

JACKET NUMBER PR-60 (7)  
PROPOSED (52 FR 5992)

JERRY J. COHEN

April 24, 1987 '87 APR 28 P2:46

OFFICE  
DOCKETING  
BRANCH

Secretary, USNRC  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attn: Docketing and Service Branch

Re: Comment on ANPR - Definition of "High-Level Radioactive Waste"  
Fed. Reg. Vol. 52, No. 39, p. 5992, February 27, 1987

Dear Sir:

For the past several years, I have participated in various research projects related to development of reasonable radioactive waste classifications systems. From this work, certain insights and approaches to the problem have evolved which I would like to offer in hopes of assisting the commission in its deliberations on defining high-level waste.

Based on previous research, we recently presented a paper to the American Nuclear Society describing what we believe to be a logical approach to defining classes of radioactive waste. A summary of that paper and a copy of the slides used in its presentation are appended to this letter. As discussed in this paper, it would seem reasonable for the definition for high-level waste to be part of a logically structured general classification system covering the complete spectrum of radioactive wastes ranging from de minimis (below regulatory concern) to high-level. Between these extremes, are the classes of low-level waste (LLW, as defined in 10 CFR 61) and intermediate-level waste (analogous to GTCC as described in the ANPR). The approach considers radiotoxicity (Hazard) of the wastes as well as the duration of the hazard. This approach is rational, consistent with existing regulatory guidance, and can be applied in a relatively straightforward manner. Although the approach may appear simplistic, we have applied it to many waste streams and have concluded that, in all cases, it appears to make

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PDR PR  
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Acknowledged by card MAY 06 1987

sense. The suggested boundary values, of course, could be changed if convincing evidence were found to indicate that such change would be reasonable. Within the suggested classification system, high-level waste would be defined as follows:

"High-level radioactive waste contains one or more radionuclides having a total level of radiotoxicity (potential hazard level) which, after 1000 years of decay, remains in excess of an equivalent of 10 Ci/m<sup>3</sup> of plutonium-239"

In the above definition, the equivalency may be measured in any of several ways. It appears to make no significant difference which equivalency method is selected; however, determination of an optimal method might provide a fruitful area of investigation for the NRC staff.

In response to the issues for which the commission seeks public comments, I would like to offer the following:

- Protection of public health should be the overriding consideration in defining high-level waste. Accordingly, the definition should be based upon the potential hazard of the waste regardless of its source. We, therefore, recommend the commission abandon the Appendix F, 10 CFR 50 source-related definition, if this is legally possible. In any case, with few exceptions, any wastes that qualify as high-level under the Appendix F definition would also qualify under a "sufficiency" definition. Those that do not qualify as being sufficiently radiotoxic (hazardous) should not rightfully be defined as high-level since they could be safely disposed of by less restrictive methods than are required for high-level waste.

- I recommend establishment of a class of intermediate-level waste (ILW) as is done in certain European countries. These wastes would encompass those that are of greater radiotoxicity than Class C (GTCC), but less than HLW. Our suggested definition for ILW is:

"Waste, other than HLW, containing a mixture of one or more radionuclides that after 100 years of decay has a total level of radiotoxicity (hazard) in excess of an equivalent of  $0.1 \text{ ci/m}^3$  of plutonium-239"

Any of several "enhanced" disposal methods could be applied for ILW disposal. A strong case could be made for the cost-effectiveness for ILW disposal vs. disposal as HLW.

- An issue I believe should be addressed by the commission is that of cost-effectiveness. Several federal directives require cost-benefit analysis. A serious question that needs to be considered in radioactive waste regulation (as in all regulation) is whether the cost of increasingly restrictive requirements for waste disposal are justified by the added degree of health protection gained. It appears that this consideration has been generally lacking in the development of our radioactive waste management policies and regulations.

It is hoped that these comments will be useful to the commission. I would be happy to provide any clarification or further comment that might be requested.

Sincerely yours,



Jerry J. Cohen

**AN APPROACH TO DEFINING DE MINIMIS,  
INTERMEDIATE AND OTHER CLASSES  
OF RADIOACTIVE WASTE**

**Jerry J. Cohen**

**Craig F. Smith**

**Science Applications International Corporation  
Pleasanton, California**

**American Nuclear Society Meeting  
Washington, DC**

**November 1986**

## **BACKGROUND**

- **No generally accepted radwaste classification system.**
- **Some types of waste (LLW & HLW) have been defined by law and/or regulations.**
- **Gaps need to be filled.**
- **Logically structured general classification system would be desirable.**

**DESIRED ATTRIBUTES OF A RADIOACTIVE WASTE  
CLASSIFICATION SYSTEM SHOULD INCLUDE:**

- **Covering complete spectrum of radioactive waste (i.e., de minimis to HLW).**
  
- **Providing guidance on acceptable disposal methods (i.e., what goes where).**
  
- **Consistent with existing legal/regulatory guidance.**
  
- **Consideration and reflection of major concerns related to radwaste disposal**
  - **degree of hazard**
  - **duration of hazard**

**THE NUCLEAR WASTE POLICY ACT (NWPA)  
DEFINES HLW AS:**

- **Highly radioactive material resulting from the reprocessing of spent nuclear fuel,**

**or**

- **Other highly radioactive material that the Commission determines ... requires permanent isolation.**

