April 24, 1987
854 Henley Place
Charlotte, NC 28207

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

Attention: Docketing and Service Branch

Comment: 10 CFR Part 60
DEFINITION OF "HIGH-LEVEL" RADIOACTIVE WASTE

CLASSIFICATION/DEFINITION

I want to express my appreciation for the opportunity to comment on the definition of classes of radioactive waste. The initial dichotomy of radioactive waste into "high-level" and "low-level" has given the erroneous impression to the general public that one kind of radioactive waste, low-level, is essentially harmless. Further, the initial designation of irradiated core materials as high-level, and all other materials as low-level has led to such things as Classes A, B, C, and "above Class C" in the low-level category. The crowning absurdity is that an irradiated core shroud, at 3.5 million Curies/cubic meter is "low-level."

This inadequacy of definition needs correcting and there is no better time than now. The language of NRC documents makes clear a recognition of the deficiencies in a definition which goes back to the early days of nuclear development and is more suited to promotional purposes than a competent treatment of a broad variety of waste streams.

I propose the deletion of the terms high-level and low-level because they are inappropriate and mislead legislators who try to deal with the problems of radioactive wastes as if there were only two kinds.

Waste streams should be named in relation to origin, for example scintillation samples, reactor coolant exchange resins, neutron flux transducers, sealed sources, accelerator-produced isotopes, etc.

Each stream should be specified with respect to kinds and levels of radioactivity. For waste streams in which the ratio of isotopes is subject to significant variation, whether as a function of initial composition or length of decay, the Curie concentration of each isotope should be listed. This will provide the necessary technical information as to potential hazard and best disposition.

The dilution and/ or intermingling of waste streams should be prohibited. The concentration of radionuclides in relation to

waste classification is a key matter. Diluted sufficiently, any isotope qualifies as Class A. The only inhibition to such dilution, I do not know of any prohibition, is the cost increase which would be associated with the increased volume. The cost schedule of the Barnwell waste site charges a premium based on Curie concentration. Depending on the specific cost schedule, it conceivably could be more economic to dilute into Class A than pay the costs of stabilization and for higher Curie concentration that go with Classes B and C.

The reasons for neither diluting nor intermingling waste streams are several. 1) The total Curie content is obviously not changed by dilution. Water extraction will be greater for a widely spread out, unstabilized source enclosed in no more than a wooden box than for the same source encased in cement or a solid polymer. 2) The more concentrated the radioactivity the less the cost of placement in an appropriate secure facility will be. 3) The intermingling of waste streams to dilute a more hazardous stream with a less hazardous one obstructs the proper disposition of the more hazardous material. 4) The downgrading of the hazard of a waste stream by dilution increases the total Curie burden in proximity to the biosphere and hence the total radiation risk.

The commonly occurring combination within many waste streams of both long and short half-life isotopes of appreciable activity raises questions as to the utility of the Table 1/Table 2 approach to determining appropriate disposition as presented in both 10 CFR Part 61 and in the discussion of the "Conceptual Definition of 'High-Level' Waste." Certainly it is economically infeasible to separate the Ni-59 from the Fe-55 and Co-60 in reactor corrosion products and activated metals. And, with a 92 year half-life is Ni-63, which is also present, really "short-lived" or long-lived"? It is a major waste constituent. Indeed, after 30 years of decay it is expected to be the second largest constituent of all wastes not designated high level (NUREG/CR-0570, Table 7.3-3, Reference Radionuclide Inventory).

The foregoing example--it is not the only one, cesium-137 is intimately intermingled with the foregoing activated metal corrosion products in some ion exchange resins--argues against the Commission's position that a waste must be <u>both</u> "highly radioactive and requiring permanent isolation" to be considered HLW. The key question is "Do any of the components or combinations thereof of this specific waste require permanent isolation?"

The definition of HLW is only important in the present context to distinguish whether the federal government or a state government is to be responsible for the disposition of a specific kind of waste. The federal assumption of responsibilty for above Class C waste is clear indication of the problems generated by the underlying premise of the 1980 Low-Level Radioactive Waste Policy Act that there is a homogeneous, large group of wastes for

which shallow land burial suffices.

The most significant consequence of classification is the disposition it determines.

WASTE DISPOSITION

As a basic rule, no wastes should be permitted to remain near or on the surface which will be hazardous for longer than a reasonable period of institutional control. That period may be as much as 150 to 200 years, though considering some of the changes in the 200 year history of the United States this may be nonconservative. Under such a rule, tritium would be the isotope of longest half life for which surface or near surface storage would be acceptable.

An exception to the rule would be for waste streams which (1) did not exceed the radioactivity of granite of average uranium content, and, (2) presented no greater exposure hazard than granite. The fundamental criterion is that the emplaced waste would not be a greater radiation source nor present a greater hazard than those commonly encountered in nature.

