-Class-C waste (GTCC). Based on the recent Nuclear Regulatory Commission (NRC) staff presentation before the Advisory Committee on Nuclear Waste, the Office of Civilian Radioactive Waste Management (OCRWM) is concerned that few, if any, of the DOE recommendations and comments were adopted by the NRC staff in preparation of the final rule. We need to understand the reasoning behind the final rule as it could impact many areas of the OCRWM geologic repository program, as well as affect other DOE programs.

In our comments transmitted on August 30, 1988, an opportunity was requested to discuss the applicability of the existing repository technical criteria for spent nuclear fuel and HLW to the disposal of GTCC wastes in a repository. Such a discussion would allow DOE to gain an understanding of the considerations which guided development of the final rule and assure us that the NRC fully understands the potential cost, schedule and technical implications of its proposed action.

The topics identified below are of particular concern to OCRWM with regard to the impact on repository development.

1. If the NRC intends to suggest in the final rule that GTCC wastes be disposed of in the repository, DOE needs to understand why NRC believes it is necessary to include this in the final rule. The alternative is to specify requirements for disposal of GTCC, irrespective of destination, to allow later determinations as to the most effective method for meeting those requirements.

2. NRC appears to have abandoned its efforts to define HLW based on its radiological characteristics. DOE has stated a preference for this risk-based approach and needs to understand the NRC's position.

3. The introduction of GTCC waste in the waste management system portends potential changes to technical criteria, performance objectives and environmental standards for the geologic repository (e.g., waste package criteria, repository surface and subsurface design criteria, basis for testing, and risk assessment basis), as well as disposal costs.

4. The NRC staff has based estimates of GTCC volume on a February 1987 DOE report (DOE/NE-0077). This report states ". . . the Department identified several factors that make it impossible to recommend specific federal or nonfederal disposal options at this time"; including, "Inadequate information on the volumes, sources, and characteristics of GTCC low-level wastes. . . ." DOE still believes that the uncertainty in the estimates of GTCC waste volume precludes selection of a disposal option.

I would appreciate the opportunity to discuss these topics with you at your earliest convenience. These concerns are not as straightforward as they may appear and deserve more detailed discussion and consideration with respect to their impact on the geologic repository program under the Nuclear Waste Policy Act, as amended.

Please contact me at 586-6842, or Ralph Stein of my staff at 586-6046, at your earliest convenience to arrange a mutually agreeable time for us to meet on this topic.

Sincerely,

Samuel Rousso, Acting Director
Office of Civilian Radioactive
Waste Management

cc:
B. J. Youngblood, NRC
J. Linehan, NRC
R. Loux, State of Nevada
D. Bechtel, Clark County, Nevada
M. Baughman, Lincoln County, Nevada
S. Bradhurst, Nye County, Nevada

REGULATORY ANALYSIS

ıtus of ECCS Rule Revision

On March 3, 1987, the NRC published proposed amendments to 10 CFR 50.46 and Appendix K that would permit applicants and licensees to use realistic calculations of emergency core cooling system response to loss of coolant accidents when determining the acceptance criteria in 10 CFR 50.46 (b) (e.g., calculated peak cladding temperature less than 2200°F) are not exceeded. The rule requires licensees who avail themselves of the new provisions to perform an uncertainty analysis and to use this estimate to provide assurance with a high level of probability that the plant is operating in such a manner that the acceptance criteria will be met. Thirty-three comment letters were received and the comments were generally favorable to the approach taken. The commenters favored grandfathering existing Appendix K modelling. The commenters were opposed: to including an explicit degree of conservatism to be applied to the evaluation model; to explicit prohibition of power uprating until all severe accident and unresolved safety issues are resolved; and to having the technical basis of the rule reviewed by an independent group such as the American Physical Society. The staff has considered and resolved all of the public comments and has prepared a Commission Paper package recommending the issuance of the rule with no substantive changes from the proposed rule.

This proposed rule as well as all of the supporting documentation is expected to be circulated to the other offices for final concurrence within the next few weeks.

Definition of High-Level Radioactive Waste (HLW) in 10 CFR Part 60/Part 61 Amendments

The Commission instructed the staff to analyze the need to revise the definition of high-level radioactive waste in Part 60 to conform with the definition in the Nuclear Waste Policy Act (NWPA). An ANPR was published on February 27, 1987 (52 FR 5992), which recommended a revision based either wholly or partially on concentrations of radionuclides in the waste. After assessing the public comments on the ANPR, and also taking into account recent information, the staff is now recommending against any revision of the definition of HLW. Instead, amendments to Part 61 are being recommended that would require geologic repository disposal of all above Class C low-level radioactive waste (LLW) unless an alternative has been approved by the Commission. This would accomplish the objective of establishing suitable disposal requirements for radioactive waste.

The proposed rulemaking package was forwarded to the EDO on February 5, 1988, and to the Commission on February 19, 1988 (SECY-88-51). The staff met with Commissioners' assistants on March 29, 1988. The detailed analysis of public comments was completed and delivered to the EDO on March 30, 1988. It will be placed in the Public Document Room after Commission action on SECY-88-51.

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

May 13, 1988

The Honorable John B. Breaux, Chairman
Subcommittee on Nuclear Regulation
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Enclosed for your information is a copy of a notice of proposed rulemaking to be published in the Federal Register.

The enactment of the Nuclear Waste Policy Act of 1982, Pub. L. 97-425, led the Commission to reexamine some of the provisions of 10 CFR 60 in order to conform with the new law. As a result of this review, the Commission had planned to revise the definition of high-level radioactive wastes in Part 60. An advance notice of proposed rulemaking was published on February 27, 1987 (52 FR 5992). After consideration of the public comments on that notice, the Commission has decided not to make any revision. Instead, the Commission is proposing to amend Part 61 to require geologic repository disposal for all low-level waste not routinely acceptable for shallow land burial, unless alternative proposals are approved by the Commission.

Sincerely,

Eric S. Beckjord, Director
Office of Nuclear Regulatory Research

Enclosure: As stated

cc: Senator Alan K. Simpson

(7590-01)

NUCLEAR REGULATORY COMMISSION

10 CFR Part 61

Disposal of Radioactive Wastes

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The NRC is publishing proposed amendments which require disposal of "greater-than-Class-C" low-level radioactive wastes in a deep geologic repository unless disposal elsewhere has been approved by the Commission. The proposed amendments obviate the need for altering existing classifications of radioactive wastes as high-level or low-level.

DATE: Comment period expires[7/18/88]. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESS: Mail written comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Docketing and Service Branch. Deliver comments to: 1 White Flint North, 11555 Rockville Pike, Rockville Md. between 7:30 AM and 4:15 PM Federal workdays, or to the NRC Public Document Room at the address and times below. Copies of the regulatory analysis and comments received may be examined at the NRC Public Document Room, 1717 H Street NW, Washington, D. C., between 7:30 a.m. and 4:15 p.m.

FOR FURTHER INFORMATION CONTACT: W. Clark Prichard, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, telephone (301) 492-3884.

SUPPLEMENTARY INFORMATION:

Background

On February 27, 1987, the Nuclear Regulatory Commission published an Advance Notice of Proposed Rulemaking (ANPRM) (51 FR 5992) announcing its intent to revise the definition of the term "high-level radioactive waste" (HLW) that appears in 10 CFR Part 60. In the ANPRM, the Commission reviewed the previous statutory and regulatory uses of the term "high-level radioactive waste," the NRC's current regulations related to waste classification and disposal, and the pertinent provisions of the Nuclear Waste Policy Act of 1982, Pub.L. 97-425, 42 U.S.C. 10101 et seq. (NWPA). As indicated in the ANPRM, the NWPA includes a specific definition of "high-level radioactive waste" and the Commission was considering a change to its own rules to conform to that definition.

In the ANPRM, the Commission proposed to define HLW in a manner that in general would apply the term "high-level radioactive waste" to materials in amounts and concentrations exceeding numerical values that would be stated explicitly in the form of a table. Thus, HLW would be characterized by the kind of hazard that could only be guarded against by disposal in a geologic repository or equivalent facility. Those wastes that could be disposed of safely in an "intermediate" disposal facility would continue to be classified as low-level radioactive waste rather than as HLW.

COMMENTS

The Commission solicited comments on several specific issues and received letters from nearly 100 public agencies, private organizations, and individuals. Virtually all comments on the ANPRM agreed with the Commission on one point: use of the term "high-level radioactive waste," at least under Clause (B) of the NWPA definition, serves to identify those wastes which require the degree of isolation afforded by a deep geologic repository. However, comments differed widely regarding the specific wastes perceived to require that degree of isolation. Some comments advocated classification of all radioactive wastes, other than the most innocuous, as HLW while other comments would prefer to reclassify as low-level large quantities of defense reprocessing wastes long regarded as HLW. Conspicuously absent from the

comments was any consensus regarding the means to be used by the Commission to distinguish HLW from non-HLW. For example, even the basic concept of a numerical definition of HLW, as suggested in the ANPRM, was criticized as an invitation to dilute or fractionate wastes solely to alter their classification. In light of the comments received, the Commission's own review of available technical information related to waste classification and "intermediate" disposal facilities, and review of relevant statutory purposes, the Commission has determined that it would be best to proceed quite differently from its original suggestion put forth in the ANPRM.

REPROCESSING WASTES

The NWPA first labels as HLW, under Clause (A), the "highly radioactive material" resulting from the reprocessing of spent fuel, including not only the liquid wastes but also any solid material derived from such liquid waste that contains fission products "in sufficient concentrations." Clause (A) wastes have little significance for purposes of NWPA, since the Federal Government was already responsible for the disposal of all reprocessing wastes at the time the statute was passed. (The only commercially-generated reprocessing wastes were made a Federal Government responsibility in 1980 pursuant to the West Valley Demonstration Project Act. Pub.L. 96-368, 42 U.S.C. 2021a note.) In light of this fact, the Commission believes that the preferable construction of the statute is to conform to the traditional definition. Under this approach, materials that are HLW for purposes of the licensing-jurisdiction provisions of the Energy Reorganization Act of 1974 (ERA) will also be regarded as HLW under NWPA. This would include the primary reprocessing waste streams at DOE facilities, though not the incidental wastes produced in reprocessing.

OTHER WASTES

In the ANPRM the Commission proposed to classify wastes as HLW or non-HLW by examining the disposal capability of hypothetical, "intermediate" disposal

facilities less secure than a deep geologic repository. Wastes which could not be safely disposed of in such facilities would be classified as HLW.

Following publication of the ANPRM, a technical report (Kocher, D. C. and A. G. Croff, A Proposed Classification System for High-Level and Other Radioactive Wastes, ORNL/TM-10289, Oak Ridge National Laboratory, 1987) was published which attempted to provide a technical basis for classification of wastes as HLW or non-HLW. This report described a number of conceptual "intermediate" disposal facilities which would use either engineered barriers or deeper burial to provide a degree of waste isolation intermediate between that of shallow land burial and a deep geologic repository. The authors attempted an analysis of the waste isolation capability of such facilities but, emphasizing the site-specific nature of such analyses and the very large uncertainties involved, concluded that "[a]t the present time . . . [such facilities are] not sufficiently developed to provide a basis for defining waste classes, and disposal of any wastes using [such facilities] must be considered on a case-by-case basis." Kocher and Croff then presented an alternative approach for defining HLW which, in essence, is based solely on the short-term storage and handling risks associated with the heat and external radiation levels generated by a waste. The Commission could not accept this alternative approach since it bears no correlation to the degree of waste isolation required following disposal.

The Commission's review of Kocher and Croff's study leads it to the same conclusion regarding the impracticability of waste classification based on analyses of the performance of intermediate disposal facilities. If waste classification is to be at all realistic, additional disposal facility development must be completed which will provide a supportable basis for such classification. Such disposal facility development is more properly the responsibility of DOE rather than NRC. However, the very small volume (about 2,000 m^3 through the year 2020) of commercially-generated, greater-than-Class-C (GTCC) wastes may make an intermediate disposal facility economically unattractive. Because no such facility now exists for disposal of commercially-generated wastes, and because there is no assurance that one will ever be constructed, the Commission believes that an alternative, technically conservative approach should be taken.

The Commission proposes to require disposal of all GTCC wastes in a deep geologic repository unless disposal elsewhere has been explicitly approved by the Commission. This proposal reflects the Commission's view that intermediate disposal facilities may never be available, in which case a repository would be the only type of facility generally capable of providing safe disposal for GTCC wastes. At the same time, the Commission wishes to avoid foreclosing possible use of intermediate disposal facilities by the Department of Energy (DOE). If DOE chooses to develop one or more intermediate disposal facilities, the Commission anticipates that the acceptability of such facilities would be evaluated in the light of the particular circumstances, considering for example the existing performance objectives of 10 CFR Part 61 and any generally applicable environmental radiation protection standards that might have been established by the U. S. Environmental Protection Agency. Technical criteria to implement the performance objectives and environmental standards would be developed by the Commission after DOE had completed its conceptual design and selected a site for a specific type of facility.