## **INTERPRETATION OF THE NEPA DEFINITIONS**

- **The first part is source based and is consistent with historical definitions**
  
- **The second part is a departure from the source-based approach**
  
- **Specific guidance is not given in NWPA for interpreting this second part**
  
- **Two possible interpretations can include:**
  - **HLW is highly radioactive and requires permanent isolation (two separate properties)**
  
  - **HLW is highly radiotoxic and remains that way long enough to require permanent isolation**

**POSSIBLE MEASURES FOR  
"RADIOACTIVITY" INCLUDE:**

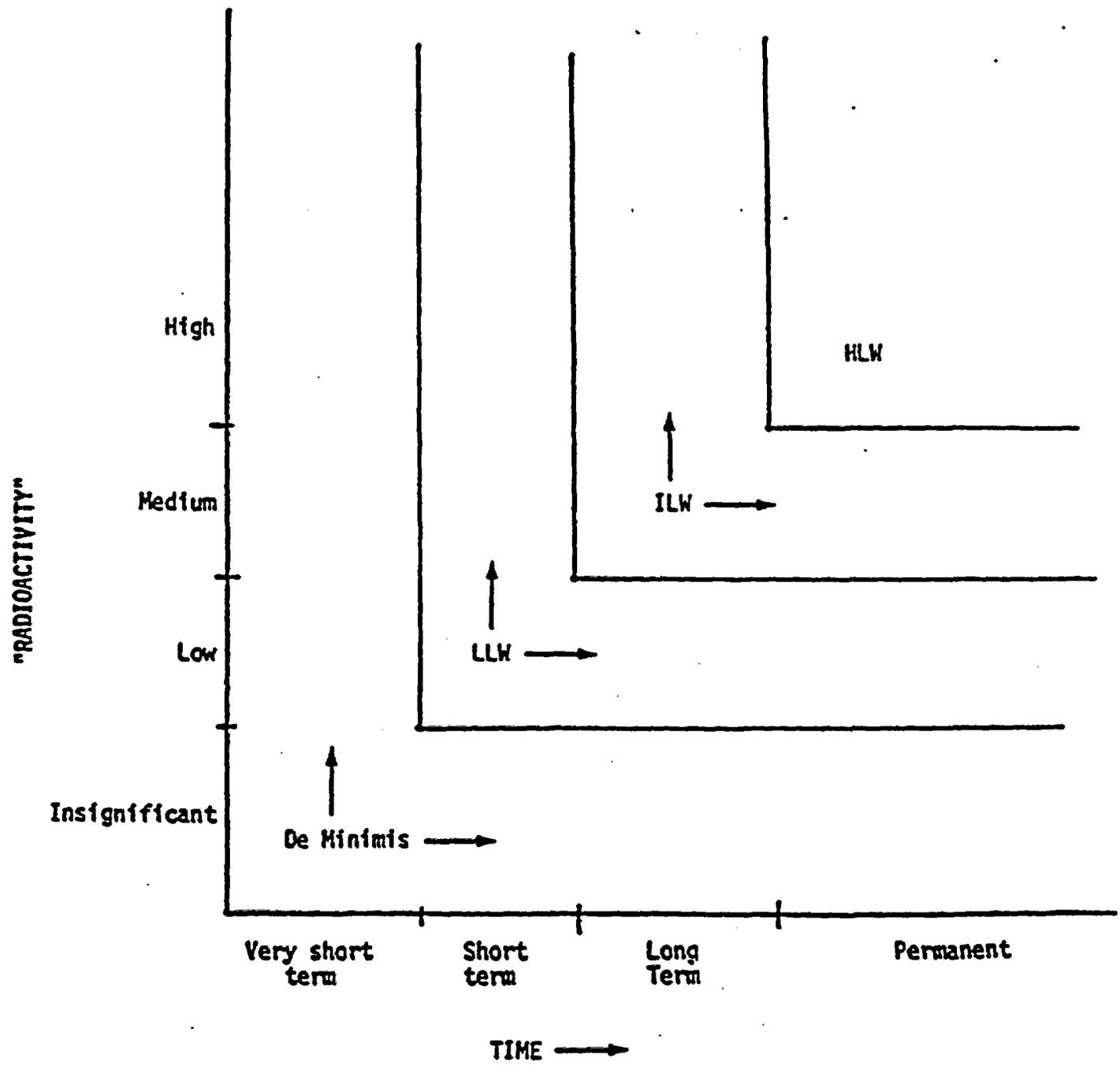
- **Concentration (Ci/gm) (Ci/m<sup>3</sup>)**
- **Hazard Index (conc/ALI) (conc/MPC)  
(conc x PDCF) (GHI)**
- **Power Density (W/m<sup>3</sup>) (W/ton)**
- **Radiation (R/hr)**

**OUR SUGGESTED APPROACH DEFINES FOUR  
CLASSES OF RADIOACTIVE WASTE AS:**

- **De Minimis (DM)**
  - disposal according to its non-radiological properties (e.g., BRC, BC)
  
- **Low Level Waste (LLW)**
  - disposal by shallow land burial or equivalent
  
- **Intermediate Level Waste (ILW)**
  - disposal by "greater confinement" or equivalent
  
- **High Level Waste (HLW)**
  - disposal by deep geologic isolation or equivalent