The estimation of exposure hazard would take into account the bio-ingestability of the isotopes. Isotopes which are water soluble, which may enter plants, which plants may be food for birds or animals, in greater degree than afforded by granite would cause exclusion. This would include Cs-137, Sr-90 and I-129.

The basic criteria for classification would relate to potential hazard rather than actual for a given item. Shielding reduces ambient radiation levels. It does not reduce the source. Shielding is subject to breach and other forms of failure.

Table 2 permits ten times the concentration of Ni-63 in activated metal as in the corrosion products of activated metal. This is probably a mistake. If subsequent dwellers in the region of LLW sites, or above Class C sites, are not a nuclear competent society, the activated metals may be melted and given other forms. As articles of dress or adornments these beta emitters would be hazardous.

The fact that in many waste streams there is a mixture of radioisotopes makes difficult near surface disposition without increased hazard. For example, although the strong gamma emissions of Fe-55 and Co-60 initially present on an ion exchange resin may have decayed to a negligible level, and the very low solubility of the hydrated oxide form they were in resulted in minimal transport in ground waters, water soluble I-129 salts still would present the hazard of ingestion either through water or edible plants.

The inescapable conclusion is that all radionuclides of half-

lives greater than ten to fifteen years which are emplaced in the biosphere are potentially hazardous once the envisioned period of institutional control has passed. The Commission is quite right in recognizing the mechanisms of both water transport and intrusion, of both men and of burrowing animals, as means of release of radionuclides from the point of disposition.

Another mechanism which would increase hazard is the reconcentration of leachates, a common geologic occurrence. Additionally there is bioconcentration of ingestibles in going up the food chain. There is total uncertainty regarding hazardous consequences of surface and near surface long-lived radionuclides in the non-forseeable future.

Accordingly, a more responsible disposition of the longer half-life radioactive wastes is, as for HLRW as now defined, in a long term repository (LTR) such as amined geologic repository or subseabed in titanium canisters embedded in ferriferous silts.

The objection will be raised that for low concentration radwastes this would be costly and arguably uneconomic. This is not necessarily the case. A major part of the volume of wastes containing radionuclides with half-lives in excess of ten to fifteen years is combustible. Incineration of such wastes results in an ash greatly reduced in volume, of the order of one percent the initial volume. There is a corresponding radioactivity concentration increase of about one hundred. Such ash, appropriately compacted in canisters, or solidified in a suitable matrix. With this major reduction in volume, the economic aspects becomes much more favorable.

A legitimate concern about incineration is the release of tritium oxide. It can be removed from a moist waste stream by vacuum distillation, cryogenically condensed, and retained for monitored surface storage.

Activated metals from fuel assemblies and reactor internals are high in radioactivity, small in volume. Sheared, super-compacted and canistered, they can economically be placed in an LTR.

Decommissioning wastes will be substantial in volume. The activated metals will best be placed in LTR's. The volume of the activated metals will be relatively small. The neutron flux-exposed and otherwise contaminated concrete structures will make for the largest part of the volume. The neutron activation products of cement and of most aggregates are very short-lived. The longer half-life materials are in the reinforcing rods. A practical solution to economic handling would appear to be offered by crushing the concrete, removing the reinforcing steel and, suitably compacted and canistered, placing it in an LTR. Depending on the level of radiation, and the specific isotopic sources, it is likely that the residual concrete would be

ordinary rubble, no more radioactive than an average granite, thereby qualifying for ordinary disposal.

These views support the Copmmission's case-by-case approach to above Class C and other hazardous wastes not covered by the traditional HLRW definition. The major difference would be the commitment to place all wastes containing radioisotopes with half-lives greater than ten to fifteen years in LTR's in the most concentrated and compacted form to which they could be converted with reasonable cost.

COMMENTS

II.A.1. Regarding salts removed from liquid HLW: Surface disposal if the radioactive residuals are in a form which will provide a leachate with no greater beta/gamma activity than average uranium bearing granite. For salts not qualifying, LTR disposition in sealed glass containers (common chemical industry practice), shock-cushioned in corrosion resistant copper or stainless steel containers.

II.A.2. As to HLW, the wastes "the technical community might not so regard. . ." This assumes a consensus in the technical community which, I suggest, may not exist. If there are materials originating in a reactor core which meet the criteria for surface or near-surface storage mentioned in the comment on II.A.1 there would be no objection. Otherwise LTR disposition should be required.

II.A.3.b. I concur with keeping open the option of LTR disposition of wastes not identified as such by the current "high-level" definition.