The Commission considers that the proposal presented in this notice would obviate any need to reclassify certain GTCC wastes as HLW. The proposal follows the alternative approach alluded to in the ANPRM, that the Commission "need not exercise NWPA Clause (B) authority in order to assure that radioactive wastes from licensed activities are disposed of properly" (52 FR 5998). Many comments on the ANPRM advocated classification of all GTCC wastes as HLW in order to ensure availability of a safe disposal "home" for those wastes, but this proposal achieves the same purpose while leaving open the prospect that an intermediate disposal facility may prove attractive at some time in the future. (Since the possibility of using such a facility is left open, the Commission is not now determining that the wastes, even if highly radioactive, do in fact "require permanent isolation"; accordingly, the NWPA definition of HLW does not apply). Moreover, this proposal avoids the problem of trying to distinguish HLW from non-HLW without an adequate technical basis for doing so. And the legal and administrative complications identified in the ANPRM, as well as questions as to the retroactive application of any new classification, would be avoided or reduced. However, additional legislation

may be needed by DOE to provide for payment of disposal costs for above Class C wastes, or to authorize receipt of such wastes for disposal at a repository.

The Commission also observes that the statutory framework for nuclear waste matters has changed greatly since enactment of NWPA. When that law was passed, it placed a responsibility on the Federal government to receive, manage, and dispose of certain wastes (HLW as well as spent nuclear fuel) in geologic repositories. In that context, the definition of the term "high-level radioactive waste" assumed importance because it provided a basis for differentiating between State and Federal responsibilities. This concern was subsequently mooted by adoption of the Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub.L. 99-240, 42 U.S.C. 2021b et seq. This later statute established a Federal Government responsibility for the disposal of commercially generated wastes with radionuclide concentrations exceeding the limits established in 10 CFR Part 61 for Class C radioactive waste. In view of this development, the Commission perceives little practical importance or significance in proceeding with a precise definition of HLW. To do so would not advance the objectives of NWPA.

PROPOSED AMENDMENTS

In line with the foregoing discussion, therefore, the Commission is proposing two changes to its existing rules. First, by amending 10 CFR 61.55, it would henceforth require all greater-than-Class-C waste to be disposed of in a geologic repository unless an alternative proposal is approved by the Commission. Second, the jurisdictional reach of 10 CFR Part 61 would be extended to cover all activities of the Department of Energy that may be subject to the licensing and regulatory authority of the Commission. This is intended to reflect the policy of the Low-Level Radioactive Waste Policy Amendments Act, which provides that all commercially-generated waste with concentrations exceeding Class C limits shall be disposed of in a facility licensed by the Commission that the Commission determines is adequate to protect the public health and safety. This change would take the form of eliminating the more restrictive language regarding the Department of Energy that appears in the definition of the term "Person" in §61.2.

Environmental Impact: Categorical Exclusion

The NRC has determined that this proposed regulation is the type of action described in categorical exclusion 10 CFR 51.22(c)(2). Therefore neither an environmental impact statement nor an environmental assessment has been prepared for this proposed regulation.

The first change, pertaining to the definition of "person," is corrective in that it merely reflects the broader jurisdiction of the Commission under the Low-Level Radioactive Waste Policy Amendments Act. The modification is not substantial.

The second change, pertaining to the disposal of greater-than-Class-C radioactive wastes in a geologic repository, is minor. The existing regulations in 10 CFR Part 61 already preclude disposal of GTCC in a Part 61 licensed disposal facility without further review and approval. This amendment does no more than state the Commission's conclusion that, in the absence of such an approved alternative, a geologic repository is the only currently authorized facility acceptable for GTCC disposal without further review by the Commission. Thus, it is a minor change to specify that the "more stringent" methods are to include disposal in a repository, where it is also expressly provided that, as before, proposals for other methods of disposal may still be submitted to the Commission for approval. No substantial modification of existing regulations is involved.

Paperwork Reduction Act Statement

This proposed rule does not contain a new or amended information collection requirement subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget approval number 3150-0135.

Regulatory Analysis

The Commission has prepared a draft regulatory analysis for this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft analysis is available for inspection in the NRC Public Document Room, 1717 H Street NW, Washington, DC. Single

copies of the draft analysis may be obtained from W. Clark Prichard, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, teltphone (301) 492-3884.

The Commission requests public comment on the draft regulatory analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Act Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)) and NRC Size Standards (December 9, 1985, 50 FR 50241), the Commission certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities. The only entity subject to regulation under this proposed rule would be the U.S. Department of Energy, which does not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act. All waste generators, some of which might be classified as small entities, must pay the costs associated with management and disposal of the wastes they generate. This proposed rule would not affect those costs since it preserves all options currently available for waste disposal. Only DOE's selection of a specific disposal technology from the full range of alternatives available would potentially have an economic impact on small entities.

List of Subjects in 10 CFR Part 61

Low-level waste, Nuclear materials, Penalty, Radioactive waste, Reporting and recordkeeping requirements, Waste classification, Waste treatment and disposal.

Backfitting Analysis

The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this proposed rule, and therefore, that a backfit analysis is not required for this proposed rule, because these amendments do not involve any provisions which would impose backfits as defined in 10 CFR 50.109(a)(1).

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Part 61.

PART 61 -- LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

1. The authority citation for Part 61 continues to read as follows:

AUTHORITY: Secs. 53, 57, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub.L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851).

For the purposes of Sec. 223, 68 Stat. 958, as amended, (42 U.S.C. 2273); Tables 1 and 2, §§61.3, 61.24, 61.25, 61.27(a) 61.41 through 61.43, 61.52, 61.53, 61.55, 61.56, and 61.61 through 61.63 are issued under Sec. 161b, 68 Stat. 948 as amended (42 U.S.C. 2201(b)); §§61.10 through 61.16, 61.24, and 61.80 are issued under Sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. In §61.2, the definition of "person" is revised in the alphabetical sequence to read as follows:

§ 61.2 Definitions.

As used in this part:

* * * * *

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to law), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political

subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

* * * * *

3. In §61.55, paragraph (a) is amended by revising paragraph (a)(2)(iv) to read as follows:

§ 61.55 Waste classification.

(a) * * *

(2) * * *

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are submitted to the Commission for approval.

* * * * *

Dated at Rockville, Md. this 17th day of May, 1988.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.

AMENDMENTS TO 10 CFR PART 61

IN LIEU OF A REVISED DEFINITION OF

"HIGH-LEVEL RADIOACTIVE WASTE"

BACKGROUND

--ON FEBRUARY 27, 1987 THE NRC PUBLISHED AN ADVANCE NOTICE OF PROPOSED RULEMAKING (ANPR) ANNOUNCING ITS INTENT TO REVISE ITS CURRENT DEFINITION OF HLW IN 10 CFR PART 60.

--THE ANPR SUGGESTED DEVELOPMENT OF A NUMERICAL DEFINITION TO DISTINGUISH HLW FROM NON-HLW. THIS NUMERICAL DEFINITION MIGHT BE APPLIED ONLY TO NON-REPROCESSING WASTES OR, ALTERNATIVELY, TO REPROCESSING WASTES AS WELL.

--DEVELOPMENT OF A NUMERICAL DEFINITION WAS TO BE BASED ON ANALYSES OF THE DISPOSAL CAPABILITIES OF "INTERMEDIATE" DISPOSAL FACILITIES. WASTES NOT SUITABLE FOR SUCH FACILITIES WOULD REQUIRE PERMANENT ISOLATION IN A REPOSITORY (OR EQUIVALENT) AND WOULD BE CLASSIFIED AS HLW.

CURRENT PROPOSAL

--RETAIN EXISTING, SOURCE-BASED DEFINITION OF HIGH-LEVEL WASTE.

--REQUIRE REPOSITORY DISPOSAL OF WASTES WITH CONCENTRATIONS ABOVE THE CLASS C LIMITS UNLESS AN ALTERNATIVE DISPOSAL FACILITY HAS BEEN APPROVED.

REASONS

--"INTERMEDIATE" DISPOSAL FACILITIES ARE NOT AVAILABLE TO PROVIDE A SUPPORTABLE BASIS FOR DEVELOPMENT OF A NUMERICAL DEFINITION OF HLW.

--A DIFFERENT CLASSIFICATION WOULD CONFLICT WITH EXISTING LAWS WHICH ARE BASED ON THE SOURCE-BASED CLASSIFICATION.

--RADIONUCLIDE CONCENTRATIONS, ALONE, DO NOT SEEM APPROPRIATE FOR CLASSIFYING WASTES. THE TOTAL RADIOACTIVE INVENTORY ALSO MUST BE CONSIDERED. ON THIS BASIS, RETAINING ALL REPROCESSING WASTES IN THE HLW CATEGORY SEEMS APPROPRIATE.

COMMENTS ON ANPR

--COMMENTS SHOWED INTEREST IN WASTE CLASSIFICATION AS IT WAS PERCEIVED TO AFFECT THE TYPE OF DISPOSAL FACILITY TO BE USED OR TO ALTER GOVERNMENTAL RESPONSIBILITIES FOR DISPOSAL.

--COMMENTS INDICATED WIDE DISAGREEMENT ABOUT HOW, OR EVEN IF, A REVISED HLW DEFINITION SHOULD BE DEVELOPED.

--A DOE CONTRACTOR STUDY, PUBLISHED AFTER THE ANPR, WAS REFERENCED. THIS STUDY ATTEMPTED THE TYPE OF ANALYSES PROPOSED IN THE ANPR, BUT CONCLUDED THAT ADDITIONAL DEVELOPMENT OF INTERMEDIATE DISPOSAL FACILITIES WOULD BE NEEDED BEFORE WASTES COULD BE CLASSIFIED ON A SOUND TECHNICAL BASIS.

--NO CONVINCING RATIONALE WAS PRESENTED TO COUNTER THE NRC'S VIEW THAT ALL REPROCESSING WASTES WERE, AND REMAIN, HLW WITHIN THE MEANING OF THE ENERGY REORGANIZATION ACT.

PROPOSED RULE

--RETAINS EXISTING WASTE CLASSIFICATIONS.

--REQUIRES DISPOSAL OF "GREATER THAN CLASS C" WASTES IN A REPOSITORY UNLESS THE COMMISSION HAS APPROVED AN ALTERNATE MEANS OF DISPOSAL.

--CODIFIES WHAT IS NOW ONLY IMPLICIT IN NRC REGULATIONS.

--SERVES AS A "SPUR" TO DOE TO SELECT A PREFERRED MEANS FOR DISPOSAL OF GREATER THAN CLASS C WASTES (EITHER REPOSITORY OR OTHER).

--LEAVES DOE WITH FLEXIBILITY TO SELECT AND DESIGN DISPOSAL FACILITIES, WHILE ENSURING THAT AT LEAST ONE SAFE MEANS OF DISPOSAL WILL BE AVAILABLE.

RATIONALE

CLAUSE A (REPROCESSING) WASTES

--REPROCESSING WASTES WOULD REMAIN HLW UNDER THE ENERGY REORGANIZATION ACT EVEN IF CLASSIFIED DIFFERENTLY UNDER THE WASTE POLICY ACT. THEREFORE, A REVISED CLASSIFICATION WOULD ACCOMPLISH NOTHING USEFUL, AND WOULD LEAD TO CONFUSION.

--A REVISED CLASSIFICATION IS NOT NEEDED TO ALLOW DOE TO CONSIDER ALTERNATIVE MEANS OF DISPOSAL (E.G., IN SITU DISPOSAL AT HANFORD).

--THE TOTAL INVENTORY OF RADIOACTIVE MATERIALS PRESENT IN REPROCESSING WASTES IS SO LARGE THAT SUCH WASTES CANNOT BE CONSIDERED TO BE EQUIVALENT TO "ORDINARY" LOW-LEVEL WASTES.