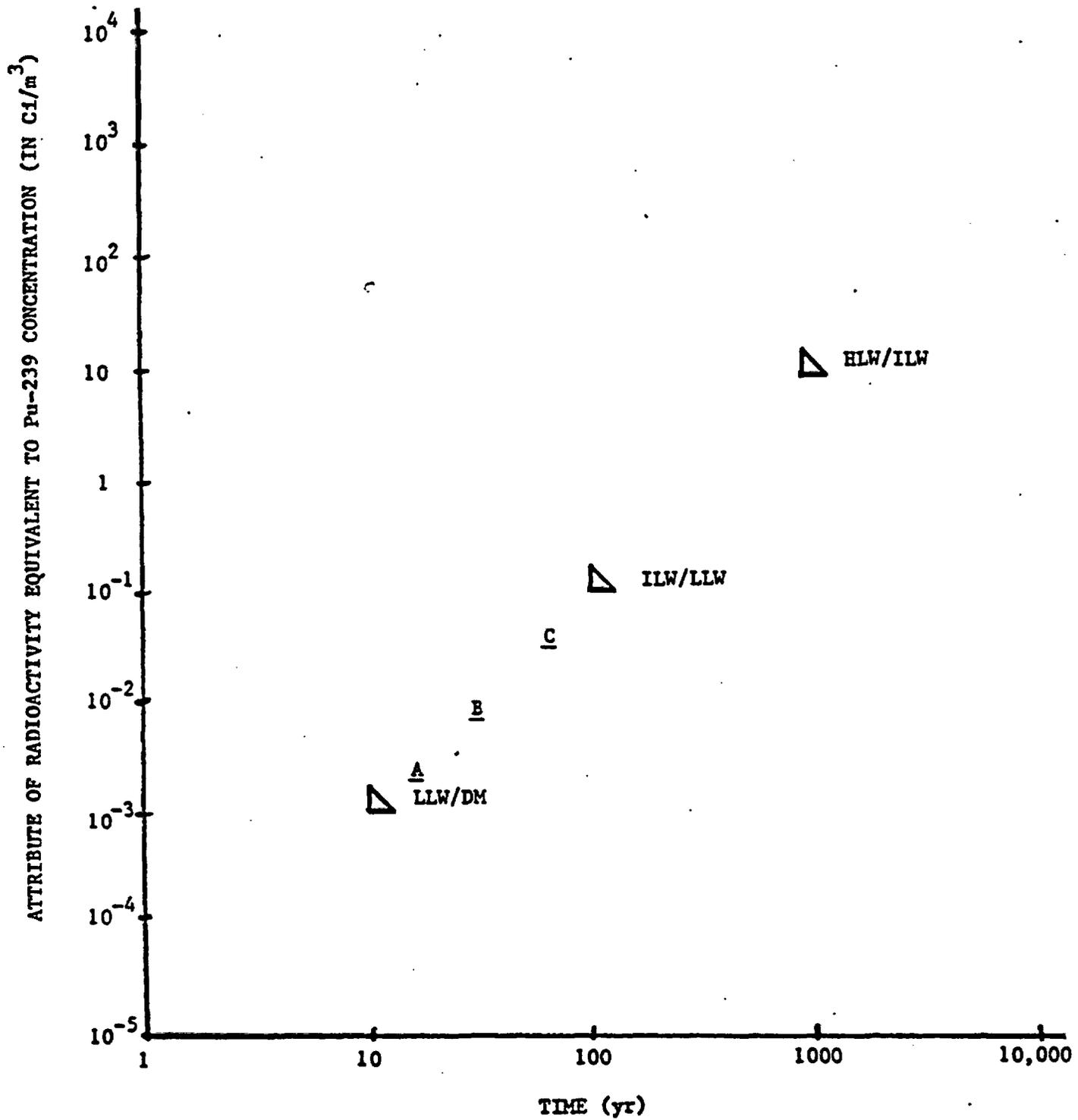
# WASTE CLASSIFICATION FORMAT



## BOUNDARY VALUES

	<u>Boundary</u>	<u>Value</u>
Time	Very Short Term/Short Term	10 yr.
	Short Term/Long Term	100 yr.
	Long Term/Permanent	1000 yr.
Radioactivity	Insignificant/Low	1.0 nCi/g*
	Low/Medium	100 nCi/g*
	Medium/High	10,000 nCi/g*

\*Equivalent (in measure used) to Pu-239 concentration.