II.B. I urge the Commission to moot its concern that to be defined as HLW a waste must be both highly radioactive and require require permanent isolation. As remarked foregoing, many waste streams are both highly radioactive due to short half-life materials and of persisting hazard due to long half-life materials. "Long" and "short" half-life, like "high-level" and "low-level" is a needless cause of confusion for several reasons.

There is the tradeoff, in the context of hazard, between half-life and concentration. A thousandfold difference in concentration corresponds to ten half-lives. Half-life and concentration must be considered to reach a hazardous life conclusion. At a low enough Curie activity, and all other considerations equal, it is a matter of indifference whether a half-life is a few years or a few millenia. At a very high Curie level a material may decay to innocuous activity levels in a reasonable term of projected institutional control. For example, Fe-56 in 100 years will have decayed to one trillionth of its initial activity. But if it is associated with a hazardous level of Ni-63 the mixture will have required LTR disposition. The

Commission should make its judgment on the concentrations, chemical and radioactive characteristics of specific materials, making a decision in regard to surface storage or LTR depending on the characteristics at the conclusion of a reasonable period of institutional control, say 100 to 150 years. By dispensing with the traditional terms a great deal of sophistical quibbling can be avoided and decisions made on a straightforward technically sound basis.

II.B.2. I agree with the Commission's judgment that "permanent isolation" is less subjective than "highly radioactive." The discussion immediately foregoing provides, I believe, criteria for disposition which make unnecessary the use of the phrase and the concept, "highly radioactive."

As to Commission evaluation of "disposal capabilities of alternative, less secure disposal facilities" for certain wastes deemed to require "permanent isolation," there is the semantic problem of "permanent." A literal reading of "permanent" recognizes no degrees of permanence. If the language were to be changed to "appropriate isolation," degrees of security would logically follow. A waste no longer hazardous at 1000 years can be, in mind of the decreasing rate of ground water movement with increased depth, placed nearer the surface than one requiring 10,000 years to reach that point.

II.B.2.a. I have stated foregoing my opposition to the 10 CFR Part 61 criteria and repeat that only wastes which will decay to nonhazardous levels within a reasonable period of institutional control should be stored on on near the surface. The reduction in volume of Part 61 wastes advocated would bring about a reasonable balance between safe isolation and cost.

II.B.2.b. The comments immediately foregoing propose criteria for appropriate isolation. As an example, if none of the radiostopes in a waste are leachable, nor form leachable radioactive decay products, hydrologic circulation will not be a concern, but the possibility of incursion will will be a major consideration.

Incursion considerations are difficult. We really have no knowledge of the characteristics of societies which may exist during the hazardous lives of these wastes. After the flowering of our technological society, and with a conceivable move toward lower energy utilization societies, it may be that engineered barriers will be highly effective means of sustaining isolation. But a society which uses energy at anything comparable to our level will have no trouble penetrating any barrier we choose to put in place. A better approach may be that of seeking technically qualified locations which seem least likely to be investigated in time to come. Arid, infertile, poor in unusual mineral deposits, and remote from fertile areas would seem to be appropriate characteristics. Site closure so as to conceal the operation of the site would seem essential. No rail

tracks, roads, surface facilities should remain. Shafts should be restored to present no distinguishing feature from the natural terrain. In this respect a sand dessert or a *silty ocean floor would seem ideal.

II.B.2.c. I totally support the considerations mentioned in this section which make waste characterization the basis for determining the means of isolation.

II.B.2.d. The foregoing remarks make clear my support of the development, along the lines mentioned, of an appropriate methodology.

II.B.2.e. It is not just that it is difficult to evaluate the performance of nonexistent disposal systems. For existent disposal systems it is only possible to evaluate their performance now, not over the entire future period in which the content remains hazardous. Clearly best judgment will have to be relied on. An honorable best judgment can best be obtained by technically qualified parties who have no financial or institutional links to the judgment. I strongly urge that a blue ribbon commission of health, safety, environmental, geological, and engineering experts be established to undertake this responsibility.

My comments on section II.B.2.b. consider a range of site locations and facilities in the context of a more workable specification than "permanent," see comment on II.B.2.

II.B.3. Remarks foregoing in regard to classification make clear my critique of the artificial, arbitrary and problem generating dichotomy of wastes into "high-level" and "low-level. The determinative nature of waste components with hazardous lives in excess of the period of institutional control has been discussed, see II.B. comments.

Regarding naturally occurring and accelerator produced materials, appropriate legislation and rules will make the disposition of radioactive wastes independent of genesis, of simplistic categorization, and dependent only on hazardous characteristics.

III. The NWPA has, in this instance, generated problems as well as attempting to solve some. Hind sight is cheap. It suggests that scientists free of links with the industry and the related agencies, NRC and DOE, be called on to work with Congressional staff in drafting nuclear legislation.

