

April 24, 1987

P.O. Box 123

Ellicottville, N.Y. 14731

DOCKETED

87 MAY -4 P6:36

Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555  
Attn: Docketing and Service Branch

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

Dear Secretary:

As someone who has been living very near the former Nuclear Fuel Services site in West Valley and seen some of the problems that have evolved there, it is my opinion that the NRC should strongly consider Option No.1 as described in the Federal Register, Vol.52, No.39, "Definition of 'High-Level' radioactive waste". This option, under Option No.1 as listed,

...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).

I have several reasons for believing that this option is the better of the two given. First of all, it is common sense that tells me that in terms of future human health it is better to have borderline Class C/High-level Waste in a federal repository than to take the chance we would be taking in having it stored in various "low-level" storage facilities, which will, most likely, be of varying efficacy.

At West Valley, for example, the DOE proposes to store within a tumulus some waste which is very questionably Class C waste, and may in actuality be transuranic waste. The proposed tumulus construction area is prone to severe erosion. This particular potential "mistake" aside, in how many other places across the nation could this type of situation occur, endangering people to highly contaminated materials? Realistically it would be safer to place this higher-level waste in a federal repository.

This leads to my second point, where again, I use West Valley as an example of what can occur under the present waste classification "system". Almost one-half of the waste which DOE intends to bury (in tumulus) at West Valley is statutorily defined as "transuranic waste". The Environmental Assessment done by DOE to assess the low-level waste problem at West Valley mislabels this waste as "low-level". Much of what this assessment is calling "low-level" waste is material contaminated with elements which have an atomic number greater than 92, including

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Acknowledged by card.....

neptunium, plutonium, americium and curium, and which are in concentrations greater than 10 nanocuries per gram. Therefore, these waste sources and types appear to constitute transuranic waste as defined by Congress in Section 6(5) of the West Valley Demonstration Project Act. It seems that the DOE has adopted a definition of "low-level" waste to suit its desired ends.

In my limited knowledge of the bureaucratic review(s) mandated for the West Valley Site, I have come to understand that the NRC may not be responsible for overseeing the definitions of waste utilized by DOE and New York State. Perhaps this in itself is a mistake, and should be taken under consideration by the Commission.

But even though lack of NRC oversight may have made it easier for DOE to choose its preferred low-level waste definition, it is possible to project that other agencies could also attempt to do the same given the vague character of radioactive waste definition as it stands. It seems to me that such exploitation of the varying (to-date) definitions, both numerical and by source, would not be so tempting if the NRC restricted such measurement to defining "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)," and especially if the NRC insisted upon the honest examination of "the hazards posed by wastes if disposed of in facilities other than a repository." (Federal Register) We cannot continue to allow various federal and state agencies, (as well as, I must assume, private enterprise,) to pick and choose their preferred definitions of low-level waste. The second option given here, definition by source, is both too vague and not at all encompassing the kinds of waste that will need to be dealt with in the future. In Option No.2 there are, put quite simply, too many holes to slip through.

However, even though Option No.1 is likely to be less vague than Option No.2, there may be definition questions in the future. For example, what about the storage of radioactive wastes mixed with highly migratory solvents? Should these, even if below Class C level, be buried in any form? The NRC must be able to distinguish particularized problems such as this one, and must be willing to work with the agencies and organizations necessary to apply safe storage of such "wicked waste".

It is also my opinion that although at present "The Commission's regulations do not generally require that any particular type of waste be disposed of in any specified type of facility," it should consider taking a harder look at the option of readily retrievable storage facilities for much of the low-level waste in existence today, until such time as we can effectively contain such waste. The "out-of-sight-out-of-mind" mentality is not helping us to solve our waste problem. At present there is no truly effective and solid method of low-level waste disposal, especially in areas of high precipitation. Government, like people, most often fails when it refuses to acknowledge that it still has much to learn.

Sincerely,

  
Kathy Roach

DOCKET NUMBER

PROPOSED RULE

PR-60 (21)  
(52 FR 5992)

DOCKETED  
USNRC

'87 MAY -4 AIO:10

OFFICE OF THE  
DOCKET CLERK

979 West Outer Drive  
Oak Ridge, TN 37830  
April 29, 1987

Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attention: Docketing and Service Branch

Dear Sirs:

I am submitting the attached material in response to the call for public comments on the advance notice of proposed rulemaking for 10 CFR Part 60, "Definition of 'High-Level Radioactive Waste'," which was published in the Federal Register on February 27, 1987. Thank you very much for your consideration of these comments.

Sincerely,

*David C. Kocher*

David C. Kocher

Enclosure

MAY 08 1987

Acknowledged by card.....

COMMENTS ON ADVANCE NOTICE OF PROPOSED RULEMAKING FOR  
10 CFR PART 60, DEFINITION OF HIGH-LEVEL RADIOACTIVE WASTE

These comments on the Advance Notice of Proposed Rulemaking (ANPR) on the definition of high-level radioactive waste (HLW) focus on the technical issues involved in developing such a definition. My belief is that the Nuclear Regulatory Commission (NRC) should develop a definition of HLW which is quantitative, generally applicable to any waste regardless of its source, and risk-based with a primary emphasis on consideration of risks from waste disposal. I recognize that there may be significant legal impediments to the NRC developing such a definition, but my comments assume that such impediments can be overcome.