COMPARISONS OF VOLUMES AND ACTIVITIES OF VARIOUS WASTES

(REFERENCE DOE/RW-0006, REV. 3, EXCEPT WHERE NOTED)

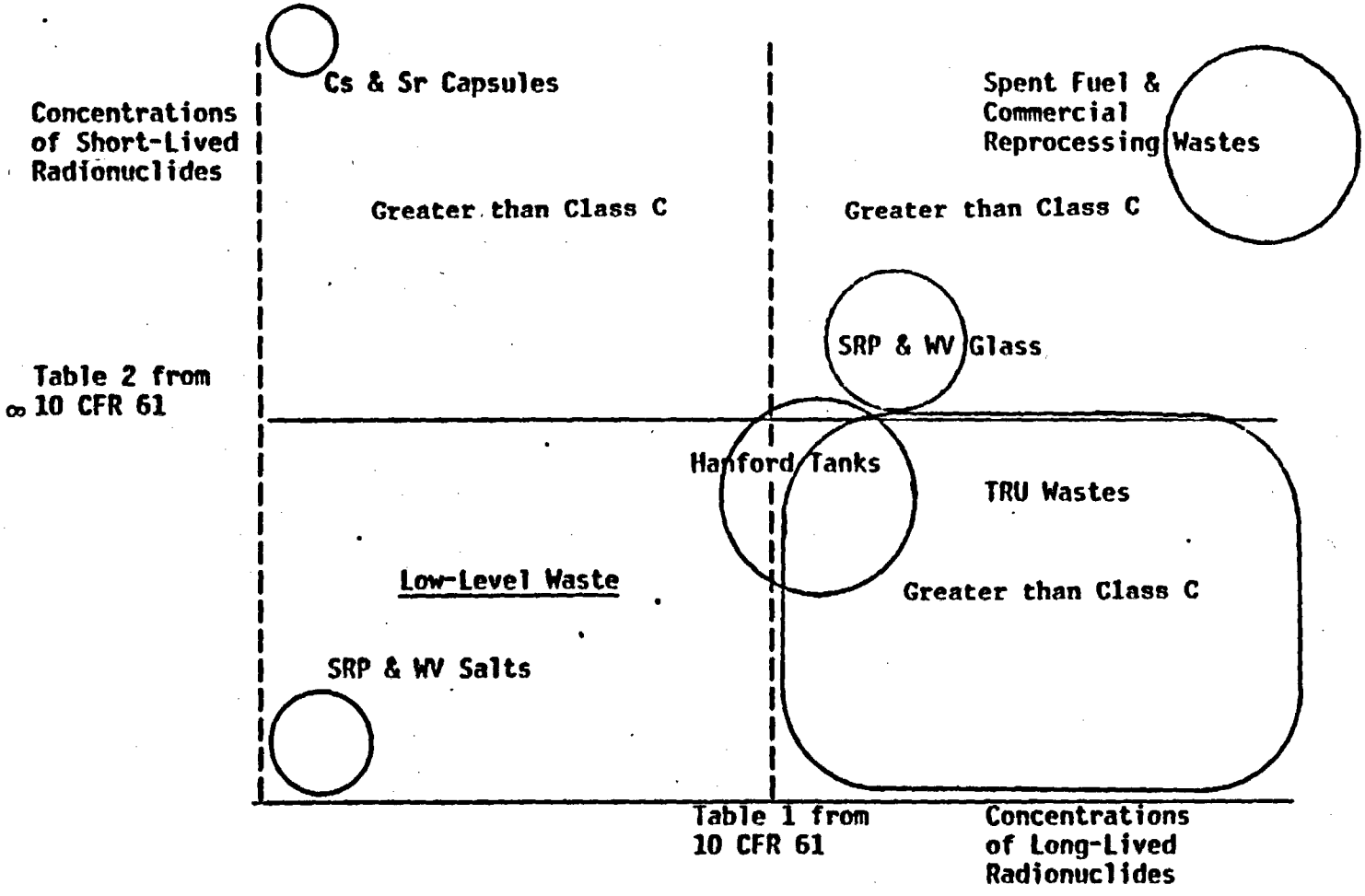
WASTE TYPE	VOLUME (MILLIONS OF M^3)	ACTIVITY (MILLIONS OF CI)
U-MILL TAILINGS (THRU 1986, SEVERAL SITES)	110	0.5
TMI-2 (3/1/84)	??	2*
COMMERCIAL LLW (THRU 1986, 6 SITES)	1.2	5
COMMERCIAL LLW (THRU 2020)	5	15
DEFENSE LLW (THRU 1986, SEVERAL SITES)	2.3	12
DEFENSE LLW (THRU 2020)	6	22
STORED DEFENSE TRU (THRU 2020, SOME OR ALL TO BE SHIPPED TO WIPP)	0.2	16
COMMERCIAL GTCC (THRU 2020)	0.002**	40***
HANFORD REPROCESSING (THRU 1986)	0.2	550****
SRP REPROCESSING (THRU 1986)	0.1	790
SPENT NUCLEAR FUEL (THRU 2020, NO NEW POWER PLANT ORDERS)	0.05	50,000

*REF. GEND-057

**REF. DOE/NE-0077.

***REACTOR DECOMMISSIONING ONLY.

****INCLUDES 210 MILLION CURIES IN CS & SR CAPSULES. SINGLE-SHELL TANK WASTES CURRENTLY CONTAIN ABOUT 125 MILLION CURIES.



CONCENTRATIONS OF VARIOUS WASTES

CLAUSE B (OTHER) WASTES

--COMMENTS WERE PRIMARILY CONCERNED WITH THE MEANS OF DISPOSAL FOR GREATER THAN CLASS C WASTES. CONCERN ABOUT CLASSIFICATION WAS EVIDENT MOSTLY AS CLASSIFICATION WAS PERCEIVED TO AFFECT DISPOSAL.

--CONCENTRATION, ALONE, DOES NOT SEEM AN ADEQUATE BASIS FOR CLASSIFICATION. TOTAL RADIOACTIVE INVENTORY ALSO SEEMS TO BE RELEVANT. ON THIS BASIS, GREATER THAN CLASS C WASTES SEEM TO BE NEITHER HLW NOR "ORDINARY" LLW.

--HYPOTHESIZING AN ALTERNATIVE TYPE OF DISPOSAL FACILITY AS THE BASIS FOR WASTE CLASSIFICATION WOULD EFFECTIVELY PLACE THE NRC IN THE POSITION OF DICTATING DISPOSAL TECHNOLOGY. THIS SHOULD BE DOE'S JOB.

Developing

--AS DOE'S CONTRACTOR STUDY SHOWED, CURRENT DEVELOPMENT OF ALTERNATIVE DISPOSAL TECHNOLOGIES IS NOT SUFFICIENTLY ADVANCED TO SERVE AS A BASIS FOR WASTE CLASSIFICATION.

--THE VERY SMALL VOLUME OF GREATER THAN CLASS C WASTES (ABOUT 2,000 M^3 THRU 2020) MAKES IT UNLIKELY THAT A SEPARATE DISPOSAL FACILITY WILL PROVE ECONOMICALLY ATTRACTIVE. WE THINK IT LIKELY THAT REPOSITORY DISPOSAL WILL PROVE MOST ECONOMICAL.

--CLASSIFICATION OF GREATER THAN CLASS C WASTES AS HLW WAS CONSIDERED AS AN ALTERNATIVE, BUT REJECTED. DOING SO

  --WOULD HAVE IMPLICATIONS FOR APPLICATION OF PART 60 WASTE PACKAGING REQUIREMENTS,

  --MIGHT AFFECT DOE'S CONTRACTS FOR RECEIPT OF WASTES AND PAYMENTS INTO THE NUCLEAR WASTE FUND,

  --MIGHT RAISE PUBLIC PERCEPTION QUESTIONS ABOUT PAST DISPOSAL OF GREATER THAN CLASS C WASTES, AND

  --WOULD BE TECHNICALLY UNSUPPORTABLE BASED ON CURRENT DEVELOPMENT OF ALTERNATIVE DISPOSAL TECHNOLOGIES.

--THE PREFERRED ALTERNATIVE, AS PROPOSED, IS TO REQUIRE REPOSITORY DISPOSAL OF GREATER THAN CLASS C WASTES (UNLESS AN ALTERNATIVE MEANS OF DISPOSAL HAS BEEN APPROVED), BUT TO RETAIN THOSE WASTES WITHIN THE LLW CATEGORY.

CLASSIFICATION OF WASTES UNDER PROPOSED RULE

HIGH-LEVEL WASTES

PRIMARY REPROCESSING WASTES

- --"TANK" WASTES AT HANFORD, SAVANNAH RIVER & WEST VALLEY
- --CALCINED WASTES AT IDAHO
- --GLASS INCORPORATING "TANK" WASTES

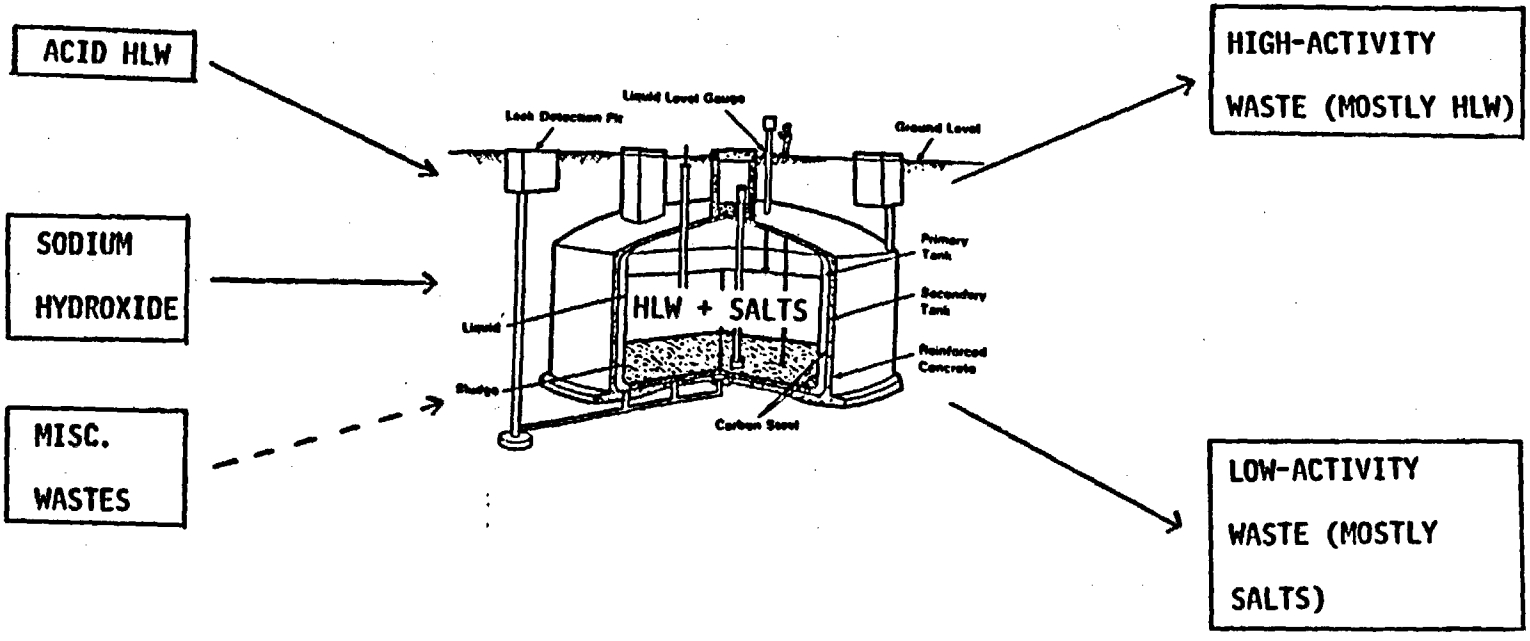
NON-HIGH-LEVEL WASTES

"INCIDENTAL" REPROCESSING WASTES

- --TRASH, IX RESINS, HULLS, ETC.
- --SOME SALTS
- --SOME HARDWARE, EMPTY TANKS, ETC.

ALL NON-REPROCESSING WASTES

- --"ORDINARY" LLW
- --"ABOVE CLASS C" LLW
- --WIPP WASTES
- --NARM WASTES



PROCESSING PROPOSED FOR HANFORD TANK WASTES

(7590-01)

NUCLEAR REGULATORY COMMISSION

10 CFR Part 61

Disposal of Radioactive Wastes

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The NRC is publishing proposed amendments which require disposal of "greater-than-Class-C" low-level radioactive wastes in a deep geologic repository unless disposal elsewhere has been approved by the Commission. The proposed amendments obviate the need for altering existing classifications of radioactive wastes as high-level or low-level.

DATE: Comment period expires 60 days. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESS: Mail written comments to: Secretary, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Docketing and Service Branch.

Deliver comments to: Room 1121, 1717 H Street, NW, Washington, DC, between 7:30 a.m. and 4:15 p.m. Federal workdays.

Copies of the regulatory analysis and comments received may be examined at: the NRC Public Document Room at 1717 H Street NW, Washington, D. C., between 7:30 a.m. and 4:15 p.m.

FOR FURTHER INFORMATION CONTACT: W. Clark Prichard, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D. C. 20555, telephone (301) 492-3884.

SUPPLEMENTARY INFORMATION:

Background

On February 27, 1987, the Nuclear Regulatory Commission published an Advance Notice of Proposed Rulemaking (ANPRM) (51 FR 5992) announcing its intent to revise the definition of the term "high-level radioactive waste" (HLW) that appears in 10 CFR Part 60. In the ANPRM, the Commission reviewed the previous statutory and regulatory uses of the term "high-level radioactive waste," the NRC's current regulations related to waste classification and disposal, and the pertinent provisions of the Nuclear Waste Policy Act of 1982, Pub.L. 97-425, 42 U.S.C. 10101 et seq. (NWPA). As indicated in the ANPRM, the NWPA includes a specific definition of "high-level radioactive waste" and the Commission was considering a change to its own rules to conform to that definition.

In the ANPRM, the Commission proposed to define HLW in a manner that in general would apply the term "high-level radioactive waste" to materials in amounts and concentrations exceeding numerical values that would be stated explicitly in the form of a table. Thus, HLW would be characterized by the kind of hazard that could only be guarded against by disposal in a geologic repository or equivalent facility. Those wastes that could be disposed of safely in an "intermediate" disposal facility would continue to be classified as low-level radioactive waste rather than as HLW.