III.A. This legalistic concern is the sort of quibble that could be avoided by an omnibus waste act that related to materials regardless of genesis. As long as the financial responsibility for disposition is established, it should be a matter of indifference whether a given highly hazardous long-lived waste came from a nuclear reactor and was covered by a contract entered into by June 30, 1983 or not. I strongly support the

Commission's views as expressed in the fourth paragraph of this section.

III.B. In regard to defining the classes of materials requiring permanent isolation in a geological or subseabed repository I would suggest a basis. A waste qualifies for the highest degree of isolation if the hazardous life, in the absence of shielding or a sealed containing vessel, exceeds 10,000 years. Expert testimony in the McGuire operating licensing proceeding anticipated the next glaciation, which could have a material effect on water table and terrain, in 2000 to 10,000 years. The prediction of seismic events, although it has advanced greatly, obviously cannot have been demonstrated for 10,000 year periods. The requirement that the unshielded, uncontained waste not be capable of producing either a *hazardous leachate nor be dangerous in proximity seems not excessively conservative. I fully concur that all wastes not qualifying for institutionally controlled surface or near-surface storage should be the responsibility of the appropriate agencies of the federal government. Certainly under present law all materials requiring what the Commission refers to as "permanent isolation" should be covered by disposal contracts with DOE. In accord with my views on the appropriate characterization of many materials now termed "low-level" waste, I support the Commission's position that radioactive materials not now regarded as HLW but requiring "permanent isolation" should, for the purposes of the NWPA, be regarded as "high-level waste.

III.C. In accord with views expressed foregoing I strongly support the authority of the Commission to "classify materials according to their hazards" and to "prescribe requirements for the long-term management thereof."

III.D. The problems being encountered by states in response to the Low-Level Radioactive Waste Policy Act as evidenced by the NIMBY (not-in-my-back-yard) syndrome and the difficulty of concluding compact arrangements would be greatly lessened or removed by federal assumption of responsibility for all wastes requiring more secure isolation than can be provided by surface or near-surface storage under institutional control.

III.E. I support the Commission's consideration of the appropriateness of new repository designs for the variety of waste types requiring long term isolation.

III.F. I reaffirm my support for the Commission to deal with materials in an appropriate and responsible way, whatever the presence or absence in legislation of such terms as "source material," "special nuclear material," and "byproduct material."

The language of Part 60 contemplating that "other radioactive materials than HLW" may be received for emplacement in a geologic repository is satisfactory. I strongly support dealing

with materials based on their attributes rather than specifics of origin, as for concentrated naturally occurring and accelerator produced radionuclides.

IV.1. The choice of options is clouded by the fact that the "sufficiency" of fission product concentration to require "permanent isolation" is not provided. Absent such definition I favor guidance by the language of Appendix F to 10 CFR Part 50 for reprocessing wastes.

IV.2. I would prefer other guidance to distinguish wastes than Tables 1 and 2 of 10 CFR Part 61.55. For all wastes which will not become nonhazardous in a period of institutional control not to exceed 150 years I advocate longer term designed security in accord with the complex of characteristics including half-lives and concentrations, chemical form, water solubility, role in the food cycle, ingestibility, retention, and (as in the case of beta emitting activated metals) contact hazard. The test for each waste item would be--150 years from now will this be no more hazardous than a granitic part of the natural environment? Leachate composition, radioactive gas release, and contact exposure to radiation would be the criteria.

IV.3. The word "permanent" is of the same doubtful utility as "high," "low," "short," and "long," common words of inexact significance which have no technical utility and are at the root of many of the problems of the Commission, the Congress and the Public. For a rational and quantitative characterization of the hazardous life of an individual item of radioactive waste, a selection from a range of appropriate repositories can be made such that there can be a rational expectation that the content of each class of repository will be secure during the hazardous life of its content. It is not practicable to present a prescriptive table. The variance in the composition of mixtures of radionuclides, the variety of chemical forms, the range of concentrations are more readily dealt with by an appropriate computer program. The key response of the computer will be the period for which the item will remain hazardous.

IV.4. Reconcentration of leachates, as when a salt stream evaporates to form a salt bed or salt lake should be considered. Bioconcentration along the food chain should also be considered. The higher concentrations obtained by these means should be offset by conservatisms in the selection of secure waste isolation sites.

IV.5. There should be no lower limit on quantity of a highly concentrated source. A practical consideration is that the volume of such wastes is small. The consequences of intrusive contact would be great.

IV.6. An expanded class of materials receiving more secure disposition than that provided by shallow land burial, with or without "engineered barriers," will encounter opposition from the

industry, i.e. generators of radioactive wastes, for two reasons. 1) It will increase costs. 2) It will convey to the public to some extent that the hazards of nuclear materials are not trivial and that much "low-level" waste presents a high-level hazard.