As a general comment, I strongly support the proposal in the ANPR that HLW should be defined in terms of two distinct attributes - namely, HLW is waste that is "highly radioactive" and "requires permanent isolation." This conceptual definition is in accord with the properties that have been associated historically with wastes defined as HLW on the basis of their source as waste from reprocessing of spent reactor fuel; and even though risks from disposal have become the primary basis for establishing waste classification systems, as opposed to risks during waste operations, it is important in the design of some disposal facilities to distinguish between wastes that are "highly radioactive" and those that are not even when both types of waste "require permanent isolation." Given this conceptual definition of HLW, the challenge then is to quantify boundaries for the two distinct attributes on the basis of risk.

The following comments specifically address the first eight issues on which the NRC is seeking public comment, as presented in Section IV of the ANPR.

- [1] Issue 1 - Regarding the two options for defining reprocessing wastes under Clause (A) of the Nuclear Waste Policy Act (NWPA) of 1982, I strongly encourage the NRC to adopt the first option which involves a quantification of "contains fission products in sufficient concentrations." I believe this is the only option that would reconcile and unify the definitions in Clauses (A) and (B) of the NWPA and yield a generally applicable, risk-based definition of HLW. In my opinion, there is no merit on technical grounds in retaining the traditional source-based definition of HLW regardless of the resulting concentrations of radionuclides in the waste and the resulting risks from waste disposal.

It seems certain that any reasonable generally applicable definition of HLW will encompass spent fuel and reprocessing wastes from normal operations of commercial power reactors, but such a definition likely will have considerable impact on reprocessing wastes currently called HLW that arise from defense activities of the Department of Energy (DOE), because of the lower fuel burnups that generally are involved. However, if such waste turns out not to be HLW under a quantitative, generally applicable, and risk-based definition, then the waste should be treated accordingly for purposes of management and disposal.

- [2] Issue 2 - In my opinion, the proposal to define wastes that are "highly radioactive" as wastes in which the concentrations of radionuclides exceed the Class-C limits in Table 2 of 10 CFR Part 61 is reasonable only for wastes from fuel reprocessing that contain high concentrations of the principal fission products  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$ ; i.e., I agree that it is reasonable to define wastes with concentrations of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in excess of their Class-C limits as "highly radioactive." However, I also believe that the proposal has significant deficiencies and must be extended to make it generally applicable to any waste.

In particular, the proposal in the ANPR provides no means of determining whether any type of waste is "highly radioactive." The ANPR has indicated that "highly radioactive" means high levels of decay heat and external radiation, but no indication of how these two properties are to be quantified has been given. Thus, the choice of the Class-C limits in Table 2 of 10 CFR Part 61 for defining "highly radioactive" without further justification and support is quite arbitrary, because the Class-C limits are not based on levels of decay heat or external radiation. Although an appropriate analysis would show that the Class-C limits for  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  probably are reasonable for defining "highly radioactive" in terms of levels of decay heat (power density) and external radiation, respectively, it is important to recognize that this result is entirely fortuitous.

The proposal for defining "highly radioactive" has one illogical and one undesirable consequence. The illogical consequence is that wastes with concentrations of  $^{63}\text{Ni}$  above its Class-C limits for bulk solid wastes or activated metals in Table 2 of 10 CFR Part 61 would be defined as "highly radioactive." However, 700 Ci/m<sup>3</sup> of  $^{63}\text{Ni}$  in bulk solid wastes and 7,000 Ci/m<sup>3</sup> in activated metals correspond to

power densities of only 0.07 and 0.7 W/m<sup>3</sup>, respectively; and such levels hardly can be regarded as "highly radioactive," particularly when the Class-C limit for <sup>90</sup>Sr corresponds to a power density of about 50 W/m<sup>3</sup>. Furthermore, the external radiation from any concentration of <sup>63</sup>Ni is essentially zero, because this radionuclide emits only low-energy beta particles. Thus, it is illogical to define "highly radioactive" strictly in terms of the Class-C limits in Table 2 of 10 CFR Part 61. The undesirable consequence of the proposal is that Table 2 of 10 CFR Part 61 contains Class-C limits for only three radionuclides. One can imagine many types of waste with high levels of decay heat or external radiation that result from the presence of radionuclides other than <sup>90</sup>Sr and <sup>137</sup>Cs, but the proposal in the ANPR provides no means of determining whether such wastes are "highly radioactive." In other words, the proposed approach to defining this attribute of waste does not have a generally applicable basis, and such a basis is necessary for a proper definition.

- [3] Issue 3 - I believe the proposed analyses for identifying wastes that "require permanent isolation" in the sense of the NWPA are appropriate and desirable, because the analyses would be used to establish for the first time minimum concentrations of radionuclides that require deep geologic repositories or equivalent for protection of public health and safety [i.e., maximum concentrations that would be acceptable for greater confinement disposal (GCD)]. Thus, such analyses would provide important incentives for developing disposal alternatives that are more confining than near-surface land disposal but less confining (and cheaper) than deep geologic isolation.

Strictly for the sake of illustration, the ANPR assumes that the Class-C concentration limits in Table 1 of 10 CFR Part 61 would provide an appropriate interpretation of the term "requires permanent isolation." This is a reasonable initial assumption in the absence of the proposed analyses that would be needed to establish a more reasonable set of concentration limits. However, the ANPR also suggests that GCD may not be significantly more effective than near-surface land disposal in providing long-term isolation for very long-lived radionuclides, i.e., that the Class-C limits in Table 1 of 10 CFR Part 61 may provide a reasonable definition of "requires permanent isolation" in the sense of the NWPA for many long-lived radionuclides. I would caution against suggesting such a conclusion in the absence of supporting analysis. One analysis for intermediate-depth burial with which I am familiar

suggests that the concentration limits of many long-lived radionuclides that would be acceptable for GCD may be significantly higher than the Class-C limits. I would regard differences of an order of magnitude or more as "significant" for purposes of this argument.