CONCEPTUAL FRAMEWORK FOR  
 RADIOACTIVE WASTE CLASSIFICATION SYSTEM

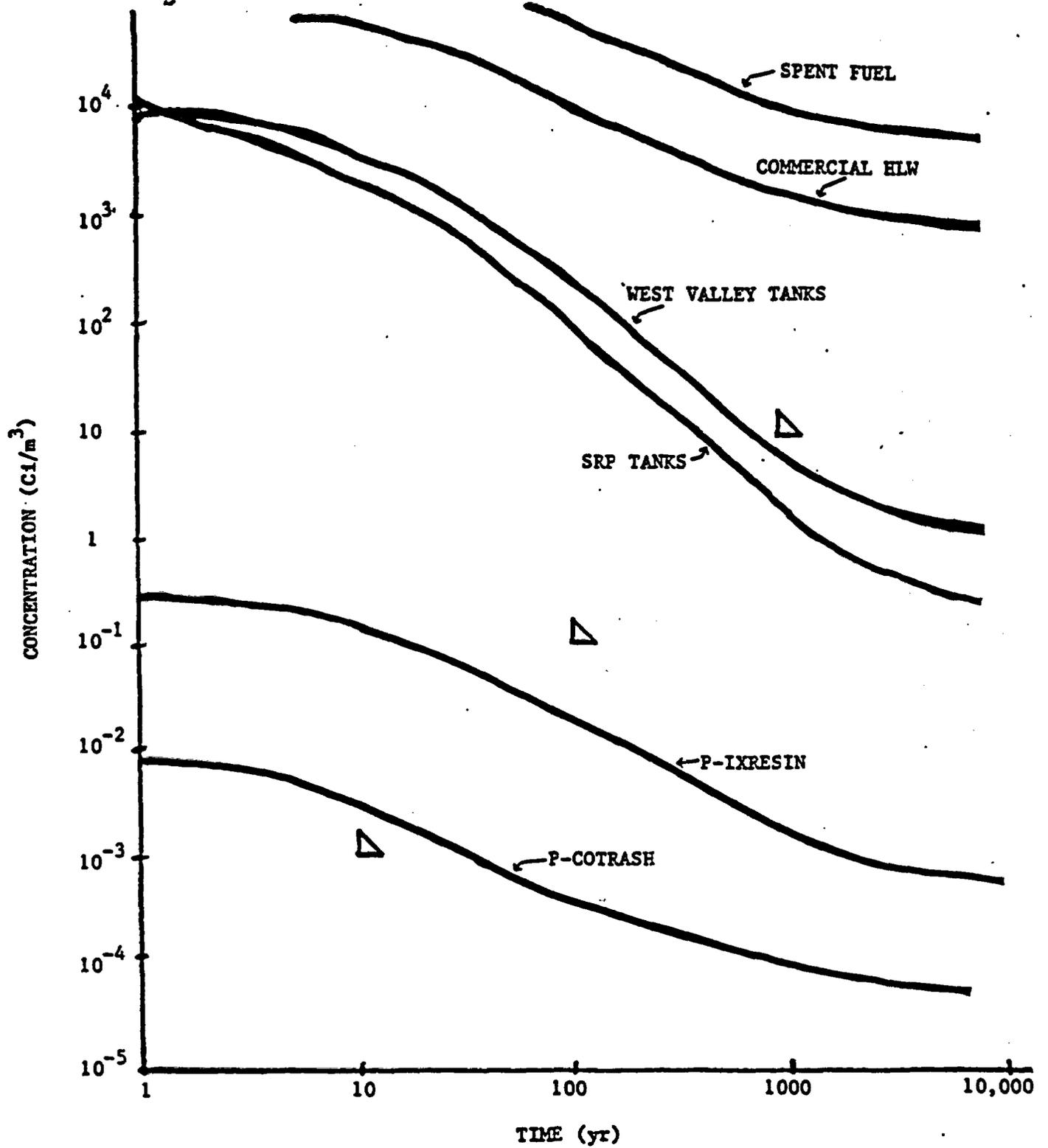
**SOME POSSIBLE MEASURES OF "RADIOACTIVITY"**

Basis	Measure	Units	Value		
			DM/LLW	LLW/ILW	ILW/HLW
Simple Concentration	Ci/mass	nCi/g	1.0	100	10,000
	Ci/vol	Ci/m <sup>3</sup>	0.001	0.1	10.0
Hazard Index	Conc/MPC <sub>w</sub>	Dmls. (m <sup>3</sup> )	200	2 x 10 <sup>4</sup>	2 x 10 <sup>6</sup>
	Conc/ALI	m <sup>-3</sup>	10 <sup>2</sup>	10 <sup>4</sup>	10 <sup>6</sup>
	Conc x PDCF	Dmls.	10 <sup>-10*</sup>	10 <sup>-8*</sup>	10 <sup>-6*</sup>
Power Density	Heat/volume	w/m <sup>3</sup>	0.003	0.3	30