IV.7. The specification of a range of secure facilities requires multidisciplinary input. The Commission has, in the course of preparing environmental impact statements, developed expertise in many matters. However I feel that strong geological and hydrogeological input is required in specifying facilities and am of the opinion that a joint effort by the NRC with USGS ,EPA, OTA and NSF might be adequate.

IV.8. NARM should be included in the Commission's analysis as a material requiring long term isolation.

IV.9. Issues other than those identified in the notice have been spoken to foregoing. Central to the issue is a technically competent classification of wastes and the elimination of the simplistic, inadequate and confusion-causing "high-level," "low-level," "short half-life," "long half-life" terminology and, worse, conceptualization.

Jesse L. Riley, Chair
Sierra Club Nuclear Subcommittee
National Energy Committee

DOCKET NUMBER
PROPOSED RULE PR-60 (15)
(52 FR 5992)

DOCKETED
USNRC

'87 APR 30 P4:31

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

DEPARTMENT OF ENERGY & TRANSPORTATION
Dickson Building, 510 George Street
Jackson, Mississippi 39202-3096
601/961-4733

April 28, 1987

Mr. Samuel Chilk, Secretary
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attn: Docketing and Service Branch

Dear Mr. Chilk:

Re: Comments on the advanced notice of proposed rulemaking on the definition of "high-level radioactive waste under 10 CFR 60 (52 FR 5992)

The State of Mississippi wishes to reserve comment on the advanced notice of proposed rulemaking on the definition of "high-level radioactive waste." This request comes in light of the fact that the representatives of the State wish to review the Department contractor report, Proposed Classification Scheme for High-Level and Other Radioactive Wastes by Kocher and Croff. The document has been requested from the Department of Energy. Following review of this document the State will provide comment on the subject notice.

Thank you for your cooperation in this matter.

Very truly yours,

John W. Green Jr.

John W. Green, Jr.
Executive Director

cy: Lisa Spruill, Office of the Attorney General
James I. Palmer, Office of the Governor
Allen Benson, RW-252, DOE/OCRWM

MAY 08 1987
Acknowledged by card.....

DOCKET NUMBER PROPOSED RULE PR-60 (16)
(52 FR 5992) DOCKETED USNRC

State of New Hampshire

HOUSE OF REPRESENTATIVES

CONCORD

'87 APR 30 P5:24

OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

April 27, 1987

Rep. Susan Schwartz
201 Roxbury St. #2
Keene NH 03431

Samuel J. Chilk, Secretary
U.S. Nuclear Regulatory Commission
Washington DC 20555

Dear Mr. Chilk,

This letter is in regards to the NRC Advance notice of proposed rulemaking which was printed in the Federal Register Vol. 52, No. 39, on February 27, 1987. That notice asked for public comments on alternative approaches for developing a revised definition of "High-Level Radioactive Waste."

As a State Representative currently serving on the N.H. House Science, Technology and Energy Committee, and a past legislative delegate to the Governor's High-Level Radioactive Waste Task Force, I often hear a variety of concerns from constituents regarding nuclear issues. There has been a lot of concern about the adequacy of the definitions of both Low and High-Level Waste. Because the definition changes could have significant ramifications far into the future, I urge you to allow an extension of the comment period. The potential impact justifies a complete review of all comments presented. The nuclear industry has technical experts on staff who are paid to spend their working hours responding to your proposals. Citizens, who have a great deal of interest in the issues, and may have also developed a great deal of technical expertise to justify their positions, must take personal time from families or jobs in order to prepare well researched comments. By extending the deadline, you allow those outside the industry to develop comments which are more meaningful, and may ultimately expedite the process by having a full review of the evidence up front instead of through challenges and appeals.

Thank you for your consideration.

Sincerely,

Susan Schwartz

Rep. Susan Schwartz

Acknowledged by card MAY 08 1987

PROPOSED RULE PR-60 (52 FR 5992) (17)

DOCKETED USNRC

812 Yancey St/
Durham NC 27701
3pp.

Secretary
Attn: Docketing and Service
52 FR 5992
High Level Waste definition -- ANPRM
Joint Comments of Conservation Council of North Carolina, Kudzu Alliance, Coalition for Alternatives to Shearon Harris, and Wells Eddleman on Definition of "High Level" Rad. Waste

APR 30 P5:00

OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

The Federal Register notice on this matter begins with a paragraph defining "high level radioactive wastes" as (a)

"combination of" "both long-lived radionuclides which pose a long-term hazard to human health" and "other, shorter-lived nuclides which produce intense levels of radiation". 52 FR 5993, col. 1, para. 1.

We believe this combination of characteristics is a basic starting point for a definition of "high level radioactive wastes" that will help to protect the health and safety of the public by insuring that both contaminated objects or materials, and sources of high level wastes such as reactors and associated equipment, as well as wastes in solid, liquid, gaseous, or combined or other forms.