- [4] Issue 4 - I have no comment on this issue.
- [5] Issue 5 - I believe there is a need for special provisions in defining wastes that are highly concentrated but contain relatively small quantities of total activity (i.e., occupy small volumes). In classifying such wastes, I would suggest that the concentration should be determined by averaging the total activity over the volume of the waste package that is intended for final disposal. However, for small sources, the allowable volume for this averaging procedure generally should not exceed  $1 \text{ m}^3$ , which is the nominal size of a canister for remote-handled transuranic (TRU) waste at the DOE's Waste Isolation Pilot Plant facility, unless a larger waste package is required for protection of workers during waste emplacement.
- [6] Issue 6 - I have no comment on this issue.
- [7] Issue 7 - I strongly support the NRC's current position that particular types of waste do not require disposal in specified types of facilities. I believe such a policy is essential for developing flexible and cost-effective disposal alternatives. However, if the NRC is successful in establishing minimum concentrations of radionuclides that require deep geologic repositories or equivalent for purposes of defining HLW, then it would be appropriate to define HLW in association with a requirement for disposal in deep geologic repositories or equivalent. On the other hand, in associating waste classes with particular disposal facilities, care must be taken to ensure that disposal of wastes in facilities that are more confining than would be necessary for protection of public health and safety is not precluded, because it may not be cost-effective to develop a number of different disposal technologies for the wide variety of wastes that may exist.
- [8] Issue 8 - In carrying out the proposed analyses for identifying "other highly radioactive material that...requires permanent isolation" in response to Clause (B) of the NWPA, I believe that naturally occurring or accelerator-produced radioactive materials should be included, even though the NRC may have no legal authority

to classify such materials. On technical grounds alone, a reasonable waste classification system should be generally applicable to all wastes regardless of their source.

The following comments refer to other aspects of the ANPR.

- [1] As indicated in the comments on Issue 2 above, a fundamental weakness of the proposed approach for defining HLW strictly in terms of concentrations of radionuclides that exceed the Class-C limits in Tables 1 and 2 of 10 CFR Part 61 is that the list of radionuclides included in these tables is too restrictive to encompass many types of wastes that may exist. For example, the proposed definition of HLW used for illustrative purposes in the ANPR provides no basis for classifying wastes that contain high concentrations of  $^{226}\text{Ra}$ ,  $^{232}\text{U}$ ,  $^{233}\text{U}$ , or highly enriched uranium, and the definition may be inadequate for classifying highly contaminated wastes from decontamination and decommissioning activities. Thus, as I have emphasized previously, there is a clear need for a generally applicable definition of HLW, and the proposal in the ANPR should be extended to provide such a definition.
- [2] The ANPR suggests that only radionuclides listed in Table 1 of 10 CFR Part 61, or other very long-lived radionuclides, would be included in the proposed analysis of radionuclide concentrations that "require permanent isolation," i.e., that the radionuclides listed in Table 2 of 10 CFR Part 61 would not be included in the analysis. I would strongly urge that the NRC not dismiss a priori the possibility that the "shorter-lived" radionuclides in Table 2 of 10 CFR Part 61 could exist in concentrations sufficient to "require permanent isolation" in the sense of the NWSA. It is important to remember that the Class-C limits in Tables 1 and 2 of 10 CFR Part 61 result from the same analysis, and that the only reason for separating the results into two tables is to distinguish between those radionuclides that decay significantly over the time period of 500 years during which inadvertent intrusion into a near-surface disposal facility is assumed to be prevented (Table 2) and those radionuclides that generally do not decay significantly over this time period (Table 1).

In particular, I believe it is improper to use the Class-C limits for  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  in Table 2 of 10 CFR Part 61 only in defining wastes that are "highly radioactive." I believe that high concentrations of these radionuclides also should be considered in



determining wastes that "require permanent isolation," i.e., that  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  by themselves could be classified as HLW. Although the half-lives of these radionuclides are relatively short compared with the half-lives of most of the radionuclides in Table 1 of 10 CFR Part 61, there exist  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  wastes in concentrations so much greater than their Class-C limits that they would still be quite hazardous after 500 years of decay, and I believe it could be appropriate to determine that such wastes "require permanent isolation" in the sense of the NWPA. If radionuclides in Table 2 of 10 CFR Part 61 are excluded from the proposed analysis, such high concentrations of  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$  always would be "above Class C" waste, even though this term remains ill-defined.

- [3] The Class-C limit of 100 nCi/g for all long-lived, alpha-emitting TRU radionuclides in Table 1 of 10 CFR Part 61 probably is adequate for near-surface land disposal of most of the commercial wastes with which the NRC has been concerned in the past. However, in developing a generally applicable definition of HLW, I would strongly urge that radionuclide-specific concentration limits for TRU radionuclides in  $\text{Ci/m}^3$  be used, as in Appendix C of the Final Environmental Impact Statement for 10 CFR Part 61, because this is the quantity that is related to risk from waste disposal. At a minimum, the determination of concentrations of TRU radionuclides that "require permanent isolation" should recognize that the risk from disposal of a given concentration of  $^{238}\text{Pu}$  is considerably less than the risk from disposal of the same concentration of most of the longer-lived TRU radionuclides if a time period of 500 years is assumed for prevention of inadvertent intrusion into a disposal facility. It also is noteworthy that  $^{238}\text{Pu}$ , which appears in the "long-lived" Table 1, has a shorter half-life than a radionuclide ( $^{63}\text{Ni}$ ) which appears in the "short-lived" Table 2, which again emphasizes the rather artificial separation of the Class-C limits into two tables.
- [4] Regarding the proposal for defining wastes that "require permanent isolation," I believe that an important goal of such an analysis should be the development of generally applicable technical criteria for the acceptability of GCD. Such technical criteria would include more than just limits on radionuclide concentrations that would be acceptable for GCD, and might include requirements on the disposal facility and engineered systems.