COMMENTS

The Commission solicited comments on several specific issues and received letters from nearly 100 public agencies, private organizations, and individuals. Virtually all comments on the ANPRM agreed with the Commission on one point: use of the term "high-level radioactive waste," at least under Clause (B) of the NWPA definition, serves to identify those wastes which require the degree of isolation afforded by a deep geologic repository. However, comments differed widely regarding the specific wastes perceived to require that degree of isolation. Some comments advocated classification of all radioactive wastes, other than the most innocuous, as HLW while other comments would prefer to reclassify as low-level large quantities of defense reprocessing wastes long regarded as HLW. Conspicuously absent from the

comments was any consensus regarding the means to be used by the Commission to distinguish HLW from non-HLW. For example, even the basic concept of a numerical definition of HLW, as suggested in the ANPR, was criticized as an invitation to dilute or fractionate wastes solely to alter their classification. In light of the comments received, the Commission's own review of available technical information related to waste classification and "intermediate" disposal facilities, and review of relevant statutory purposes, the Commission has determined that it would be best to proceed quite differently from its original suggestion in the ANPR.

REPROCESSING WASTES

The NWPA first labels as HLW, under Clause (A), the "highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations." Clause (A) wastes have little significance for purposes of NWPA, since the Federal Government was already responsible for the disposal of all reprocessing wastes at the time the statute was passed. (The only commercially-generated reprocessing wastes were made a Federal Government responsibility in 1980 pursuant to the West Valley Demonstration Project Act. Pub.L. 96-368, 42 U.S.C. 2021a note.) In light of this fact, the Commission believes that the preferable construction of the statute is to conform to the traditional definition. Under this approach, materials that are HLW for purposes of the licensing-jurisdiction provisions of the Energy Reorganization Act of 1974 (ERA) will also be regarded as HLW under NWPA. This would include the primary reprocessing waste streams at DOE facilities, though not the incidental wastes produced in reprocessing.

OTHER WASTES

In the ANPRM, the Commission proposed to classify wastes as HLW or non-HLW by examining the disposal capability of hypothetical, "intermediate" disposal

facilities less secure than a deep geologic repository. Wastes which could not be safely disposed of in such facilities would be classified as HLW.

Following publication of the ANPRM, a technical report (Kocher, D. C. and A. G. Croff, A Proposed Classification System for High-Level and Other Radioactive Wastes, ORNL/TM-10289, Oak Ridge National Laboratory, 1987) was published which attempted to provide a technical basis for classification of wastes as HLW or non-HLW. This report described a number of conceptual "intermediate" disposal facilities which would use either engineered barriers or deeper burial to provide a degree of waste isolation intermediate between that of shallow land burial and a deep geologic repository. The authors attempted an analysis of the waste isolation capability of such facilities but, emphasizing the site-specific nature of such analyses and the very large uncertainties involved, concluded that "[a]t the present time . . . [such facilities are] not sufficiently developed to provide a basis for defining waste classes, and disposal of any wastes using [such facilities] must be considered on a case-by-case basis." Kocher and Croff then presented an alternative approach for defining HLW which, in essence, is based solely on the short-term storage and handling risks associated with the heat and external radiation levels generated by a waste. The Commission could not accept this alternative approach since it bears no correlation to the degree of waste isolation required following disposal.

The Commission's review of Kocher and Croff's study leads it to the same conclusion regarding the impracticability of waste classification based on analyses of the performance of intermediate disposal facilities. If waste classification is to be at all realistic, additional disposal facility development must be completed which will provide a supportable basis for such classification. Such disposal facility development is more properly the responsibility of DOE rather than NRC. However, the very small volume (about 2,000 m^3 through the year 2020) of commercially-generated, greater-than-Class-C (GTCC) wastes may make an intermediate disposal facility economically unattractive. Because no such facility now exists for disposal of commercially-generated wastes, and because there is no assurance that one will ever be constructed, the Commission believes that an alternative, technically conservative approach should be taken.

The Commission proposes to require disposal of all GTCC wastes in a deep geologic repository unless disposal elsewhere has been explicitly approved by the Commission. This proposal reflects the Commission's view that intermediate disposal facilities may never be available, in which case a repository would be the only type of facility generally capable of providing safe disposal for GTCC wastes. At the same time, the Commission wishes to avoid foreclosing possible use of intermediate disposal facilities by the Department of Energy (DOE). If DOE chooses to develop one or more intermediate disposal facilities, the Commission anticipates that the acceptability of such facilities would be evaluated in the light of the particular circumstances, considering for example the existing performance objectives of 10 CFR Part 61 and any generally applicable environmental radiation protection standards that might have been established by the U. S. Environmental Protection Agency. Technical criteria to implement the performance objectives and environmental standards would be developed by the Commission after DOE had completed its conceptual design and selected a site for a specific type of facility.

The Commission considers that the proposal presented in this notice would obviate any need to reclassify certain GTCC wastes as HLW. The proposal follows the alternative approach alluded to in the ANPRM, that the Commission "need not exercise NWPA Clause (B) authority in order to assure that radioactive wastes from licensed activities are disposed of properly" (52 FR 5998). Many comments on the ANPRM advocated classification of all GTCC wastes as HLW in order to ensure availability of a safe disposal "home" for those wastes, but this proposal achieves the same purpose while leaving open the prospect that an intermediate disposal facility may prove attractive at some time in the future. (Since the possibility of using such a facility is left open, the Commission is not now determining that the wastes, even if highly radioactive, do in fact "require permanent isolation"; accordingly, the NWPA definition of HLW does not apply). Moreover, this proposal avoids the problem of trying to distinguish HLW from non-HLW without an adequate technical basis for doing so. And the legal and administrative complications identified in the ANPRM, as well as questions as to the retroactive application of any new classification, would be avoided or reduced. However, additional legislation

check w/ DOE legal staff

may be needed by DOE to provide for payment of disposal costs for above Class C wastes, or to authorize receipt of such wastes for disposal at a repository. ?

The Commission also observes that the statutory framework for nuclear waste matters has changed greatly since enactment of NWPA. When that law was passed, it placed a responsibility on the Federal government to receive, manage, and dispose of certain wastes (HLW as well as spent nuclear fuel) in geologic repositories. In that context, the definition of the term "high-level radioactive waste" assumed importance because it provided a basis for differentiating between State and Federal responsibilities. This concern was subsequently mooted by adoption of the Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub.L. 99-240, 42 U.S.C. 2021b et seq. This later statute established a Federal Government responsibility for the disposal of commercially generated wastes with radionuclide concentrations exceeding the limits established in 10 CFR Part 61 for Class C radioactive waste. In view of this development, the Commission perceives little practical importance or significance in proceeding with a precise definition of HLW. To do so would not advance the objectives of NWPA.

PROPOSED AMENDMENTS

In line with the foregoing discussion, therefore, the Commission is proposing two changes to its existing rules. First, by amending 10 CFR 61.55, it would henceforth require all greater-than-Class-C waste to be disposed of in a geologic repository unless an alternative proposal is approved by the Commission. Second, the jurisdictional reach of 10 CFR Part 61 would be extended to cover all activities of the Department of Energy that may be subject to the licensing and regulatory authority of the Commission. This is intended to reflect the policy of the Low-Level Radioactive Waste Policy Amendments Act, which provides that all commercially-generated waste with concentrations exceeding Class C limits shall be disposed of in a facility licensed by the Commission that the Commission determines is adequate to protect the public health and safety. This change would take the form of eliminating the more restrictive language regarding the Department of Energy that appears in the definition of the term "Person" in §61.2.

Environmental Impact: Categorical Exclusion

The NRC has determined that this proposed regulation is the type of action described in categorical exclusion 10 CFR 51.22(c)(2). Therefore neither an environmental impact statement nor an environmental assessment has been prepared for this proposed regulation.

The first change, pertaining to the definition of "person," is corrective in that it merely reflects the broader jurisdiction of the Commission under the Low-Level Radioactive Waste Policy Amendments Act. The modification is not substantial.

The second change, pertaining to the disposal of greater-than-Class-C radioactive wastes in a geologic repository, is minor. The existing regulations in 10 CFR Part 61 already preclude disposal of GTCC in a Part 61 licensed disposal facility without further review and approval. This amendment does no more than state the Commission's conclusion that, in the absence of such an approved alternative, a geologic repository is the only currently authorized facility acceptable for GTCC disposal without further review by the Commission. Thus, it is a minor change to specify that the "more stringent" methods are to include disposal in a repository, where it is also expressly provided that, as before, proposals for other methods of disposal may still be submitted to the Commission for approval. No substantial modification of existing regulations is involved.

Paperwork Reduction Act Statement

This proposed rule does not contain a new or amended information collection requirement subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget approval number 3150-0135.

Regulatory Analysis

The Commission has prepared a draft regulatory analysis for this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The draft analysis is available for inspection in the NRC Public Document Room, 1717 H Street NW, Washington, DC. Single

copies of the draft analysis may be obtained from W. Clark Prichard, Division of Engineering, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, teltphone (301) 492-3884.

The Commission requests public comment on the draft regulatory analysis. Comments on the draft analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Act Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)) and NRC Size Standards (December 9, 1985, 50 FR 50241), the Commission certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities. The only entity subject to regulation under this proposed rule would be the U.S. Department of Energy, which does not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act. All waste generators, some of which might be classified as small entities, must pay the costs associated with management and disposal of the wastes they generate. This proposed rule would not affect those costs since it preserves all options currently available for waste disposal. Only DOE's selection of a specific disposal technology from the full range of alternatives available would potentially have an economic impact on small entities.

List of Subjects in 10 CFR Part 61

Low-level waste, Nuclear materials, Penalty, Radioactive waste, Reporting and recordkeeping requirements, Waste classification, Waste treatment and disposal.

Backfitting Analysis

The NRC has determined that the backfit rule, 10 CFR 50.109, does not apply to this proposed rule, and therefore, that a backfit analysis is not required for this proposed rule, because these amendments do not involve any provisions which would impose backfits as defined in 10 CFR 50.109(a)(1).

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 553, the NRC is proposing to adopt the following amendments to 10 CFR Part 61.

PART 61 -- LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

1. The authority citation for Part 61 continues to read as follows:

AUTHORITY: Secs. 53, 57, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846); secs. 10 and 14, Pub.L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851).

For the purposes of Sec. 223, 68 Stat. 958, as amended, (42 U.S.C. 2273); Tables 1 and 2, §§61.3, 61.24, 61.25, 61.27(a) 61.41 through 61.43, 61.52, 61.53, 61.55, 61.56, and 61.61 through 61.63 are issued under Sec. 161b, 68 Stat. 948 as amended (42 U.S.C. 2201(b)); §§61.10 through 61.16, 61.24, and 61.80 are issued under Sec. 161o, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

2. In §61.2, the definition of "person" is revised in the alphabetical sequence to read as follows:

§ 61.2 Definitions.

As used in this part:

* * * * *

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to law), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political

subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

* * * * *

2. In §61.55, paragraph (a) is amended by revising paragraph (a)(2)(iv) to read as follows:

§ 61.55 Waste classification.

(a) * * *

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, such waste must be disposed of in a geologic repository as defined in Part 60 of this chapter unless proposals for disposal of such waste in a disposal site licensed pursuant to this part are submitted to the Commission for approval.

* * * * *

Dated at Washington, D.C. this _____ day of _____, 1988.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,
Secretary of the Commission.

Spokesman-Review
Spokane, WA
7/9/87
PP A4

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

MAR 13 1987

STATE LIAISON OFFICERS
ALL AGREEMENT AND NON-AGREEMENT STATES
LOW-LEVEL RADIOACTIVE WASTE DISTRIBUTION

ADVANCE NOTICE OF PROPOSED RULEMAKING RE: DEFINITION OF HIGH-LEVEL RADIOACTIVE WASTE

For your information and comment, please find enclosed the advance notice of proposed rulemaking, "Definition of 'High-Level Radioactive Waste,' 10 CFR Part 60." This notice was published in the Federal Register, Volume 52, No. 39, Friday, February 27, 1987, pp. 5992-6001.

The Commission intends to modify the definition of high-level radioactive waste (HLW) in previously adopted regulations (10 CFR Part 60) so as to follow more closely the statutory definition in the Nuclear Waste Policy Act of 1982 (NWPA). The Commission identifies in this advance notice of proposed rulemaking a number of legal and technical considerations that are pertinent to the definition of HLW and solicits public comment on alternative approaches for developing a revised definition.

The comment period expires April 29, 1987. Your comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Attention: Docketing and Service Branch. For further information, contact Clark Prichard, Division of Engineering Safety, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555. His telephone is (301) 443-7668.

Copies of this notice were sent separately to the first repository HLW State and Tribal distribution by the Division of Waste Management.

Considerations of special concern that OSP highlights are:

- Relationship to State role that discusses the classification of "above Class C" Wastes as HLW or non-HLW having no impact on State government responsibilities. (Section III.D.)

- Applicability of HLW definition to naturally-occurring and accelerator-produced radioactive materials (NARM). Under certain conditions, NARM could be disposed of in a geologic repository developed under NWPA. (Sections III.F and IV.8)

The notice discusses nine issues on which public comments are particularly sought in Part IV.