However, as you next note, High Level Waste (HLW) "was defined in terms of the source of the material rather than its hazardous characteristics". 52 FR 5993, col. 1., item I.A.

But in light of the goal of protecting the public health and safety, which is part of the Commission's mandate under the Atomic Energy Act and has been clearly endorsed by Congress for wastes beyond those traditionally called "High Level Wastes" (see e.g. West Valley Act including as High Level Wastes "such other material as the Commission designates as high level radioactive waste for purposes of protecting the public health and safety", 52 FR 5993, col. 3 near top), it seems more sensible, and indeed required, to use the characteristics of nuclear wastes and contaminated materials in defining High Level Radioactive Waste, and to do so from a public health perspective, i.e. giving primary importance to the protection of public health and safety, especially in light of the uncertainties surrounding our ability to contain radioactive wastes, for long periods of time, until they are no longer radiological hazards, simultaneously limiting their toxic and other hazards and risks. (The Commission says it has not designated any other material as HLW at West Valley since the West Valley Act passed in 1980.

We believe that other long-lived radionuclides such as Ni-59 and Nb -94 should be included with ones like Tc-99, C-14, I-129 and transuranics as "long-lived". The life of the nuclide, measured by half-life, should be the governing criterion for such designation, with consideration of any nuclides with halflives such that 30 to 40 halflives equals 5000 or more years being considered "long lived", and greater biohazard materials being treated even more conservatively than this, (e.g. 50 or more halflives equalling 5000 years, for greater biohazard materials, taking into account their worst known radioecological damaging effects including ability to enter living organisms and to do genetic damage from inside or outside of living organisms), to be appropriate. (Cf. 52 FR 5994, Item II, middle column)

We see no reason why any salts extracted from high level nuclear wastes should not be processed to remove radioactive contaminants before being disposed of. (Item II.A.1, 52 FR 5994, 3d column). Chemical purification techniques for salts are well known, and salts of purity 99.999% or more are often produced for chemical reagent purposes. The solution is to remove the contaminants, not to allow contaminants to escape with any salts removed from high level radioactive wastes.

Acknowledged by card MAY 08 1987

Wastes containing other fission products besides Sr-90 and Cs-137, which also contain transuranics or other long-lived radioactive materials should still be treated as high level wastes, even though the short-term radioactivity may be somewhat less, and the radioactivity within 30 to 1000 or more years may be considerably less for them than for wastes containing Cs-137 and Sr-90 (both of which have half-lives about 28-30 years). The reason is that the combination of nuclides involved still requires isolation from the environment both short and long-term. Even if the "medium-term" (30-1000 years; even though 1000 years is a very long time in human of human institutional terms, it is not "long" in terms of long-lived radioactive materials, some of which have half-lives of 80,000 years or even millions of years) hazard is less, both the shorter and longer term hazards must still be addressed by isolation.

We believe the idea of reclassifying wastes as non-HLW because of lower concentrations of fission products is without merit for wastes that will still require long-term isolation (cf. item II.A.3.a 52 FR 5995, cols. 1-2). In the absence of a change in regulation of the wastes there would be no useful reason to change the definition; since the Commission disavows any change in how the wastes are regulated, these wastes should still be defined as "high level".

As to item II.A.3.b, the isolation itself, not the type of facility being considered for providing it, is the key to handling high level radioactive wastes. To define wastes in terms of the isolation afforded by deep geologic storage (which may be rather small in many instances, e.g. where there are earthquakes, deep groundwater circulation to or near the surface or surface or well waters, or means to uplift or remove radioactive material) is to put the cart before the horse, it seems. Just as the combination of radioactive hazards, both short and long-lived, shou and must be the definition of high level nuclear wastes, the definition of isolation should be the actual effectiveness of the isolation. We believe that all high-level wastes requirex very long term isolation. The term "permanent" as used in Section II.B, 52 FR 5995, seems appropriate for defining this long term since some nuclides have half-lives longer than any structure yet envisioned.

Because "alternative disposal facilities are currently unavailable", 52 FR 5996, col. 1, for high level wastes, we believe that there should be no consideration of any alternative disposal methods that have allowed escape or migration of radioactive materials. The reason is that methods which have allowed such materials to fail in the 45 or so years that human beings have been producing them, will surely not provide permanent isolation. This would includeshallow land burial, which has failed at Sheffield, IL; Maxey Flats, Ky; West Valley, NY; and which appears to be leaking radionuclides at Barnwell, SC and possibly other sites.