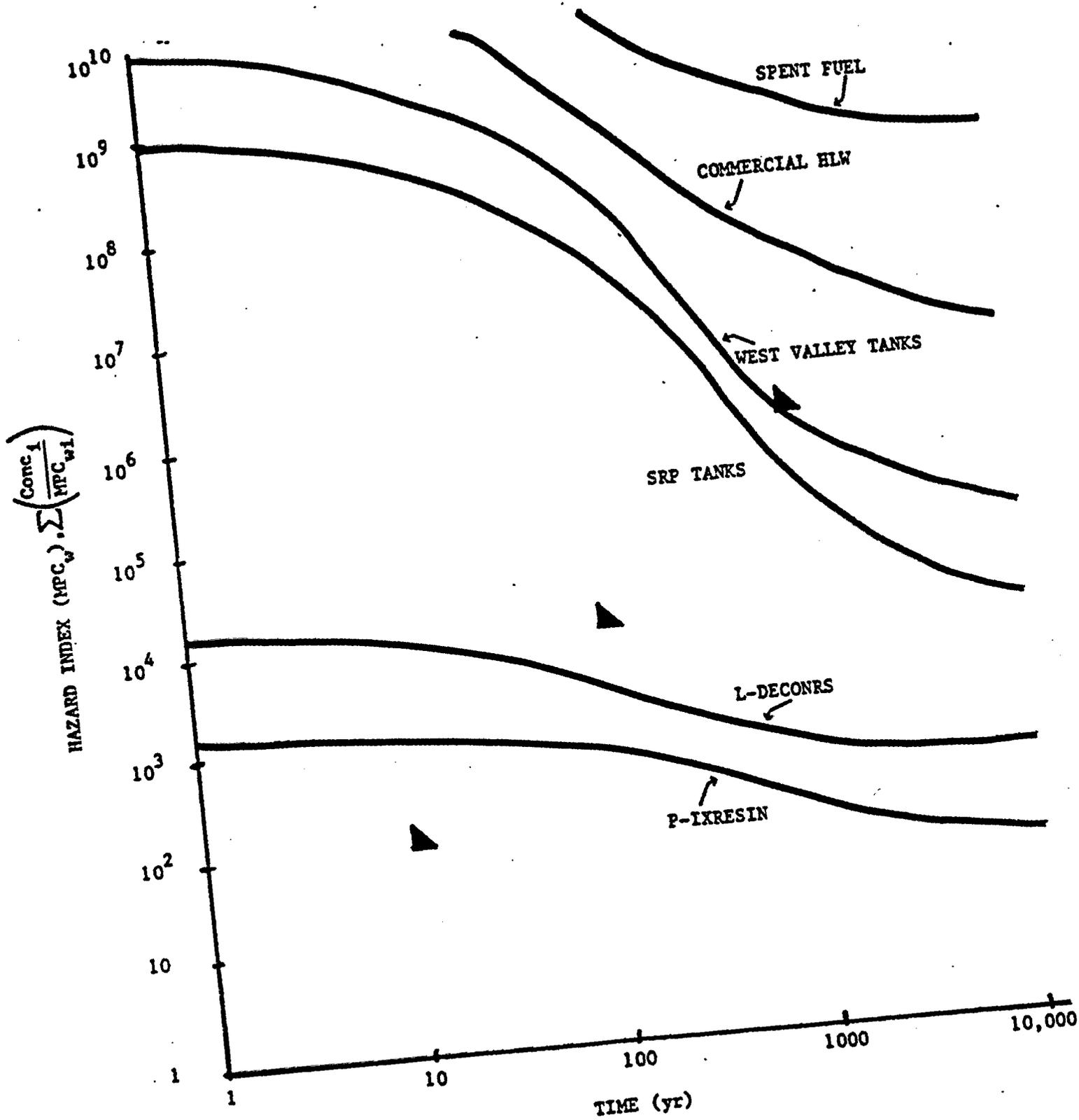
\*Based on PDCF-6 [Leaching & Migration (Well Water)] (from NUREG-0782).

## WASTE STREAMS AND DATA SOURCES

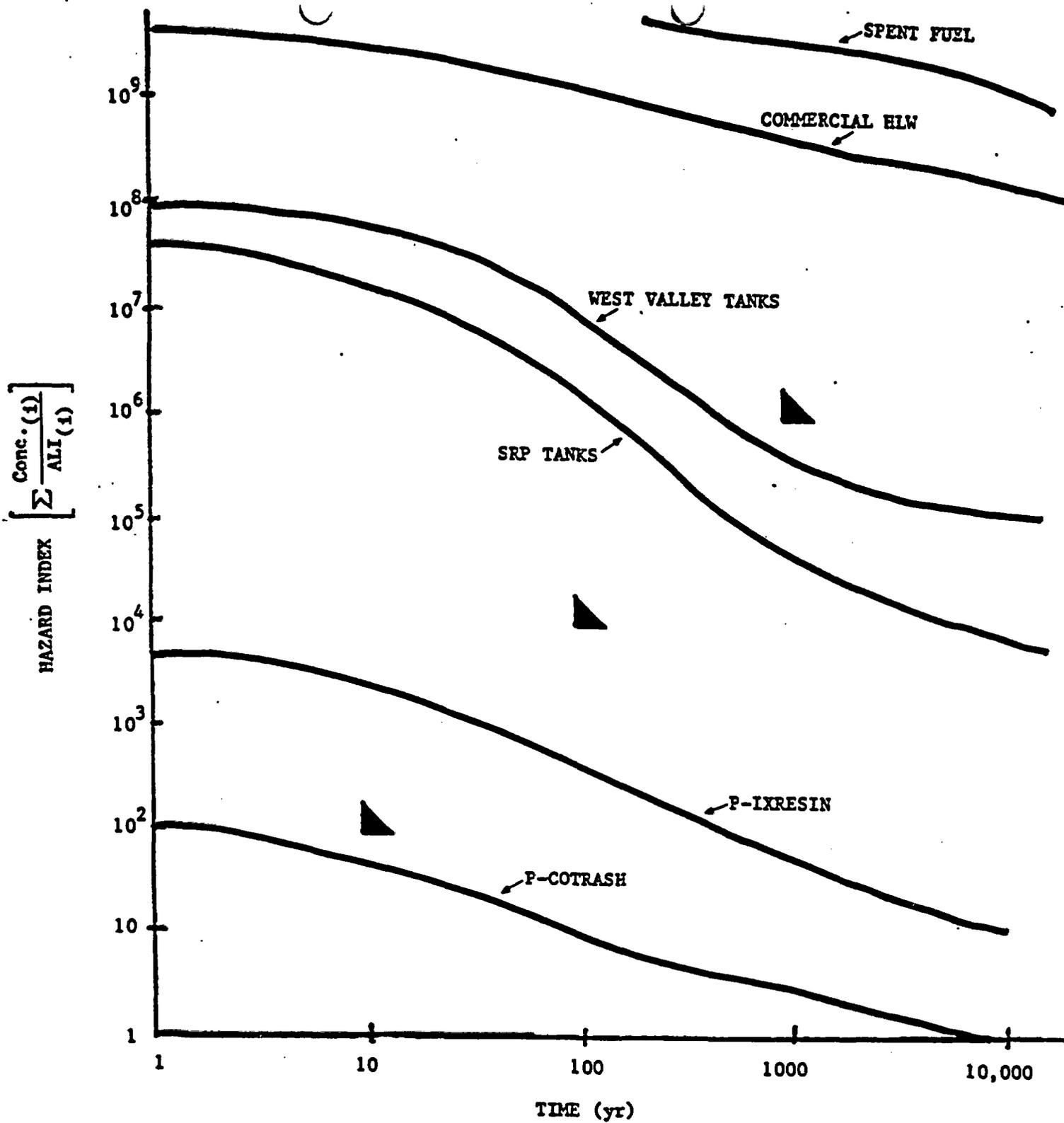
<u>Waste Stream &amp; Designation</u>	<u>Data Source</u>
Spent Fuel (Light Water Reactor)	ORNL-4451
High Level Waste (HLW)	
West Valley Tank 802 (West Valley)	NUREG-0946
Savannah River Plant (SRP) (Fresh Tank Waste)	
PWR Ion Exchange Resins (P-IXRESIN)	NUREG/CR-1759
PWR Compactible Trash (P-COTRASH)	
LWR Decontamination Resins (L-DECONRS)	
PWR Filter Sludge (P-FSLUDGE)	