Additional information may also be obtained from Dr. Stephen Salomon of our office. His phone is (301) 492-9881.

G. Wayne Kerr

G. Wayne Kerr, Director
Office of State Programs

Enclosure:
As stated

NUCLEAR REGULATORY COMMISSION

10 CFR Part 60

Definition of "High-Level Radioactive Waste"

AGENCY: Nuclear Regulatory Commission.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Commission has previously adopted regulations for disposal of high-level radioactive wastes (HLW) in geologic repositories (10 CFR Part 60). The Commission intends to modify the definition of HLW in those regulations so as to follow more closely the statutory definition in the Nuclear Waste Policy Act of 1982 (NWPA). In this advance notice of proposed rulemaking (notice), the Commission identifies legal and technical considerations that are pertinent to the definition of HLW and solicits public comment on alternative approaches for developing a revised definition.

DATES: Comment period expires April 29, 1987. Comments received after this date will be considered if it is practical to do so, but assurance of consideration can be given only for comments received on or before this date.

ADDRESSES: Send comments or suggestions to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch. Copies of comments received and of documents referenced in this notice may be examined at the NRC Public Document Room, 1717 H Street NW., Washington, DC. Copies of NUREG documents may be purchased through the U.S. Government Printing Office by calling (202) 275-2060 or by writing to the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies of NUREG and DOE documents may also be purchased from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

FOR FURTHER INFORMATION CONTACT: W. Clark Prichard, Division of Engineering Safety, Office of Nuclear Regulatory

Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 443-7668.

SUPPLEMENTARY INFORMATION:

I. Introduction and Background

Radioactive wastes contain a wide variety of radionuclides, each with its own half-life and other radiological characteristics. These radionuclides are present in concentrations varying from extremely high to barely detectable. One type of waste, generated by reprocessing spent nuclear fuel, contains both long-lived radionuclides which pose a long-term hazard to human health and other, shorter-lived nuclides which produce intense levels of radiation. This combination of highly-concentrated, short-lived nuclides together with other very long-lived nuclides has historically been described by the term "high-level radioactive wastes" (HLW). There has long been a recognition that such waste materials require long-term isolation from man's biological environment and that, in view of public health and safety considerations, disposal of such wastes should be accomplished by the Federal government on Federally owned land. This policy was codified by the Atomic Energy Commission (AEC) in 1970 in Appendix F to 10 CFR Part 50.

A. *Previous use of the term "HLW."* In Appendix F, HLW was defined in terms of the source of the material rather than its hazardous characteristics. Specifically, HLW was defined as "those aqueous wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles or equivalent, in a facility for reprocessing irradiated reactor fuels." As used in Appendix F, "high-level waste" thus refers to the highly concentrated (and hazardous) waste containing virtually all the fission product and transuranic elements (except plutonium) present in irradiated reactor fuel. The term does not include incidental wastes resulting from reprocessing plant operations such as ion exchange beds, sludges, and contaminated laboratory items, clothing, tools, and equipment. Neither are radioactive hulls and other irradiated and contaminated fuel structural hardware within the Appendix F definition.[1]

The first statutory use of the term "high-level radioactive waste" occurs in the Marine Protection, Research, and Sanctuaries Act of 1972 (Marine Sanctuaries Act). Congress adopted the Appendix F definition, but broadened it to include unreprocessed spent fuel as well.[2] Two years later, the AEC was abolished and its functions were divided between the Energy Research and Development Administration (ERDA, now the Department of Energy, DOE) and the Nuclear Regulatory Commission (NRC or Commission) by the Energy Reorganization Act of 1974, Pub. L. 93-438, 42 U.S.C. 5811. Under this legislation, certain activities of ERDA were to be subject to the Commission's licensing and regulatory authority. Specifically, NRC was to exercise licensing authority as to certain nuclear reactors and the following waste facilities:

(1) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from activities licensed under the [Atomic Energy] Act.

(2) Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration [now DOE], which are not used for, or are part of, research and development activities.[3]

Although neither the statute nor the legislative history defines the term "high-level radioactive waste," earlier usage of the term in Appendix F and the Marine Sanctuaries Act is indicative of the meaning. The Commission so construed the statute when it declared spent nuclear fuel to be a form of HLW and, by the same token, when it found transuranic-contaminated wastes not to be HLW.[4]

A different statutory formula appears in the West Valley Demonstration Project Act (West Valley Act), enacted in 1980. This legislation authorizes the Department of Energy (DOE) to carry out a high-level radioactive waste management demonstration project for the purpose of demonstrating solidification techniques which can be used for preparing HLW for disposal. It includes the following definition:

> The term "high level radioactive waste" means the high level radioactive waste which was produced by the reprocessing at the Center of spent nuclear fuel. Such term includes both liquid wastes which are produced directly in reprocessing, dry solid material derived from such liquid waste and such other material as the Commission designates as high level radioactive waste for purposes of protecting the public health and safety.[5]

The Commission has not yet designated any "other material" as HLW under the West Valley Act. Rather, it has construed the term in a manner equivalent to the 10 CFR 50, Appendix F definition. That is, it is the liquid wastes in storage at West Valley and the dry solid material derived from solidification activities that are regarded as HLW, and it is DOE's plans with respect to such wastes that are subject to the Commission's review.

B. *Current NRC regulations.* The Commission has adopted regulations that govern the licensing of DOE activities at geologic repositories for the disposal of HLW. The regulations define HLW in the jurisdictional sense. That is, if the facility is for the "storage" of "HLW" as contemplated by the Energy Reorganization Act, the prescribed procedures and criteria would apply.[6] The appropriate definition for this purpose draws upon the understanding in 1974, as reflected in Appendix F and the Marine Sanctuaries Act, rather than the words of the West Valley Act of more limited purpose and scope.

It should be emphasized that NRC's existing regulations in Part 60 do not require that any radioactive materials, whether HLW or not, be stored or disposed of in a geologic repository.[7]

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[1] See 34 FR 8712, June 3, 1969 (notice of proposed rulemaking), 35 FR 17530 at 17532, November 14, 1970 (final rule). Incidental wastes generated in further treatment of HLW (e.g., decontaminated salt with residual activities on the order of 1,500 nCi/g Cs-137, 30 nCi/g Sr-90, 2 nCi/g Pu, as described in the Department of Energy's FEIS on long-term management of defense HLW at the Savannah River Plant, DOE/EIS-0023, 1979) would also, under the same reasoning, be outside the Appendix F definition.

[2] Sec. 3, Pub. L. 92-532, as amended by Pub. L. 93-254 (1974), 33 U.S.C. 1402.

[3] Sec. 202, Pub. L. 93-438, 42 U.S.C. 5842. Nuclear waste management responsibilities were subsequently transferred to the Department of Energy. Secs. 203(a)(8), 301(a), Pub. L. 95-91, 42 U.S.C. 7133(a)(8), 7151(a).

[4] Proposed General Statement of Policy, "Licensing Procedures for Geologic Repositories for High-Level Radioactive Wastes," 43 FR 53868, 53870, November 17, 1978; Report to Congress, "Regulation of Federal Radioactive Waste Activities," NUREG-0527 (1979), 2-1, 2-2, Appendix G.

[5] Sec. 6(4), Pub. L. 98-368, 42 U.S.C. 2021a note.

[6] NRC regulations are codified in 10 CFR Part 60 (Part 60). DOE is required to have a license to receive source, special nuclear or byproduct material at a geologic repository operations area. § 60.3. A geologic repository operations area is defined to refer to a "HLW facility" which in turn is defined as a facility subject to NRC licensing authority under the Energy Reorganization Act of 1974, note 3, *supra*. § 60.2 The Part 60 definition of HLW, *ibid.*, is as follows:

> "High-level radioactive waste" or "HLW" means: (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (3) solids into which such liquid wastes have been converted.

[7] In the event that commercial reprocessing of irradiated reactor fuel is pursued, Appendix F of 10 CFR Part 50 would require that the resulting reprocessing wastes be transferred to a Federal repository.

Nor do they provide that radioactive materials must be HLW in order to be eligible for disposal in a geologic repository. Part 60 expressly provides for NRC review and licensing with respect to any radioactive materials that may be emplaced in a geologic repository authorized for disposal of HLW. The term "high-level radioactive waste" in Part 60 identifies the class of facilities subject to NRC jurisdiction.

The Commission has also adopted regulations related to land disposal of low-level radioactive wastes (10 CFR Part 61). Based on analyses of potential human health hazards, these regulations identify three classes of low-level radioactive wastes which are routinely acceptable for near-surface disposal, with "Class C" denoting the highest radionuclide concentrations of the three. Class C does not, however, denote a maximum concentration limit for low-level wastes. The low-level waste category includes all wastes not otherwise classified, while HLW is currently defined by source (rather than concentration or hazard) and is limited to reprocessing wastes and spent fuel. Thus, there is no regulatory limit on the concentrations of LLW, and some LLW (exceeding Class C concentrations) may have concentrations approaching those of HLW. These are the wastes which the Commission wishes to evaluate for possible classification as HLW. The Appendix to this notice presents information on the volumes and characteristics of wastes with radionuclide concentrations exceeding the Class C concentration limits. [This Appendix was prepared in 1985. DOE is currently carrying out a study of "above Class C" wastes which will update the information presented here.]

C. *Nuclear Waste Policy Act of 1982.* The Nuclear Waste Policy Act of 1982 (NWPA), Pub. L. 97-425, provides for the development of repositories for the disposal of high-level radioactive waste and establishes a program of research, development, and demonstration regarding the disposal of high-level radioactive waste.[8] The NWPA follows, with some modification, the text of the West Valley Act. For purposes of the NWPA, the term "high-level radioactive waste" means:

(A) The highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and

(B) Other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.[9]

It should be noted that the NWPA does not require that materials regarded as HLW pursuant to this definition be disposed of in a geologic repository. Indeed, the NWPA directs the Secretary (of DOE) to continue and accelerate a program of research, development and investigation of alternative means and technologies for the permanent disposal of HLW.[10] Part 60 and the changes discussed in this notice would allow for consideration of such alternatives by the Commission. Nevertheless, the NWPA does not specifically authorize DOE to construct or operate facilities for disposal by alternative means, and new legislative authorization might be needed in order to dispose of HLW by means other than emplacement in a deep geologic repository.

II. Considerations for Defining "High-Level Radioactive Waste"

Wastes which have historically been referred to as HLW (i.e., reprocessing wastes) are initially both intensely radioactive and long-lived. These wastes contain a wide variety of radionuclides. Some (principally Sr-90 and Cs-137) are relatively short-lived and represent a large fraction of the radioactivity for the first few centuries after the wastes are produced. These nuclides produce significant amounts of heat and radiation, both of which are of concern when disposing of such wastes. Other nuclides, including C-14, Tc-99, I-129 and transuranic nuclides, have very long half-lives and thus constitute the longer-term hazard of the wastes. Some of these nuclides pose a hazard for sufficiently long periods of time that the term "permanent isolation" is used to describe the type of disposal required to isolate them from man's environment. The Commission considers that these two characteristics, intense radioactivity for a few centuries followed by a long-term hazard requiring permanent isolation, are key features which can be used to distinguish high-level wastes from other waste categories.

The NWPA identifies two sources of HLW, each of which is discussed separately in the following sections.

A. Clause (A)

Clause (A) of the NWPA definition of HLW refers to wastes produced by reprocessing spent nuclear fuel and thus is essentially identical to the Commission's current HLW definition in 10 CFR Part 60. Clause (A) is, however, different in one respect. The NWPA wording would classify solidified reprocessing waste as HLW only if such waste "contains fission products in sufficient concentrations"—a phrase that may reflect the possibility that liquid reprocessing wastes may be partitioned or otherwise treated so that some of the solidified products will contain substantially reduced concentrations of radionuclides.

The question, then, is whether Commission should (1) numerically specify the concentrations of fission products which it would consider "sufficient" to distinguish HLW from non-HLW under Clause (A); or (2) define HLW so as to equate the Clause (A) wastes with those which have traditionally been regarded as HLW.

1. Numerically Specifying Concentrations of Fission Products

The first option considered is to numerically define "sufficient concentrations" of fission products. Liquid reprocessing wastes may contain significant amounts of non-radioactive salts, and removal of these salts prior to waste solidification may be desirable for both economic and public health and safety reasons. Removal of salts in this way would result in a smaller volume of highly radioactive wastes, which might reduce the cost and radiological impacts associated with transportation and occupational handling of those wastes. Nevertheless, any salts removed from liquid HLW would retain residual amounts of radioactive contaminants. By establishing numerical limits on the concentrations of fission products, the Commission would be identifying those wastes from reprocessing that require disposal in a deep geologic repository or its equivalent. The proper classification of the salts discussed above would then be made on the basis of the numerical limits on radionuclide concentrations and the salts would be disposed of accordingly. In other cases, certain radionuclides may be removed from the bulk liquid reprocessing waste (as has been done in removing cesium and strontium from wastes at Hanford), raising similar questions about the classification of the remaining waste and acceptable methods of disposal. For these reasons, there would be merit in numerically specifying the

[8] For purposes of the NWPA, "spent nuclear fuel" is distinguished from "high-level radioactive waste," but the provisions of the statute dealing with such spent nuclear fuel are not of present concern.