Since high level wastes are present in large quantities, it makes sense to do testing on materials securely stored, inside the storage medium (e.g. migration tests can be done inside secure containers by putting in waste at one end, or in the center, etc. Some such testing in carefully isolated containers is required, as well as analysis, before other disposal methods are even to be considered. Of course, both fully conservative analysis, and all test results which are valid, including those which are adverse to the disposl method's approval, need to be evaluated honestly and thoroughly before and during such a process for considering alternative disposal methods. To

The table1 reproduced on 52 FR 5996 do not appear to include all nuclides which have long half-lives. For example, an item containing radium (half-life about 1600 years) which is also contaminated with shorter-lived nuclides should be classified, and disposed of, as high level waste. Similarly, Table 2 does not contain nearly all of the shorter half-life radionuclides which should be of concern Even if held for 20 years for decay, wastes can contain

sufficient radioactive materials to be dangerous, from shorter half-life nuclides other than those in Table 2.

In extending the nuclides represented in each table, the sum-of-the-fractions rule (amount of each nuclide as a fraction of the limit given in the table) should be retained. We do not believe that the limits are sufficiently low in all cases to protect the health and safety of the public. In light of new knowledge, these limits should be re-evaluated and lowered, not raised, since more information on radiation hazards and their greater seriousness has been being developed over the last 18 or more years, and we are not even sure that the Gofman-Tamplin results from the late 1960s are incorporated into these limits properly.

Finally, we specifically request that the Commission respond to the concepts and points raised above in order to provide us with information on how the Commission views these matters which are quite important, we submit.

CONSERVATION COUNCIL OF NORTH CAROLINA
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by Wells Eddleman, authorized agent fort
the above

4. 27. 1987

April 28, 1987

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

Dear Sir:

In accordance with your request for input in the Advance Notice of Proposed Rulemaking (ANPR) on 10 CFR Part 60 (Federal Register, Volume 52, Number 39, Friday, February 27, 1987), I am writing to offer the following comments.

- From a general standpoint, I believe that the proposed rulemaking represents a very important action and the ANPR identifies and provides excellent discussion on many of the significant issues relative to the proposed rulemaking.

- Section IIA of the ANPR identifies a major issue in terms of two alternative definitions for "Clause A" HLW. Clearly, the numerical specification of concentration limits makes a great deal of technical sense; however, the legal issue of reconciling this approach to NWPA with previous law (e.g., ERA of 1974) requires consideration. I believe that in the long run, the best interests of the public will be served by quantitative definition.

- In Section IIA, the discussion of the disadvantages of utilizing the "traditional definition" does not get to the real point. The disadvantages of requiring management as HLW for materials that do not have the characteristics identified in NWPA (i.e., "highly radioactive" and "requires permanent isolation") are significant. These disadvantages include excessive costs to the generators (either governmental or commercial) and hence to the public as taxpayers, ratepayers and/or consumers; and unnecessary diversion of NRC regulatory efforts.

- In Section IIB, the position is presented that the two characteristics identified in NWPA must be present "simultaneously" for a material to be classified as HLW. Does this mean that after a storage or disposal period of 1-300 years, most HLW would cease to be HLW?

- In Section IIB, the "Highly Radioactive" characteristic is assumed to be defined by the Class C limits of 10 CFR 61. This appears to be arbitrary; a firmer basis or rationale for this definition should be developed.

- The Section IIB discussion of "Permanent Isolation" appears to indicate that there is a clear break between the protection afforded by "permanent isolation" and less restrictive disposal approaches. In fact, the range of proposed disposal facilities and techniques probably forms a continuum in degrees of protection from most to least restrictive.

- In Section IIIB, the ANPR states that "highly radioactive waste (other than those previously regarded as HLW) ... should be regarded as High-Level Waste." This statement seems to exceed the authority given under NWPA and is probably unnecessary.

- In Section IV, comments are solicited on particular issues. The following are my comments on several of these issues:

  1. From a technical standpoint, the first approach is clearly preferable. Such an approach would ensure more consistent management of all radioactive wastes.

  2. The basis and rationale for the use of the Class C limits to define "highly radioactive" should be discussed in much greater detail than the ANPR. Alternative approaches should also be addressed.

  3. The NRC should recognize that the degrees of protection afforded by geological and other disposal techniques probably form a continuum. Protection of the public health and safety can best be achieved by matching disposal technology with waste characteristics.

  4-6. No comment.

  7. It would not be appropriate for NRC to prescribe a particular disposal method for any given type of waste.

  8. For purposes of consistency, NARM that qualifies as HLW under the Clause B definition should be included in the NRC analyses.

  9.
     - Since the Table 1 and 2 limits of 10 CFR 61 are generic limits, caution should be used in incorporating them directly into the definition for HLW.

     - The effort to define HLW together with previous definition of LLW suitable for near surface disposal makes it obvious that "intermediate" wastes (i.e., greater than Class C LLW or other wastes not qualifying as HLW) should be addressed and accounted for. The public interests will be best served if an approach matching disposal techniques with waste characteristics is taken.