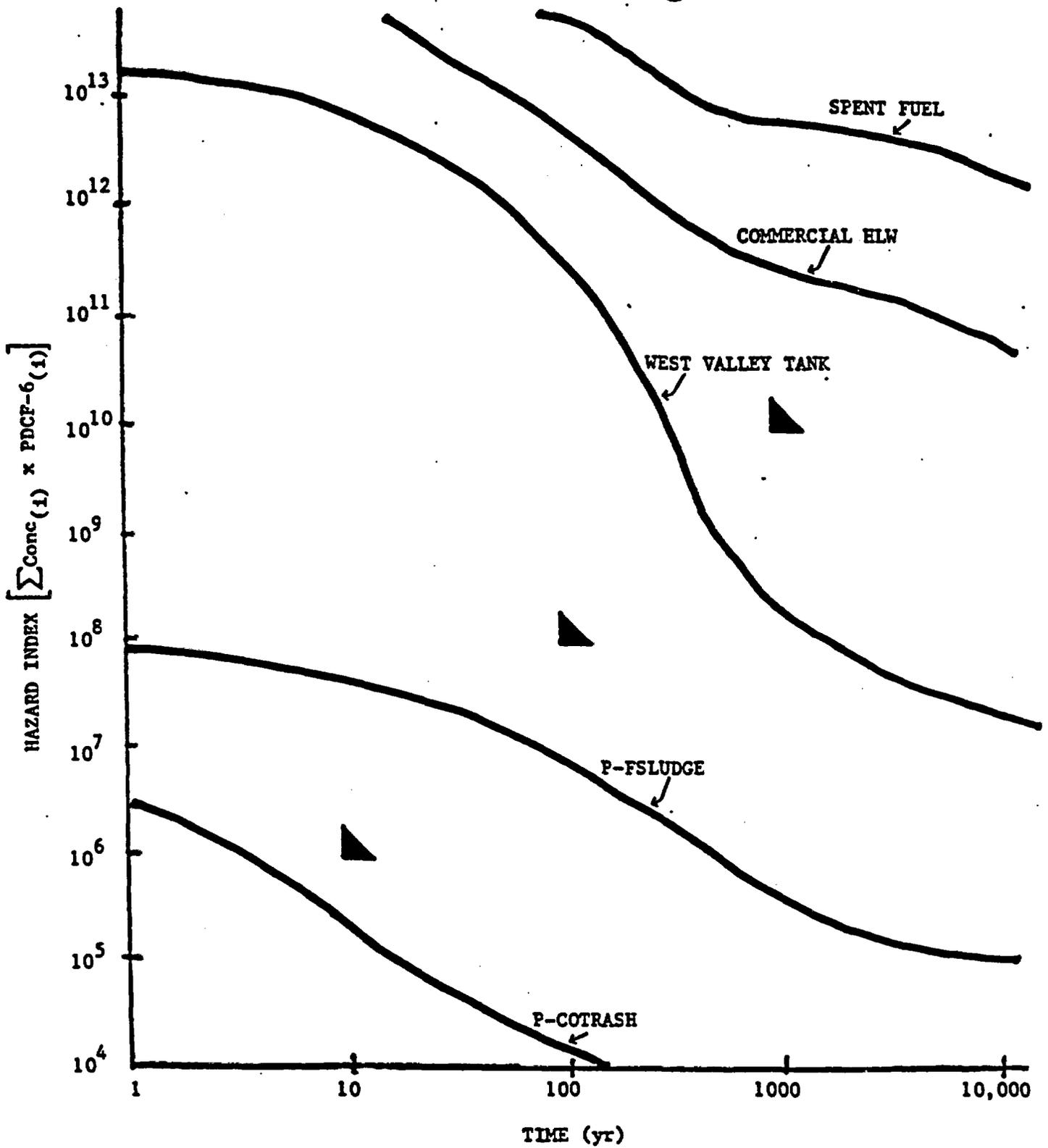
SIMPLE CONCENTRATION vs. TIME



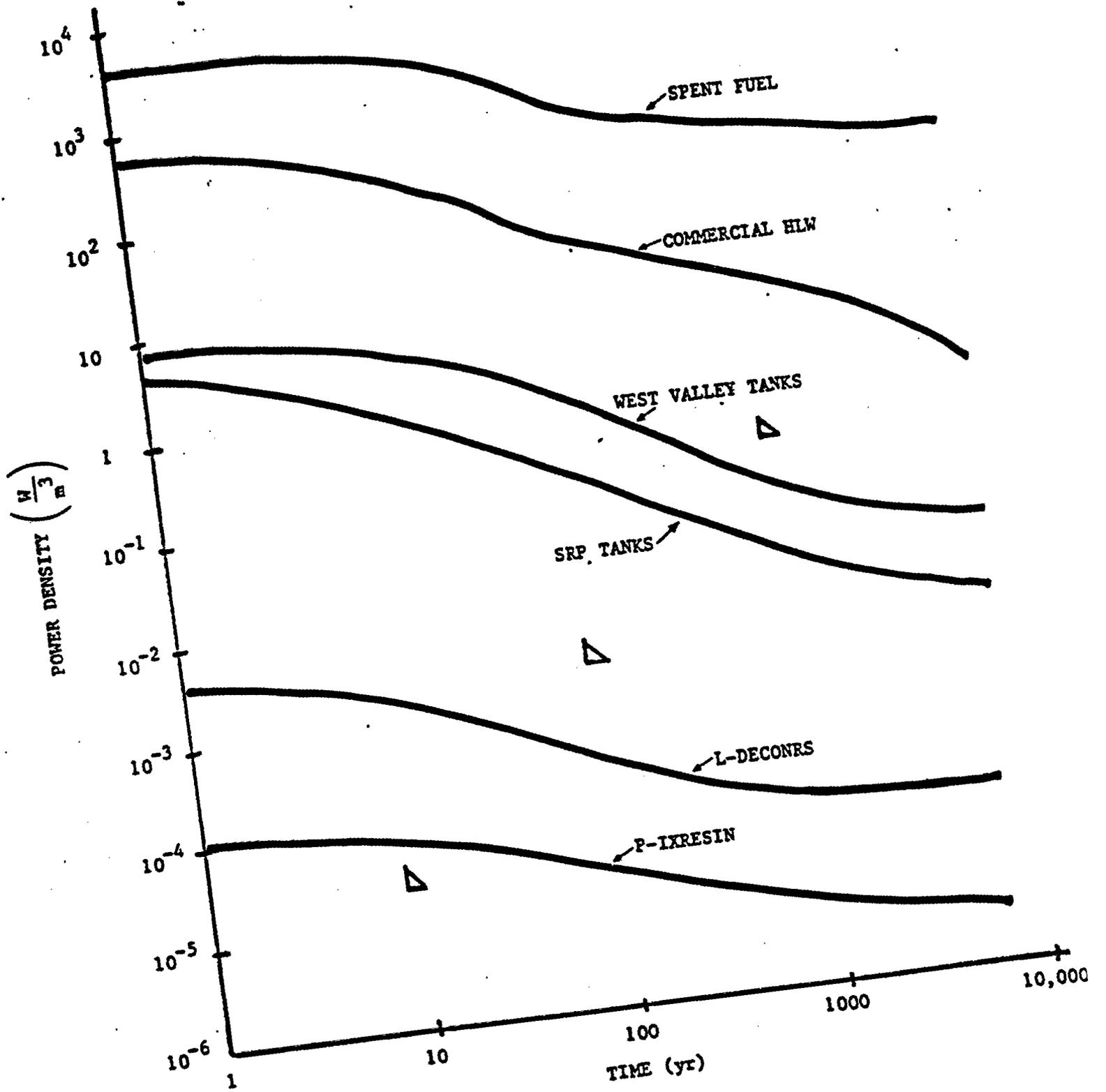
HAZARD INDEX  $\left(\frac{\text{Conc}}{\text{MPC}_w}\right)$  vs. TIME