[9] Sec. 2(12), Pub. L. 97-425, 42 U.S.C. 10101(12). Sec. 2(16) also authorizes the Commission to classify certain radioactive material as low-level radioactive waste.

[10] Sec. 222, Pub. L. 97-425, 42 U.S.C. 10202.

concentrations of radionuclides in solidified reprocessing wastes which would distinguish HLW from non-HLW.

(Clause (A) refers to solidified waste "that contains fission products in sufficient concentrations." No mention is made of the long-lived transuranic radionuclides which are also present in liquid reprocessing wastes but, since the transuranics constitute the predominant long-term hazard of reprocessing wastes, such nuclides must be considered as well in defining reprocessing wastes that should be regarded as HLW. With this view, a numerical classification of solidified wastes under Clause (A) could be derived in the same manner, and contain the same concentration limits, as the numerical definitions developed under Clause (B). Derivation of concentration limits under Clause (B) is discussed in the following section of this notice.)

2. Traditional Definition

The alternate approach is to define HLW so as to equate the category of Clause (A) wastes with those wastes which have traditionally been regarded as HLW under Appendix F to 10 CFR Part 50 and the Energy Reorganization Act. The advantage of this option is that the term HLW retains its utility in defining the facilities that are subject to NRC licensing. That is, all materials that have traditionally been considered HLW for purposes of the Energy Reorganization Act would also be regarded as HLW under the Nuclear Waste Policy Act. The disadvantage is that some materials might continue to fall within the HLW classification even though they do not require the degree of isolation afforded by a repository. They would be called "HLW" even though the technical community might not so regard them.

3. Other Considerations Regarding Clause (A) Options

The Commission would add two observations regarding the options discussed above.

a. Development of a definition under Clause (A), as suggested by the first option, would not alter the Commission's existing authority to license DOE waste facilities, including defense wastes facilities, under the Energy Reorganization Act of 1974 (ERA). Any classification of wastes as non-HLW on the basis that they do not contain "sufficient concentrations" of fission products would be irrelevant in determining whether such wastes must be disposed of in licensed disposal facilities. For example, if DOE were to pursue its proposal for in-place stabilization of the Hanford "tank" wastes (see DOE/EIS-0113, March, 1986), most or all of the disposal "facilities" for those wastes would need to be licensed by the NRC.

b. Retaining the traditional definition for purposes of Clause (A) does not limit the Commission's ability to establish at some later date criteria to define wastes that require the isolation afforded by a deep geologic repository or its equivalent. That is, wastes requiring such isolation could be identified by terms other than "high-level".

B. Clause (B)

Clause (B) of the NWPA authorizes the Commission to classify "other highly radioactive material" (other than reprocessing wastes) as HLW if that material "requires permanent isolation." The Commission considers that both characteristics (highly radioactive and requiring permanent isolation) must be present simultaneously in order to classify a material as HLW.[11] Each of these characteristics is discussed in turn in the following sections.

1. Highly Radioactive

The Commission proposes [12] to consider a material "highly radioactive" if it contains concentrations of short-lived radionuclides in excess of the Class C limits of Table 2 of 10 CFR Part 61. Such concentrations are sufficient to produce significant radiation levels and to generate substantial amounts of heat. Moreover, the Class C concentration limits for short-lived nuclides approximate the actual concentrations of those nuclides present in some existing reprocessing wastes (see NUREG-0946, Table 4).

2. Permanent Isolation

The phrase "permanent isolation" in NWPA is much less subjective than is "highly radioactive." Within the context of NWPA, "permanent isolation" clearly implies the degree of isolation afforded by a deep geologic repository.[13] Thus, a waste "requires permanent isolation" if it cannot be safely disposed of in a facility less secure than a repository. The Commission will determine which wastes require permanent isolation by evaluating the disposal capabilities of alternative, less secure, disposal facilities.[14] Any wastes which cannot be safely disposed of in such facilities will be deemed to require permanent isolation and, if also highly radioactive, would be classified as high-level wastes.

The approach which the Commission proposes to pursue to determine which wastes requires permanent isolation will be an extension of the 10 CFR Part 61 waste classification analyses and will consist of the following steps.

a. *Establish acceptance criteria.* 10 CFR Part 61 currently contains performance objectives for disposal of radioactive wastes in a land disposal facility. These performance objectives will serve as acceptance criteria for waste classification analyses, but might need to be supplemented for specific types of facilities or wastes. The Part 61 performance objectives may also need to be supplemented to accommodate any environmental standards for non-HLW which may be promulgated by the U.S. Environmental Protection Agency pursuant to its authority under the Atomic Energy Act of 1954, as amended.

b. *Define disposal facility.* The hazard which a radioactive waste poses to public health depends, in part, on the nature of the facility used for its disposal. Thus, a reference disposal facility, less secure than a repository, needs to be defined in terms of the characteristics which contribute to isolation of wastes from the environment. For land disposal facilities, such characteristics might include depth of disposal, use of engineered barriers, and the geologic, hydrologic and geochemical features of a disposal site.

c. *Characterize wastes.* Wastes will be characterized in terms of the factors which determine their hazard and behavior after disposal, including

[11] The Commission would not find tenable the argument that a material requires permanent isolation *because* it is highly radioactive. The need for permanent isolation correlates with the length of time a material will remain hazardous. Long half-lives, in turn, correlate with low rather than high levels of radioactivity.

[12] All references to "proposals" by the Commission refer only to its tentative views. No formal proposals will be developed until comments are received in response to this notice.

[13] The NWPA includes the following definitions:

The term "disposal" means the emplacement in a repository of high-level radioactive waste, spent nuclear fuel, or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.

The term "repository" means any system licensed by the Commission that is intended to be used for, or may be used for, the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel, whether or not such system is designed to permit the recovery, for a limited period during initial operation, of any materials placed in such system. Such term includes both surface and subsurface areas at which high-level radioactive waste and spent nuclear fuel handling activities are conducted.

[14] These facilities might make use of intermediate depth burial or various engineering measures, such as intruder barriers, to accommodate wastes with radionuclide concentrations unsuitable for disposal by shallow land burial.

physical and chemical forms of the waste, the radionuclide concentrations and associated radiological characteristics, the waste volumes, and the heat generation rates. The wide range of types and characteristics of wastes arising from industrial, biomedical and nuclear fuel cycle sources makes this a particularly critical step in the waste classification process—especially for wastes to be generated in the future (e.g., decommissioning wastes).

d. *Develop assessment methodology.* Analytical methods (including mathematical models and computer codes) for projecting disposal system performance will be acquired or developed. For land disposal facilities, such methods include models of groundwater flow and contaminant transport. An assessment methodology also includes descriptions of the natural and human-initiated disruptive events or processes which could significantly affect disposal system performance as well as the analytical means for evaluating the impacts of such events or processes.

e. *Evaluate disposal system performance.* The performance of the alternative disposal facility will be evaluated to estimate the public health hazards from disposal of various types and concentrations of wastes. Hazards below the acceptance criteria of item (a) above indicate an acceptable match of waste type and disposal option. Wastes which cannot be safely disposed of in the alternative facility will be classified as requiring permanent isolation.

A practical difficulty with classifying wastes as described here is that alternative disposal facilities are currently unavailable. Thus, classification of wastes in this manner requires many assumptions about the performance of nonexistent disposal facilities. Such analyses will inevitably involve substantial uncertainties.

It is also possible that no alternative disposal facility will ever be needed for commercially-generated "above Class C" wastes. (Disposal of such wastes is a Federal, rather than State, responsibility.) Because of the overhead costs of developing and licensing new facilities, the relatively small volumes of such wastes, and the low heat generation rates of some of these wastes, it might prove most economical to dispose of all such wastes in a repository. Nevertheless, the Commission recognizes a "chicken-and-egg" problem here. Until wastes are classified as HLW or non-HLW, it may be difficult for the DOE to make decisions regarding appropriate types of disposal facilities. Therefore, despite the uncertainties involved, the Commission proposes to select a hypothetical alternative disposal facility which will serve as the basis for carrying out waste classification analyses.

Previous analyses by the NRC (NUREG-0782, draft EIS for 10 CFR Part 61) suggest that disposal facilities with characteristics intermediate between shallow land burial and geologic repository disposal may be most effective in protecting against short-term radiological impacts associated with inadvertent intrusion into a disposal facility. These "intermediate" facilities may be much less effective in providing enhanced long-term isolation of very long-lived radionuclides. If this preliminary view is supported by subsequent analyses, wastes with concentrations above the Commission's current Class C limits for long-lived nuclides (Table 1 of 10 CFR Part 61) would require permanent isolation. In the following sections, the Commission will assume, for the sake of illustration, that Table 1 is an appropriate interpretation of the term "requires permanent isolation."

3. Conceptual Definition of "High-Level Waste"

The Commission proposes to Classify wastes as HLW under Clause (B) of the NWPA definition only if they are both highly radioactive and in need of permanent isolation. As discussed above, the Commission considers that wastes should be considered to be highly radioactive if they contain concentrations of short-lived radionuclides which exceed the Class C limits of Table 2 of 10 CFR Part 61. The Commission also assumes, for illustrative purposes, that the radionuclide concentrations of Table 1 of Part 61 are appropriate for identifying the concentrations of long-lived radionuclides requiring permanent isolation. Solidified reprocessing wastes would similarly be classified as HLW only if they contain both short- and long-lived radionuclides in concentrations exceeding Tables 2 and 1, respectively.

It is assumed that a revised definition of HLW would appear in the definitions section of Part 60, and that the materials encompassed by the definition would be subject to the containment requirements of that regulation. It would also serve incidentally to define the materials covered by DOE's waste disposal contracts. This definition would apply only to wastes disposed of in a facility licensed under Part 60. As discussed elsewhere in this notice, there would be no alteration of the Commission's authority to license disposal of HLW under provisions of the Energy Reorganization Act. Some technical amendments would be needed to preserve the jurisdictional provisions of existing Part 60—i.e., to indicate that Part 60 applies to the DOE facilities described in sections 202(3) and (4) of the Energy Reorganization Act, and for that purpose the proposed definition of HLW would not be controlling.

A conceptual, revised definition of HLW could be stated as follows:

"High-level radioactive waste" or "HLW" means: (1) Irradiated reactor fuel, (2) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, (3) solids into which such liquid wastes have been converted, and solid radioactive wastes from other sources, provided such solid materials contain both long-lived radionuclides in concentrations exceeding the values of Table 1 and short-lived radionuclides with concentrations exceeding the values of Table 2.

TABLE 1

Radionuclide	Concentration [1] (Ci/m³)
C-14	8
C-14 in act. metal	80
Ni-59 in act. metal	220
Nb-94 in act. metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting TRU, $t_{1/2}$ > 5 yr	[2]100
Pu-241	[2]3,500
Cm-242	[2]20,000

[1] If a mixture of radionuclides is present, a sum of the fractions rule is to be applied for each table. The concentration of each nuclide is to be divided by its limit, and the resulting fractions are to be summed. If the sum exceeds one for both tables, the waste is classified as HLW.

[2] Units are nanocuries per gram.

TABLE 2

Radionuclide	Concentration [1] (Ci/m³)
Ni-63	700
Ni-63 in act. metal	7,000
Sr-90	7,000
Cs-137	4,600

[1] If a mixture of radionuclides is present, a sum of the fractions rule is to be applied for each table. The concentration of each nuclide is to be divided by its limit, and the resulting fractions are to be summed. If the sum exceeds one for both tables, the waste is classified as HLW

4. Status of wastes not classified as HLW

The NWPA, the Low-Level Radioactive Waste Policy Act, and the Commission's regulations in 10 CFR Part 61 currently classify wastes as "low-level" if they are not otherwise classified as high-level wastes or certain other types of materials (e.g., uranium mill tailings). Classification of certain wastes as HLW, under Clause (B) of the NWPA definition, would reduce the amount of waste classified (by default) as LLW and, more importantly, would establish a distinct, concentration-based boundary between the two classes of waste.

If this conceptual definition of Clause (B) were adopted, certain wastes with radionuclide concentrations above the Class C limits of 10 CFR Part 61 would not be classified as HLW because they do not contain the requisite combination of short- and long-lived nuclides. These wastes would continue to be classified as special types of low-level wastes analogous to DOE's "transuranic" waste category. Any such wastes generated by defense programs would continue to fall under DOE's responsibility for disposal, and no NRC licensing of facilities intended solely for their disposal, such as the Waste Isolation Pilot Plant (WIPP), would be authorized.

As provided by the amendments to the Low-Level Radioactive Waste Policy Act,[15] the Federal government is responsible for disposal of all commercially-generated "above Class C" wastes; it is contemplated, under the amendments, that the NRC would be responsible for licensing the facilities for their disposal. The Commission would continue to permit disposal of wastes containing naturally-occurring or accelerator-produced materials in licensed facilities provided there was no unreasonable risk to public health and safety.