- [5] The ANPR discusses the issue of the impacts of a definition of HLW, as called for in Clause (B) of the NWPA, on existing source-based definitions of HLW in law and other regulations. I believe that a quantitative and generally applicable definition of HLW should be developed that would replace all previous legal and regulatory definitions. It is illogical and inconsistent to develop a quantitative and generally applicable definition of HLW for one regulation (10 CFR Part 60) but to maintain the existing source-based and qualitative definitions elsewhere.
- [6] The proposed definition of HLW in the third column of page 5996 of the Federal Register notice in terms of the Class-C concentration limits in Tables 1 and 2 of 10 CFR Part 61 appears to apply only solid wastes derived from liquid reprocessing wastes or other sources, but not to spent fuel or liquid reprocessing wastes. Again, this would not be a generally applicable definition, and the problem would remain that spent fuel and liquid reprocessing wastes still would be defined as HLW regardless of their radionuclide concentrations (i.e., regardless of the fuel burnups involved). This approach is inconsistent with the apparent intent of the NRC, as expressed in the ANPR, to develop a definition of HLW that also encompasses and quantifies the traditional source-based definitions of HLW. As emphasized in previous comments, it is illogical to develop a quantitative definition of HLW that applies to some wastes but not to others. In a generally applicable definition, there is in fact no need to say anything about the source of the waste. Rather, one only needs to specify radionuclide concentrations that define "highly radioactive" and "requires permanent isolation."
- [7] In developing a definition of HLW, I believe it is important that the definition apply only to materials that have been declared to be waste and to waste materials that are in the form intended for final disposal. This is particularly important for spent fuel because such material is not necessarily waste, e.g., when it has been withdrawn temporarily from a reactor. Application of the definition to waste forms intended for final disposal is important because radionuclide concentrations can change considerably between the time of waste generation and final disposal, due to waste processing and radioactive decay. Furthermore, with this approach, there would be no need to apply a definition of HLW to liquid reprocessing wastes (or liquid wastes from any source), because such wastes must be solidified before final disposal.

My principal comments on the ANPR may be summarized as follows.

- The NRC should develop a quantitative, generally applicable, and risk-based definition of HLW. In particular, such a definition should encompass and quantify all wastes described in Clauses (A) and (B) of the NWPA definition, and the definition should apply to all waste materials even though the NRC may have no legal authority to classify them.
- The proposal to define HLW as waste that is "highly radioactive" and "requires permanent isolation" is the most appropriate conceptual approach.
- The proposals to define "highly radioactive" in terms of high levels of decay heat and external radiation and to define "requires permanent isolation" in terms of concentrations of radionuclides that require deep geologic repositories or equivalent for protection of public health and safety are appropriate.
- The proposal to define "highly radioactive" quantitatively in terms of the Class-C limits in Table 2 of 10 CFR Part 61 is seriously flawed, because the definition is not related to levels of decay heat or external radiation and, thus, is not generally applicable to any wastes.
- The proposed analyses to determine wastes that "require permanent isolation" in the sense of the NWPA should ensure that all radionuclides of concern are included, not just those listed in Table 1 of 10 CFR Part 61.
- The definition of HLW should apply only to materials that have been declared to be waste and to waste materials that are in the form appropriate for final disposal.



COALITION ON WEST VALLEY NUCLEAR WASTES, Sharp Street, East 95, Accord, NY 14055  
87 MAY 11 1987  
716-941-3168

R-60 (22)  
(52 FR 5992)

OFFICE OF THE SECRETARY  
May 9, 1987

Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

To: Nuclear Regulatory Commission  
From: Coalition on West Valley Nuclear Wastes  
Re: NRC Proposed rulemaking (2/27/87)

I

The Coalition on West Valley Nuclear Wastes believes that it more appropriate to define high level waste by concentration and by length of half life than by source or by storage facility type. Both factors, concentration and longevity, are important considerations and should be considered sufficient to delineate high level waste either alone, or in combination with each other. We believe this either/or stipulation is more reasonable than a requirement that both long half-life and high concentrations be present before a waste could be designated as high level.

Perhaps a grid would be best to illustrate this point:

Half life (in years)

Concen-            1        5        10        20        50        100        200  
trations

Class A			x	x	x	x	x
Class B			x	x	x	x	x
Class C	x	x	x	x	x	x	x
Over Class C	x	x	x	x	x	x	x

Across the top of the grid the years of half life would be placed. On the vertical side would be the concentration, Ci/m3. The squares with x-es in them indicate the combination of factors which we suggest be used to define HLW. For instance, all wastes with half lives over 10 years, regardless of concentration, should be classified as HLW. All wastes with concentrations above Class B levels (10 CFR 61) should be considered HLW. This grid concept should be useful even if different values are used. The two factors are discussed below.