I hope that these comments are useful in your deliberations.

Sincerely,

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Acknowledged by card.....

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COMMENTS ON THE PROPOSED REDEFINITION OF
'HIGH-LEVEL RADIOACTIVE WASTE'

Initially, it is suggested that the comment period on the proposed new definition of high-level radioactive waste (HLW) be extended for at least 6 months to give the interested public the time to adequately assess the potential environmental and sociological impact of these proposed new rules. The Nuclear Regulatory Commission has had many years to come up with these proposals which have the possibility to effect the lives of every American living downstream of a nuclear waste dump. To give the public only eight weeks to discuss and assess the potential impact of these rules is tantamount to implementing the rules with no comment period at all.

A proposed definition:

"High-level radioactive waste is any waste that can pose a radiation hazard beyond the institutional control period of a low-level radioactive waste repository."

The definition of (HLW) is inextricably tied to the definition of low-level radioactive waste (LLW) and to the problems of disposal of LLW. In the past we have had a definition of LLW that is one of exclusion, that is, if it's not HLW it's LLW. We have spoken of HLW as something that is so incredibly hazardous that it must be isolated from the biosphere forever, while we have described LLW as gloves and booties and we have dumped it into shallow trenches. This disposal has been described as the kitty litter method of waste disposal, and has not been terribly successful. We have dumped materials that is every bit as hazardous an spent nuclear fuel (eg. the wastes from the production of some medical isotopes) into these trenches. In this process we have irreversibly contaminated thousands of acres of the earth's surface, while we have jealously guarded HLW in spent fuel pools at reactors and leaky tanks at West Valley, NY.

The changes being presented in the Nuclear Regulatory Commission's (NRC) "Advance notice of proposed rulemaking" in the February 27, 1987, edition of the Federal Register seem to be intent upon freeing potentially vast quantities of intensely radioactive and extremely long lived isotopes from the requirement of the National Waste Policy Act (NWPA) that they be handled in the same manner as HLW. These materials, the activation products in commercial power reactor internal structures, are currently a very small part of the waste stream. But, in the not too distant future, when our commercial power reactor fleet begins to come of decommissioning age, this

proportion of the waste stream will expand to become the majority portion of the radioactive waste to be disposed of. If the rules are implemented as proposed the responsibility for the disposition of these materials will shift from the federal government to the states or the LLW compact commissions (CC's). This change in rules would greatly increase the responsibility of the states and CC's by requiring them to handle wastes which were not foreseen when their structures were put into place for handling LLW under the requirements of Waste Policy Act of 1982 (LLWPA).

Additionally, under LLWPA the institutional control periods for LLW disposal sites was set at 100 years, a very short time when the halflives of some of the neutron activation present in reactor internals is considered. Ni-59 has a half-life of 80,000 years, or Nb-94 with a half-life of 20,000 years. These materials will be radioactively hazardous for periods counted in eons rather than years. As proposed the rules would place these materials in a disposal facility "less secure than a repository". These "less secure" facilities would, presumably, be operated by states or CC's and would come under the 100 year institutional control period criterion. These "less secure" facilities be subject to thousands of years of the forces of nature, including the forces of erosion, which will eventually uncover the materials. While intrusion barriers will be put into place and layering will be required to minimize the chances of the accidental removal of these wastes from their burial sites and markers will be used to identify the sites, how will people in a society as removed from ours as we are from the early hunter gatherers be able to understand the meaning of these devices? Consider that we, in our infinite wisdom, are still trying to understand the meaning of the markings in the Mayan temples, which are only a few hundred years old. Should there be times of scarcity in the future, an all too real possibility that many people would like us to forget, these stainless steel wastes could be easily mined and converted into products to be handled daily, products such as cars, pots and pans, or even table legs as was the case with Co-60 waste in Jaurez, Mexico, in 1984.

The proposal to redefine HLW in the terms specified in February 27, 1987, "Advance notice of proposed rulemaking" is absolute lunacy, another veiled attempt to bail the utilities out of their responsibility to pay for the cost of adequately disposing of this hazardous material.

What is needed are rules that would expand the definition of HLW to more, not less, securely isolate the wastes that are now considered low-level. A definition similar to the definition presented at the beginning of these comments coupled with realistic intrusion scenarios which allow for the possibility that a future discoverer of a waste site would not have access to the records that tell him what he has found would go a long way toward solving the radioactive waste disposal problem.

Since the proposed HLW rules will significantly up the ante

as to the security measures that need to be taken by the states and CC's to ensure to safety of future generations, it is suggested that a full environmental impact statement, with its associated public hearings, be prepared for these rules.

David Metson Pykes