III. Legal Considerations Related to the Nuclear Waste Policy Act

The exercise of NWPA Clause (B) authority may give rise to a number of legal questions which are discussed below.

A. *Disposal of waste generated by materials licensees.* The NWPA established a Nuclear Waste Fund composed of payments made by the generators and owners of "high-level radioactive waste" (including spent fuel) that will ensure that the costs of disposal will be borne by the persons responsible for generating such waste. The Nuclear Waste Fund is to be funded with moneys obtained pursuant to contracts entered into between the Secretary of Energy and persons who generate or hold title to high-level radioactive waste.

The statute addresses the particulars of contracts with respect to spent nuclear fuel and solidified high-level radioactive waste derived from spent nuclear fuel used to generate electricity in a civilian nuclear power reactor. It further limits the authority of the Commission to issue or renew licenses for utilization and production facilities—i.e., for present purposes, nuclear reactors and reprocessing plants—unless the persons using such facilities have entered into contracts with the Secretary of Energy.

The absence of any reference to materials licensees (e.g., fuel fabricators, some research laboratories) suggests that the Nuclear Waste Fund was not intended to apply to their activities. As a result, there could be a question if the Commission were to define materials licensees' waste as high-level waste, because the waste might thereby become ineligible for disposal in a repository. The reason is that the law prohibits disposal of HLW in a repository unless such waste was covered by a contract entered into by June 30, 1983 (or the date the generator or owner commences generation of or takes title to the waste, if later). Few contracts have been entered into with materials licensees except those who are also facility licensees. Thus, it can be argued that the Commission should refrain from designating as HLW, under Clause (B),[16] materials generated by materials licensees.

The Commission is not persuaded by such an argument. The statutory language dealing with the Commission's classification of materials as HLW refers solely to considerations relating to the nature of the wastes, and the character of the licensee generating or owning the waste is simply not relevant. If there are good reasons to treat that waste from materials licensees as HLW, the Commission regards it as likely that any statutory impediment to the acceptance of such waste at a geologic repository could be modified.

B. *Confidence regarding disposal capacity for power reactors.* The availability of waste disposal facilities for wastes generated at commercial power reactors has been the subject of controversy and litigation. The NWPA addresses these concerns by establishing a Federal responsibility to provide for the construction and operation of a geologic repository, leaving undefined (i.e., to the discretion of the Commission) the classes of materials that require permanent isolation in such a facility. Whatever materials they may be, however, they must be transferred to DOE for disposal; and the persons responsible for generating the waste must enter into contracts with DOE which provide for payment of fees sufficient to offset DOE's costs of disposal. Existing facility licensees were required to enter into such contracts by June 30, 1983.

The Commission believes that the purpose of the NWPA can best be accomplished if all the highly radioactive wastes generated by facility licensees (reactors and reprocessing plants) which require permanent isolation are covered by waste disposal contracts with DOE. This would assure that DOE can and will accept possession of such wastes when necessary. Further, in the absence of such assurance, the basis for Commission confidence that these wastes will be safely stored and disposed of would be subject to question even if concerns about the disposal of the licensees' spent nuclear fuel had been laid to rest. Accordingly, if there are any highly radioactive materials (other than those previously regarded as HLW) that are generated by facility licensees and that require permanent isolation, the Commission believes that, for purposes of the NWPA, they should be regarded as "high-level waste." The Commission has reviewed the terms of DOE's standard waste disposal contract and believes that classifying such additional materials as HLW would require no changes to the contract terms.

C. *Implications with respect to disposal methods.* Under the Atomic Energy Act of 1954, the Commission is authorized to establish such standards to govern the possession of licensed nuclear materials as it may deem necessary or desirable to protect health.[17] Under this authority, the Commission may classify materials according to their hazards and may prescribe requirements for the long-term management or disposal thereof. It is not necessary to label materials as HLW under the NWPA in order to require their disposal in a geologic repository or other suitably permanent facility.

The Commission exercised this authority with respect to concentrated

[15] Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. 99-240, Sec. 3, 42 U.S.C. 2021e.

[16] The Nuclear Waste Fund is governed by Sec. 302, Pub. L. 97-425, 42 U.S.C. 10222. The prohibition of disposal of HLW not covered by timely contracts is set out in sec. 302(b)(2).

[17] Sec. 161b., Pub. L. 83-703, 42 U.S.C. 2201(b).

reprocessing wastes by specifying, in Appendix F to 10 CFR Part 50, that any such wastes generated at licensed facilities are to be transferred to a Federal repository for disposal. More recently, the Commission classified certain low-level wastes as being generally acceptable for near-surface disposal (10 CFR Part 61). On the basis of further consideration, the Commission could specify appropriate disposal means for wastes exhibiting radionuclide concentrations greater that those defined in Part 61. Thus, the Commission need not exercise NWPA Clause (B) authority in order to assure that radioactive wastes from licensed activities are disposed of properly. Moreover, the identification of material as HLW under Clause (B) would not by itself mandate that such material must be disposed of in a geologic repository. Since the NWPA authorizes only a single method of permanently isolating HLW—geologic repositories—classification of materials as HLW may effectively preclude disposal of such wastes by other means. Nevertheless, the Commission's regulations will continue to leave open the prospect of disposal by other means if Congress should so authorize.

D. *Relationship to State role.* Section 3 of the Low-level Radioactive Waste Policy Act (LLRWPA), Pub. L. 96-573, 42 U.S.C. 2021b., enacted in 1980, defines a State responsibility to provide, pursuant to regional compacts, for the disposal of "low-level radioactive waste" (LLW).[18] Such waste is defined to mean "radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or by-product material as defined in section 11.e.(2) of the Atomic Energy Act of 1954."

The Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. 99-240, 42 U.S.C. 2021c., limited the range of LLW for which the States must provide disposal capacity. Specifically, the States are not responsible for wastes with radionuclide concentrations in excess of the Class C limits of 10 CFR Part 61. Instead, the Federal government now assumes responsibility for providing disposal capacity for such wastes. Thus, classification of "above Class C" wastes as HLW or non-HLW will have no impact on State government responsibilities.

E. *Impact on existing technical criteria.* NRC's regulations in Part 60 include technical criteria to be applied in licensing DOE's receipt and possession of source, special nuclear, and byproduct material at a geological repository. The regulations would accommodate the disposal of any radioactive materials, including spent fuel, reprocessing wastes, or any other materials which could be disposed of in accordance with the specified performance objectives.

Materials categorized as high-level waste are subject to a containment requirement (§ 60.113(a)(1)(i)(A)) and to specified waste package design criteria and waste form criteria (§ 60.135 (a-c)). These criteria apply to wastes characterized by the presence of fission products generating substantial amounts of heat at the time of emplacement, but with much reduced heat generation after decades or a few centuries.[19] The rule also explicitly provides that design criteria for waste types other than HLW will be addressed on an individual basis if and when they are proposed for disposal in a geologic repository (§ 60.135(d)).

If additional materials were to be designated as high-level waste, the Commission would need to consider whether the existing repository design criteria are appropriate with respect to such materials.

F. *Applicability of HLW definition to naturally-occurring and accelerator-produced radioactive materials.* Clause (B) of the NWPA provides that the Commission may extend the definition of the term "high-level radioactive waste" to include material requiring permanent isolation only where this is "consistent with existing law." The applicable existing law is the Atomic Energy Act of 1954, under which the Commission has authority to regulate the possession and use of "source material," "special nuclear material," and "byproduct material." There are other radioactive materials, however: naturally-occurring radionuclides, such as radium, and accelerator-produced radionuclides. These are not covered by the Atomic Energy Act and hence there would be no statutory basis, consistent with existing law, for the Commission to require that they be disposed of at facilities licensed by the Commission or otherwise to regulate their possession or use. Accordingly, no legal basis exists for the Commission to classify such materials as HLW or non-HLW.

Nevertheless, as already noted, 10 CFR Part 60 contemplates that "other radioactive materials other than HLW" may be received for emplacement in a geologic repository. This provision of Part 60 would not be altered by expanding the definition of HLW. Part 60 provides that waste package requirements for such wastes will be determined on a case-by-case basis when these wastes are proposed for disposal. Thus, it might be determined, on the basis of technical considerations, that certain naturally-occurring or accelerator-produced radioactive waste materials present hazards similar to licensed materials that are defined as high-level waste and that such material should be disposed of in a geologic repository developed under NWPA. If so, plans for such disposal can be reviewed under Part 60 and the Commission could impose such packaging or other requirements as appropriate to protect public health and safety.

IV. Issues on Which Public Comments are Particularly Sought.

The Commission invites comments on all the issues identified in this notice and any other issues that might be identified. However, comments (with supportive rationale) in response to the following would be particularly helpful.

1. Two options are presented for defining reprocessing wastes under Clause (A) of NWPA. The first option proposes to define the "sufficiency" of fission product concentrations in solidified reprocessing wastes in a manner analogous to its treatment of "highly radioactive" and "requires permanent isolation" under Clause (B) (i.e., by examining the hazards posed by wastes if disposed of in facilities other than a repository). The second option interprets Clause (A) as encompassing all those wastes which have heretofore been considered high-level waste under Appendix F to 10 CFR Part 50 and the Energy Reorganization Act. Which of these two approaches is preferable?

2. The Commission proposes that the current Class C concentration limits of 10 CFR Part 61 serve to identify radionuclide concentrations which are "highly radioactive" for purposes of Clause (B) of the NWPA definition. Would an alternative set of concentration limits be preferable? If so, how should such limits be derived?

3. The Commission proposes to equate the "requires permanent isolation" wording of the NWPA definition with a level of long-term radiological hazard requiring disposal in a geologic repository. Are the Commission's

[18] States are not responsible for disposal of LLW from atomic energy defense activities or Federal research and development activities.

[19] The Commission's expectation that HLW would generate significant amounts of heat is reflected in the discussion of transuranic waste in the notice of proposed rulemaking on the Part 60 technical criteria, 46 FR 35284, July 8, 1981. Reduction of the heat load, for example by removal of cesium-137 and strontium-90, could result in different containment requirements. 48 FR 28196, June 21, 1983 (final rule).

proposed analyses appropriate for identification of concentrations requiring permanent isolation?

4. Although, under section 121 of NWPA, no environmental review is required with respect to the definition of HLW, the Commission would welcome identification of any environmental consequences associated with the matters discussed in this notice.

5. Some waste materials, such as certain laboratory wastes or some sealed sources, may be highly concentrated, yet contain only relatively small total quantities of radioactive materials. Is there a need for a special provision (e.g., a minimum total quantity of activity) before a waste should be classified as HLW?

6. What difficulties (legal, administrative, financial, or other) would an expanded definition of HLW cause in implementing the provisions of the NWPA?

7. The Commission's regulations do not generally require that any particular type of waste be disposed of in any specified type of facility. Would such a requirement be appropriate?

8. As discussed in this notice, the Commission has no legal authority to classify naturally-occurring or accelerator-produced radioactive materials (NARM) as HLW or non-HLW. Nevertheless, such materials may be presented for disposal at facilities licensed by the Commission. When the Commission carries out its proposed analyses to identify "other highly radioactive material that . . . requires permanent isolation," should NARM be included in the analyses?

9. Are there issues other than those identified in this notice which the Commission should consider in developing approaches to implement its authority?

Separate Views of Commissioner Asselstine

Commissioner Asselstine is concerned about the potential for creating a confusing situation if the Commission were to adopt the first option under Clause (A). The first option is to numerically specify concentrations of fission products in defining high-level wastes. Under this approach, it is conceivable that material considered high-level waste for the purposes of licensing under the Energy Reorganization Act of 1974 will also be considered low-level waste for the purposes of the Nuclear Waste Policy Act (NWPA) of 1982. Wastes presently being stored at the Hanford waste tanks, which have traditionally been classified as high-level wastes, would likely be reclassified as above Class C low-level waste under the first option. Commissioner Asselstine requests public comment on how this reclassification would affect the NRC's licensing authority over the long-term storage or *in situ* disposal of the Hanford waste tanks. Commissioner Asselstine also requests comments on whether there are alternative approaches to achieving the stated purpose of this advanced notice of proposed rulemaking of identifying wastes subject to the provisions of the NWPA without altering the traditional definition of high-level waste and thus creating this potential for confusion.

List of Subjects in 10 CFR Part 60

High-level waste, Nuclear power plants and reactors, Nuclear materials, Penalty, Reporting requirements, Waste treatment and disposal.

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Dated at Washington, DC, this 20th day of February 1987.

For the Nuclear Regulatory Commission.

Samuel J. Chilk,

Secretary of the Commission.

Appendix—Volumes and Characteristics of Wastes Exceeding Class C Concentration Limits

For a number of years NRC has had an ongoing program to develop regulations and criteria for disposal of low-level radioactive waste. At the time this program was initiated, there was a well-documented need for comprehensive national standards and technical criteria for the disposal of low-level waste. The absence of sufficient technical standards and criteria was seen to be a major deterrent to the siting of new disposal facilities by states and compacts.