### CONCENTRATIONS

We believe the concentrations listed in Tables 1 and 2 for Class C wastes in 10 CFR 61 are too high to be defined as low level and would like to see wastes of these concentrations classified as HLW as well as all higher concentrations.

### LONGEVITY

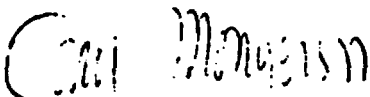
A ten year half life would, using a commonly accepted rule of thumb, give us a period of 100 years during which the wastes would have to be secured and monitored. This is the institutional control period already agreed upon as reasonable by many people. Wastes with half lives over ten years should be treated as high level, regardless of source or atomic number.

### III

There may be wastes with physical and/or chemical characteristics which will require special consideration. An example would be the presence of organic solvents such as chelating agents or kerosene, benzene or toluene, which encourage the migration of radionuclides. The presence of organics in a waste should disqualify it immediately for shallow land burial. Other cases may be more difficult to classify and may require case by case consideration. Enough flexibility should be built into the definition to take care of these special cases. Where there is a question, the waste definition should default to the next higher level.

### III

A prohibition against dilution of wastes to make them fit into a lower class should be included in the NRC regulations. This practice does not reduce the total potential person-rem of the wastes but only makes them more accessible to the public because lower classifications of waste require less secure disposal.

  
Submitted by Carol Mongerson  
Coalition on West Valley Nuclear  
Wastes



**Consumers  
Power**

**POWERING  
MICHIGAN'S PROGRESS**

General Offices: 1845 West Parnall Road, Jackson, MI 49201 • (517) 788-1636

FILE NUMBER 12-60 (23)  
(52 FR 5992)

**Kenneth W Berry**  
Director  
Nuclear Licensing

May 11, 1987

Secretary of the Commission  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attention: Docketing and Service Branch

**CONSUMERS POWER COMPANY COMMENTS ON ANPR - DEFINITION OF HIGH-LEVEL WASTE**

Consumers Power Company is pleased to provide comments on the advance notice of proposed rulemaking "Definition of High-Level Radioactive Waste" published in the Federal Register on February 27, 1987 (52FR5992).

The following comments deal specifically with the questions posed by the Commission in Section IV of the ANPR. The numbering of our comments follows the numbering of Section IV.

1. Section II describes two options for defining high-level waste (HLW) under Clause (A) of the Nuclear Waste Policy Act of 1982 (NWPAA). The first option proposes to define high-level waste based on the concentration of radionuclides in the solidified reprocessing waste. The second option would equate Clause (A) wastes with those wastes that have been traditionally been regarded as HLW under Appendix F to 10 CFR 50. Question 1 of Section IV restates the two options and requests an opinion on which one of the two approaches is preferable.

Consumers Power Company recommends that the "first option", numerically specifying the concentration of fission products in solidified waste to distinguish HLW from non-HWL, be selected as the definition for HLW. We believe that a definition of HLW based on the activity of the waste material rather than basing the definition of HLW on the primary source of the material, as has been traditional, provides the most accurate characterization of the risk associated with the waste. In addition, the first option will tend to reduce the total amount of material that would require storage in a geologic repository compared to the amount of material that would require such storage if the traditional definition of HLW was adopted.

The development of numerical guidelines that relate the specific hazard posed by radioactive waste material to the disposal requirements of that material will ensure that the health and safety of the public are protected without imposing undue requirements or restrictions on the disposal of material that poses less of a risk to the public or the environment.

2. The Commission proposes to use the current 10 CFR 61 Class C concentration limits to define radionuclide concentrations that are highly radioactive.

Consumers Power Company agrees that the current Class C concentration limits of 10 CFR 61 are appropriate for identifying radionuclide concentrations as "highly radioactive." However, Consumer Power Company is concerned that the ANPR does not adequately address the isolation requirements for material that falls into the "greater than Class C" category.

3. The Commission proposes to equate the definition of "requires permanent isolation" with a long-term radiological hazard requiring disposal in a geological repository.

Consumers Power Company is in general agreement with the Commission proposal to use long-term activity as a basis for establishing what material requires disposal in a geological repository. However, Consumers Power Company believes that the definition of "requires permanent isolation," in addition to the long-term hazard posed by the material, should consider the material matrix. Material such as activated metal components and sealed sources, although they may pose a long term hazard, have a stable matrix which effectively precludes the migration of radioactive material into the environment and permits safe disposal by methods other than placement in a geologic repository.

4. No comment.

5. The Commission notes that some waste material, while highly concentrated, may contain relatively small amounts of radioactive materials and questions whether a special provision (minimum total activity) is needed below which waste would not be classified a HLW.

Consumers Power Company believes that such a special provision is appropriate. Consumers Power Company also believes that in addition to the activity present in the waste material, consideration should be given to the material matrix when determining whether the material should be classified a HLW. As noted in our response to item 3. above, some material, such as activated metal, has an inherently stable matrix and is not subject to environmental degradation. Such material does not require the level of isolation from the environment that should characterize HLW.

6. through 9. No Comment.

*Kenneth W. Berry*

Kenneth W Berry

CC Vice President, NOD



# CHEM-NUCLEAR SYSTEMS, INC.

220 Stoneridge Drive • Columbia, South Carolina 29210

PR-60  
(52) 5992 (24)

May 12, 1987  
RA-0270-7

'87 MAY 15 A8:18

OFFICE  
DOCKETING  
BRANCH

Secretary of the Commission  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555

Attention: Docketing and Services Branch

Dear Sir:

In reference to the ANPR "Definition of High-Level Radioactive Waste" (52FR5992), Chem-Nuclear Systems, Inc. offers the following comments:

1. The approach taken to define HLW by specifying radionuclide concentrations is preferable to a definition solely by the source of waste. The suggested plan of using the classification limits from 10 CFR 61 is a logical and consistent method of specifying these limits. However, the classification limits in 10 CFR 61 were developed based on a very conservative assessment of a generic shallow land burial (SLB) disposal site. To require permanent isolation for all wastes exceeding limits developed for generic SLB site is unduly restrictive.