A significant milestone in this program was the promulgation of the regulation 10 CFR Part 61 ("Licensing Requirements for Land Disposal of Radioactive Waste") on December 27, 1982 (47 FR 57446). This regulation establishes procedural requirements, institutional and financial requirements, and overall performance objectives for land disposal of radioactive waste, where land disposal may include a number of possible disposal methods such as mined cavities, engineered bunkers, or shallow land burial. This regulation also contains technical criteria (on site suitability, design, operation, closure, and waste form) which are applicable to near-surface disposal, which is a subset of the broader range of land disposal methods. Near-surface disposal is defined as disposal in or within the upper 30 meters of the earth's surface, and may include a range of possible techniques such as concrete bunkers or shallow land burial. The Part 61 regulation is intended to be performance-oriented rather than prescriptive, with the result that the Part 61 technical criteria are written in relatively general terms, allowing applicants to demonstrate how their proposals meet [illegible] criteria for various specific near-surface disposal methods.

A waste classification system was also instituted in the regulation which established three classes of waste suitable for near-surface disposal: Class A, Class B, and Class C. Limiting concentrations for particular radionuclides were established for each waste class, with the highest limits being in Class C. The concentration limits were established based on NRC's understanding (at the time of the rulemaking) of the characteristics and volumes of low-level waste that would be reasonably expected to the year 2000, as well as potential disposal methods.

The Class C concentration limits are applicable to all potential near-surface disposal systems; however, the calculational [illegible] performed to establish the limits are based on postulated use of one near-surface disposal method: shallow land burial. The Class C limits are therefore conservative since there may be other near-surface disposal methods that have greater confinement capability (and higher costs) than shallow land burial.

The regulation states that waste exceeding Class C concentration limits is considered to be "not generally acceptable for near-surface disposal," where this is defined in § 61.55(a) as "waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste." Thus, waste exceeding Part 61 concentrations generally has been excluded from near-surface disposal and is being held in storage by licensees. (This amounts to less than 1% of the approximately 3,000,000 ft³ of commercial low-level waste generally considered generated.) Given the current absence of prescriptive requirements for disposal of waste exceeding Class C concentration limits, the regulation allows for evaluation of specific proposals for disposal of such waste on a case-by-case basis. The general criteria to be used in evaluating specific proposals are the Part 61 performance objectives contained in Subpart C of the regulation.

Current NRC activities include analyses of low-level waste that exceeds Class C concentration limits to determine the extent to which alternative near-surface disposal systems (e.g. concrete bunkers, augered holes, deeper disposal) may be suitable for safe disposal of such waste. These analyses include a more detailed characterization of physical, chemical, and radiological characteristics of wastes that may be close to or exceed Class C concentration limits, as well as development of improved methods for modeling the radiological and economic impact of disposal of these wastes. A related activity is development of more specific guidance for design and operation of alternative near-surface and other land disposal systems. These activities represent a continuation of the Part 61 rulemaking process as discussed in the December 27, 1982 notice of the final Part 61 regulation (47 FR 57446).

Wastes exceeding Class C concentrations are projected to be generated by nuclear power reactors and other supporting nuclear fuel cycle facilities, and also generated by

radioisotope product manufacturers and other facilities and licensees outside of the nuclear fuel cycle. Such wastes can be grouped as follows:

—*Plutonium-contaminated nuclear fuel cycle wastes*
—Activated metals
—Sealed sources
—Radioisotope product manufacturing wastes
—Other waste

Plutonium-contaminated nuclear fuel cycle wastes. These wastes are being generated from two principal sources. One source of waste arises from operations supporting the nuclear fuel cycle—i.e., post-irradiation radiochemical and other performance analyses of spent fuel rods from nuclear reactors (e.g., "burnup" studies). These operations generate about 200 ft³ of plutonium-contaminated waste per year, much of which is believed to exceed Class C concentration limits. This waste consists of solidified liquids and other solid material such as scrap, trash, and contaminated equipment. Eventual decommissioning of the three facilities currently performing these analyses is expected to generate additional waste volumes, a portion of which is expected to exceed Class C concentration limits.

The second source of waste arises from fuel cycle licensees who have previously been authorized to use plutonium in research and development of advanced reactor fuels. None of these licensees is using plutonium now, and there is no prospect in the foreseeable future for such activities. In fact, each of the licensees in this category has either decommissioned, or is in the process of decommissioning, its facility. Some of the licensees have made contractual arrangements to transfer their decommissioning waste to DOE for retrievable storage. Approximately 5,000 to 10,000 ft³ of waste, however, is projected to be generated on a one-time basis that will not be covered by contract.

Activated metals. Activated metals are typically generated as a result of long-term neutron bombardment of metals forming the structure or internal components of a nuclear reactor used for power production, radioisotope production, or other purpose (e.g., education, testing, research). Activated metal wastes are unlike most other wastes being generated in that the radionuclides form part of the actual metal matrix rather than being mixed with large volumes of other, nonradioactive material such as paper, cloth or resins. Radionuclide release is principally governed by the material corrosion rate, and for most reactor metals of concern (e.g., stainless steel), the corrosion rate is quite low.

To date, only a small fraction (about 200 ft³/yr) of the activated metal waste currently being generated by nuclear power reactors has been identified as exceeding Class C concentration limits. Such waste appears to primarily consist of in-core instrumentation which is no longer serviceable. An example of this waste is a reactor flux wire which is physically small but may be high in activity. (A flux wire is a wire that is inserted into a tube running the length of the reactor core and used to make neutron flux measurements.)

Large quantities of activated metal wastes are projected to be generated in the future as a part of reactor decommissioning. Studies by NRC (NUREG/CR-0130, addendum 3 and NUREG/CR-0672, addendum 2) indicate that over 99% of the waste volume that is projected to result from nuclear power reactor decommissioning will not exceed class C concentration limits and the 1% that is projected to exceed these limits will be almost all activated metals from core structure. Conservative estimates presented in these studies indicate that packaged quantities of decommissioning wastes exceeding Class C concentration limits will total about 3700 ft³ for a large (1175 MWe) pressurized water reactor (PWR) and about 1660 ft³ for a large (1155 MWe) boiling water reactor (BWR). Much smaller quantities of wastes exceeding Class C concentration limits may also be generated from future decommissioning of test, research, and education reactors.

Another source of activated metal waste is expected to arise as part of consolidation of spent fuel assemblies for storage and/or disposal. Spent fuel assemblies now being periodically discharged from nuclear power reactors are stored in on-site fuel storage pools. Each assembly is composed of a large number of fuel rods arranged in a rectangular array, and held in place by spacer grids, tie rods, metal end fittings, and other miscellaneous hardware. One option under consideration, for long-term waste storage and eventual disposal is to remove this hardware form the fuel rods. This allows the fuel rods, which contain the fission products which are of primary interest in terms of geologic repository disposal, to be consolidated into a smaller volume. This enables more economical storage and easier handling for transport and disposal. The hardware, which is composed of various types of corrosion-resistant metal such as Inconel or zircalloy, becomes a second waste stream which could potentially be safely disposed by a less expensive method than a geologic repository.

Based on information from DOE (DOE/RW-0006, September, 1984) about 12 kg of waste hardware would be generated per BWR fuel assembly, and about 26 kg per PWR fuel assembly. Assuming 200 fuel assemblies are replaced per year per large 1000-NWe) BWR, roughly 2400 kg of activated metal hardware would be generated per year per large BWR, and about 1700 kg per PWR. An approximate compacted volume is on the order of 50 ft³/yr per large reactor, or about 4,600 ft³/yr over the entire industry. Depending upon parameters such as the fuel irradiation history and the hardware elemental composition, particular pieces of separated hardware may or may not exceed Class C concentration limits.

Other than perhaps a few isolated cases, all of the spent fuel assemblies are being stored by licensees with the hardware still attached. Under the provisions of the NWPA, operators of nuclear power plants have entered into contracts with DOE for acceptance by DOE of the spent fuel for storage and eventual disposal. (See 48 FR 16590, April 18, 1983 for the terms of the contract.) Acceptance of the spent fuel by DOE implies acceptance of the activated hardware along with the fuel rods, with the result that disposal of the hardware would intrinsically be a Federal rather than a State responsibility. Disposal responsibility becomes less clear if licensees, seeking more efficient onsite storage, consolidated fuel themselves.

Sealed sources. A number of discrete sealed sources have been fabricated for a variety of medical and industrial applications, including irradiation devices, moisture and density gauges, and well-logging gauges. Each source contains only one or a limited number of radioisotopes. Sealed sources can range in activity from a few millionths of a curie for sources used in home smoke detectors to several thousand curies for sources used in radiotherapy irradiators. Sealed sources are produced in several physical forms, including metal foils, metal spheres, and metal cylinders clamped onto cables. The larger activity sealed sources typically consist of granules of radioactive materials encapsulated in a metal such as stainless steel.

Sealed sources are generally quite small physically. Even sources containing several curies of activity have physical dimensions which are normally less than an inch or two in diameter and 6 inches in length. These dimensions are such that, like activated metals, sealed sources may be considered to be a unique form of low-level waste. Characterizing sealed sources in terms of radionuclide concentration certainly appears to be of less utility than characterizing sealed sources in terms of source activity.

Depending upon the application, sealed sources may be manufactured using a variety of different radioisotopes. A review of the NRC sealed source registry was conducted to identify those source designs which may contain radioisotopes in quantities that might exceed Class C concentration limits. The principal possibilities appear to be those containing cesium-137, plutonium-238, plutonium-239, and americium-241. Large cesium-137 sources are generally used in irradiators, and while some large sources can range up to a few thousand curies, most which are sold appear to contain in the neighborhood of 500 curies. Cesium-137 is a beta/gamma emitter having a half-life of 30 years, which suggests that special packaging and disposal techniques can be readily developed for safe near-surface disposal of sources containing this isotope.

The remaining three isotopes are alpha emitters and are longer lived. Sources manufactured using these isotopes can range up to a few tens of curies, although most that have been sold appear to be much less than one curie in strength. Plutonium-239 sources are not commonly manufactured. Plutonium-238 sources have been manufactured for use as nuclear batteries for applications such as heart pacemakers. Plutonium-238 has also been used in neutron sources, although neutron sources currently being manufactured generally contain americium-241. Americium-241 is also used in a wide

variety of other industrial applications such as fill level gauges.

Neutron sources produce neutrons for applications such as reactor startup, well logging, mineral exploration, and clinical calcium measurements. These sources contain alpha-emitting radionuclides such as americium-241 plus a target material (generally beryllium) which generates neutrons when bombarded by alpha particles. Neutron sources can contain up to approximately 20 curies of activity.

It is difficult to project potential waste sealed source quantities and activities, since sealed sources as wastes are not routinely generated as part of licensed operations. In addition, sealed sources only become waste when a decision is made by a licensee to treat them as such. In many instances sources held by licensees may be recycled back to the manufacturer when they are no longer usable, and the radioactive material recovered and fabricated into new sources. Finally, source manufacturers are licensed by the NRC and NRC Agreement States to manufacture a particular source design up to a specified radioisotope curie limit. Most actual sources, however, contain activities considerably less than the design limit.

NRC staff estimates that licensees currently possess approximately 10,000 encapsulated sources having activities above a few thousandths of a curie and containing americium-241 or plutonium-238. Given the hypothetical case that all these sources were candidates for disposal, the total consolidated source volume would be only about 35 ft^3. After packaging for shipment, however, the total disposed waste volume would be significantly increased. The total activity contained in the sources is estimated to be approximately 70,000 curies.

Radioisotope product manufacturing wastes. Wastes exceeding Class C concentration limits are occasionally generated as part of manufacture of sealed sources, radiopharmaceutical products, and other materials used for industrial, educational, and medical applications. Volumes and characteristics of such wastes are difficult to project. However, it is believed that the largest volume of this waste consists of sealed sources which cannot be recycled, plutonium-238 and americium-241 source manufacturing scrap, and waste contaminated with carbon-14.

Sealed sources as a waste form are discussed above. Manufacture of large plutonium-238 and americium-241 sources is concentrated in only a few facilities, from which the generation of waste exceeding Class C concentration limits is believed to total only a few hundred ft^3 per year. Approximately 10 ft^3 per year of carbon-14 waste is generated as a result of radiopharmaceutical manufacturing.

Other wastes. Although the above discussed wastes are believed to be the principal wastes that are expected to exceed Class C concentration limits, other wastes may occasionally also be generated. For example, relatively small quantities of such wastes are currently being generated as part of decontamination of the Three Mile Island, Unit 2, nuclear power plant. However, these wastes are being generated as a result of an accident, are therefore considered abnormal, and are being transferred to DOE under a memorandum of understanding with NRC. Wastes exceeding Class C concentration limits and generated as part of the West Valley Demonstration Project are also being transferred to DOE for storage pending disposal.

Sealed sources and other waste containing discrete quantities of radium-226 may also exceed Class C concentration limits. Products containing radium-226 have been manufactured in the past for a variety of industrial and medical applications. Such wastes are not regulated by NRC but occasionally have been disposed at licensed low-level waste disposal facilities. NRC is currently investigating the impacts of disposal of such waste in order to provide guidance to States and other interested parties on safe disposal methods and any concentration limitations.

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