Also, there does not appear to be sufficient justification for the proposed coupling of short-lived and long-lived radionuclides in the HLW definition. Since the objective is to identify those wastes that need permanent isolation, the definition must include wastes with high concentrations of long-lived radionuclides, i.e. concentrated TRU wastes. Additionally, while the radionuclides in Table 2 are short-lived, wastes containing very high concentrations of these nuclides may still pose a long term environmental hazard if not properly isolated. Thus, the HLW definition should make provision for wastes containing: 1) very high concentrations of Table 2, "short-lived," radionuclides, 2) high concentrations of Table 1, "long-lived," radionuclides, or 3) combinations of 1 and 2.

As stated earlier, using the Class C limits from 10 CFR 61 as the lower limits for HLW is unnecessarily, conservative. The analysis described in NUREG/CR-4370, Update of Part 61 Impacts Analysis Methodology, demonstrates that wastes with radionuclide concentrations at 10 times the Class C limits (defined in the NUREG as Class D waste) will not cause doses in excess of the established limits if an increased burial depth or equivalent engineered barrier is used. It is appropriate therefore, to define the lower limits of HLW as 10 times the Class C limits. Thus, HLW would be defined as irradiated fuel and fuel reprocessing wastes, or wastes containing radionuclides in concentrations greater than 10 times the limits of Table 1 or Table 2. Wastes that exceed Class C but are less than HLW would still require a degree of greater confinement beyond SLB. This greater confinement could be the increased burial depth described in NUREG/CR-4370 or an engineered system providing an equivalent degree of protection.





Secretary of the Commission

2

May 12, 1987

2. Wastes with radioisotope concentrations exceeding the Class C limits but which are less than the lower limits of HLW should be formally defined as Class D waste. The current method, i.e. undesignated, implies that this type of waste is unacceptably hazardous and cannot be safely handled by the private sector. Disposal of Class D wastes should be required to utilize confinement systems licensed by either an agreement state or the NRC.
3. Wastes in "special form," as defined in 49 CFR 173.403(z), that exceed the Class D limits should be exempted from the HLW definitions and included in the definition of Class D waste.
4. While the responsibility for disposal of HLW resides appropriately with DOE, also placing the responsibility for LLW greater than Class C with DOE is unnecessary. Should legislation be required to implement the new HLW definition, a portion of that legislation should remove the responsibility for greater than Class C waste from DOE and return it to the private sector.
5. Chem-Nuclear Systems, Inc. has designed an "alternative disposal facility" for greater than Class C wastes. Chem-Nuclear offers this design as the basis for the NRC waste classification analysis.

If you have any questions concerning these comments, please contact me at (803)256-0450.

Very truly yours,

CHEM-NUCLEAR SYSTEMS, INC.

M. S. Whittaker  
Corporate Health Physicist

MSW:as

c: File

CHEM-NUCLEAR SYSTEMS, INC.



DOCKET NUMBER  
PROPOSED RULE

(52 FR 5992)

57-60

(25)

Nuclear Waste  
Study Program  
DOCKETED  
USNRC

CONFEDERATED TRIBES

of the

*Umatilla Indian Reservation*

87 MAY 15 P2:46

P.O. Box 638

PENDLETON, OREGON 97801

Area Code (503) Phone 276-3018

OFFICE  
DUC

May 8, 1987

Secretary of the Commission  
Attention: Docketing and Service Branch  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Sirs:

Enclosed you will find the Confederated Tribes' Nuclear Waste Study Program's comments on Federal Register Notice (FRN), February 27, 1987 - Advance Notice of Proposed Rulemaking for Change to 10CFR Part 60 on the Definition of High-Level Radioactive Waste.

Sincerely,

CONFEDERATED TRIBES OF THE  
UMATILLA INDIAN RESERVATION

William H. Burke, Director  
Nuclear Waste Study Program

Enclosure

WHB/GB/sm

Acknowledged by card.....

**COMMENTS ON  
FEDERAL REGISTER NOTICE (FRN), FEBRUARY 27, 1987 -  
ADVANCE NOTICE OF PROPOSED RULEMAKING FOR CHANGE TO 10CFR PART 60  
ON THE  
DEFINITION OF HIGH-LEVEL RADIOACTIVE WASTE**

**INTRODUCTION**

The Nuclear Regulatory Commission (NRC) has previously adopted regulations for disposal of high-level radioactive wastes (HLW) in geologic repositories as prescribed in 10CFR Part 60. The Commission recently has published its intent 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 an advanced notice of proposed rulemaking as set forth in Vol. 52, No. 39 of the Federal Register on Friday, February 27, 1987. As affected parties under the NWPA, the Confederated Tribes of the Umatilla Reservation (CTUIR) and the Nez Perce Tribe hereby submit the following comments related to the subject rulemaking proposed by the NRC.

A general summary of the tribal commentary on the proposed rulemaking is followed by a series of itemized comments addressing each major topic sequentially as it appears in the subject FRN.

**GENERAL SUMMARY**

The recent decision by the NRC to publish its intent to modify the definition of HLW in their regulatory procedures brings into focus serious deficiencies in the federal program to manage and control radioactive wastes emanating from the nuclear fuel cycle. It is suggested that the policy makers responsible for formulating the U.S. nuclear program have failed over the years to recognize that the effective management of radioactive wastes is a total systems problem encompassing all of the activities within the nuclear fuel cycle. This early failure to scope the problem of radioactive waste management in a more comprehensive and precise manner has led to a series of legislative and regulatory measures over the last 20 to 30 years which are all based upon an incomplete and imprecise definition of the term "HLW." Until this fundamental issue is resolved it

seems highly unlikely that effective solutions to the more complex issues of radioactive waste management resulting from the passage of the NWPA can be established.

The CTUIR and the Nez Perce Tribe, as affected parties under the NWPA, have recognized the need for a structured systems approach in the development of their plans to assess potential impacts to their reservations and possessory and usage rights area as a consequence of the proposed geologic repository being located at the Hanford Site. Both tribal programs have begun to develop methodologies that will be applicable to evaluating those elements of the overall nuclear fuel cycle that are germane to impact assessments important to the Tribes.

During Fiscal Year 1987, the tribal programs have initiated activities for: (1) preliminary characterization of potential radioactive contaminant release scenarios; (2) characterization of the environmental dose to predesignated on-reservation receptor locations, principally by means of either atmospheric or hydrologic dispersion and transport of the radioactive contaminant from the origin of its release; (3) characterization of the human dose at specified receptor locations in terms of individual human health effects; and (4) conceptualization of a system for classifying and ranking the risks associated with human health effects for each contaminant release scenario. Currently, only the available characterization data related to some of the spent fuel waste forms has been employed in the tribal development of their preliminary assessment methodologies. However, it is recognized that the tribal programs, as well as the programs of all the affected parties, must rely heavily upon the Department of Energy (DOE) for characterization data for other wastes and waste forms that are possible candidates for permanent disposal at the proposed geologic repository. Therefore, both the CTUIR and the Nez Perce Tribe look forward to the prospects for a more technically precise definition of HLW and, subsequently, to constructive changes in NRC's 10CFR Parts 60 and 61 which are direly needed within the tribal programs to implement their respective systems-oriented impact assessments studies for the Basalt Waste Isolation Project (BWIP).

## SUPPLEMENTARY INFORMATION

### 1. Comment - I. Introduction and Background, FRN, p. 5993

Although it has long been recognized that certain radioactive waste materials require long-term isolation from man's biological environment for public health and safety considerations, federal policy, as codified by the Atomic Energy Commission (AEC) in 1970 in Appendix F to 10CFR Part 50, failed to consider the broad scope of radioactive wastes that could arise from the myriad activities within the entire nuclear fuel cycle. This failure to clearly recognize and define all of the ramifications of a total waste management system for the entire nuclear cycle has been the precursor to the present dilemma facing the Commission. Historically, previous attempts to adequately define HLW have been hampered by either political and/or programmatic efforts to expedite at various times certain activities within the overall federal nuclear development program as stated, in part, under subheading IA, Previous use of the term "HLW," of the subject FRN.

### 2. Comment - A. Previous Use of the Term "HLW"

The Confederated Tribes of the Umatilla Reservation (CTUIR) and the Nez Perce Tribe concur with the statement by the Commission that the legislative history as defined by the AEC in 1970 (Appendix F to 10CFR Part 50), the Marine Protection, Research, and Sanctuaries Act of 1972) and the Energy Reorganization Act of 1974, Pub. L.93-438, 42 U.S.C. 5811, does not technically define the term "high-level waste." It also is agreed that spent nuclear fuel was appropriately considered as a radioactive waste form requiring permanent isolation from the general public. However, the declaration by the Commission to consider transuranic-contaminated wastes not to be HLW is judged to be paradoxical in the absence of a technically quantifiable definition of the term "HLW" at that time.

### 3. Comment - B. Current NRC Regulations

Current NRC regulations, codified in 10CFR Part 60, that govern the licensing of DOE activities at geologic repositories for the disposal of HLW, once again circumvent the

issue of a technically incomplete and, hence, inadequate definition of HLW. Part 60 regulations define HLW solely in a jurisdictional sense, as so stated in the FRN.

The NRC regulations related to land disposal of "low-level" radioactive wastes as established in 10CFR Part 61 identify three classes of low-level radioactive wastes (LLW). Part 61 states that these materials are acceptable for near surface disposal, with "Class C" denoting the highest radionuclide concentrations of the three foregoing classes. Presumably, the basis for the above classifications comes as a result of analysis of potential human health effects as so stated. Thus, it is recommended that maximum "Class C" concentrations for low-level wastes should be established by NRC in 10CFR Part 61 as a means of quantifying a boundary limitation for low-level wastes. Without regulatory limits on LLW there is no adequate way to clearly segregate LLW from HLW in a technically supportable manner. Therefore, HLW should be defined by concentration limits directly traceable to the applicable regulatory standards as promulgated under law by the Environmental Protection Agency (EPA). These regulatory standards should be based on the numerical limits most universally accepted by the scientific community for each pertinent radionuclide both on an individual basis and in combination with other pertinent radionuclides of concern.

#### 4. Comment - C. Nuclear Waste Policy Act of 1982

Although the NWPA distinguishes "spent nuclear fuel" from high-level nuclear wastes, spent fuel from commercial nuclear power plants will constitute 80 to 90 percent by weight of the radioactive waste presently being considered for long-term storage (permanent isolation) in a geologic repository. Hence, spent nuclear fuel currently must be considered synonymously with high-level radioactive waste in terms of defining the term "high-level waste" on a technical basis within prescribed numerical concentration limits. This requirement will be necessary as long as full-scale reprocessing of "spent nuclear fuels" is legislatively prohibited.

Additionally, it is agreed that the NWPA does not specifically authorize the DOE to construct or operate facilities for disposal by alternative means and these alternatives could require new legislative authorization. However, cognizance of alternative disposal methods must be retained within NWPA in order to incorporate future new technological

advances for the disposal of high-level radioactive wastes. It is reasoned that one or more of these alternatives might prove superior to permanent isolation in a geological repository at some point in the future.

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

The CTUIR and the Nez Perce Tribe concur with the NRC position that two fundamental characteristics of radioactive waste can and should be used as a basis for distinguishing by definition, high-level radioactive wastes from other waste categories. These two key characteristics are intense radioactivity for a few centuries followed by a long-term hazard requiring permanent isolation. However, the presence of either of these two key characteristics in any category of radioactive wastes subject to review and evaluation for regulatory compliance by the NRC should dictate the requirement for more detailed review and assessment prior to any final recommendations by the Commission as to specific disposal facility requirements. Such a procedure would enable a more definitive quantitative assessment of those radioactive wastes that must be stored in a geologic repository under the current provisions of the NWPA.

6. Comment - A. Clause (A)

It is suggested that the Commission should numerically specify not only "sufficient concentrations" of fission products present in spent fuel and spent fuel reprocessing wastes, but "sufficient concentrations" of any pertinent radionuclides present in all activities associated with the entire nuclear fuel cycle that might exceed the Class C limits established in 10CFR Part 60. Although this proposal would entail considerably more effort by the Commission, it would provide a more substantive technical basis for defining HLW. It is cautioned that a less thorough approach probably will only postpone the inevitable requirements for more comprehensive assessments of potentially hazardous radioactive wastes arising from all activities within the entire nuclear fuel cycle waste management system. A more comprehensive option for developing a better technical definition of HLW, however, would probably require clarification of the present definitions of HLW contained in both Clause (A) and Clause (B) of the NWPA. However, it is felt that the inherent long-term advantages gained by this more comprehensive option would probably justify re-examination of the inappropriate wording in Clauses (A) and (B) of the present NWPA.

**7. Comment - 2. Traditional Definition**

The Tribes agree that one alternate approach which could be adopted by the NRC would be 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 10CFR Part 50 and the Energy Reorganization Act. However, it is felt that this alternate would still result in a general confusion for the reasons stated previously in Comment No. 6.

**8. Comment - 3. Other Considerations Regarding Clause (A) Options**

It is agreed that development of a definition under Clause (A) of the NWPA, as suggested by the first NRC option, probably would not alter the Commission's existing authority to license DOE waste facilities, including defense wastes facilities under the Energy Reorganization Act of 1974. However, both Tribes are concerned about the amount of regulatory control that can be exercised by the NRC related to permanent disposal of certain types of defense HLW. For example, it is conceivable that a wide range of LLW and HLW derived from the Naval Reactors program would require permanent isolation in a geologic repository. How does the NRC envision its overall regulatory compliance role under such circumstances?

**9. Comment - 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 tribal position contends that with the present wording of the NWPA it is entirely possible that only the "requires permanent isolation" characteristics might be sufficient since the NRC proposal to more appropriately define the term "highly radioactive" on the basis of radionuclide concentrations in excess of the Class C limits of Table 2 of 10CFR Part 61 has not been officially authorized.

**10. Comment - 2. Permanent Isolation**

The general approach which the NRC proposes to pursue in determining those wastes that require permanent isolation appears to be acceptable for the near term. However, the



basis for determination of the critical radionuclides and their maximum Class C concentration limits will be the key to the proposed NRC definition of HLW and will be reviewed with interest when the revised 10CFR Part 61 is made available to the affected parties.

II. Comment - III. Legal Considerations Related to the Nuclear Waste Policy Act

The comments related to this section of the subject FRN are not available and presumably will be forwarded under separate cover by the tribal legal representatives.

PROPOSED RULE PR-60 (26)  
(52 FR 5992)

'87 JUN 12 P2:56

OFF  
OGCn:

3 West Street  
PO Box 503  
Byfield, MA 01922  
June 9, 1987

Secretary  
US Nuclear Regulatory Commission  
Washington, DC 20555

Re: Comments on rule change  
on definition of "high-level waste"

Dear Commissioners:

These comments are general in nature, but I feel are the general criteria you should use when defining "high-level radioactive waste" in order to protect the health and safety of the American people to the maximum.

All radioactive wastes that are EITHER highly radioactive OR long-lived should be classified as "high-level" and should be isolated permanently. It is amazing to me that now Strontium 90 and Cesium 137 are not considered high-level wastes.

Also, I think that the responsibility for the isolation of these wastes should not be left to the states. The administrative commitment and the financial resources of the various states differ too much. We need one extremely high federal standard that is financed by and administered by the federal government.

Of course, the best avenue is not to generate so much nuclear waste in the first place: "source reduction".

I hope you will use the criteria I have enumerated when defining or redefining "high level radioactive waste".

Very truly yours,

*R. Michael Fosburg*  
R. Michael Fosburg

cc: Kennedy  
Kerry  
Mavroules

JUN 1 1987  
Acknowledged by card