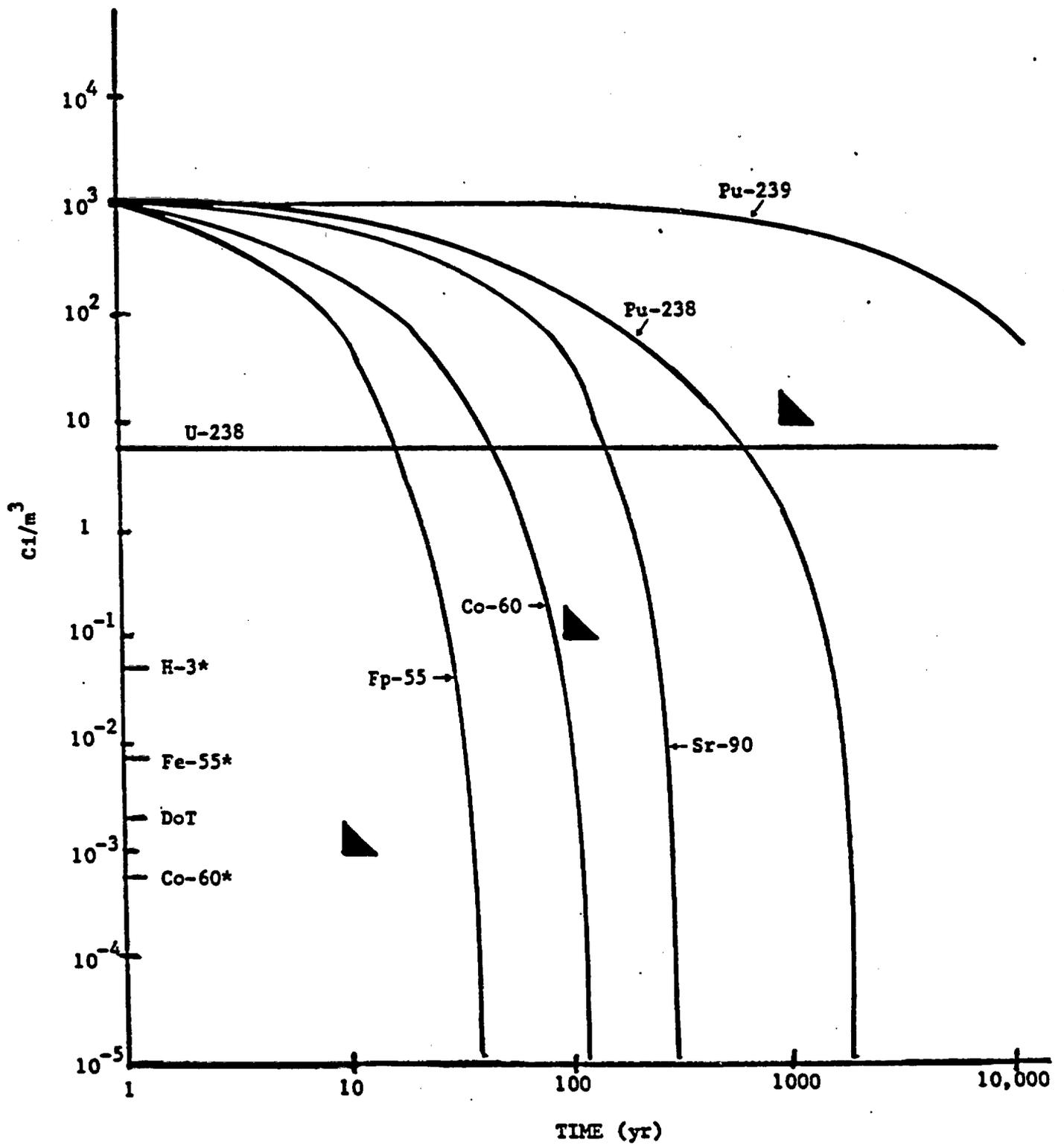
HAZARD INDEX (ALI) vs. TIME



HAZARD INDEX (PDCF-6) vs. TIME



POWER DENSITY vs. TIME



SINGLE RADIONUCLIDE WASTES

( $1.0 \text{ Ci/m}^3$  at 1.0 yr)

\*Exempt concentration (10 CFR 30, Schd. A)

**7. An Approach to Defining De Minimis, Intermediate, and Other Classes of Radioactive Waste, Jerry J. Cohen, Craig F. Smith (SAIC, Pleasanton), invited**

Several previous studies have been conducted with the intent of developing a rational system for classifying radioactive wastes. Although none of the proposed systems has gained general acceptance, certain waste classes, specifically low-level and high-level waste, have been defined by regulation. Those

wastes which remain undefined include: those intermediate level wastes that require more restrictive controls than are prescribed for low level but not the high degree of isolation needed for high-level wastes (HLW), and "de minimis" wastes which entail so low a radiological risk that they can be managed according to their nonradiological properties. This study has developed a framework within which the complete spectrum of radioactive wastes can be defined.

The two fundamental concerns related to the management of radioactive wastes are (a) extremely high hazard due to its radiotoxicity, and (b) because of the long half-life of component radionuclides, its hazard can persist for time periods considered to be of unprecedented duration for purposes of institutional control. These concerns are embodied in the Nuclear Waste Policy Act (NWPA), which defines HLW as being "highly radioactive" waste that "requires permanent isolation."

An approach has been developed that reflects both concerns in the framework of a radioactive waste classification system. This approach is depicted in Fig. 1. In this approach, the class of any radioactive waste stream is dependent on its degree of radioactivity and its persistence. To be consistent with conventional systems, four waste classes are defined. In increasing order of concern due to radioactivity and/or duration, these are

1. *De Minimis* Waste: This waste has such a low content of radioactive material that it can be considered essentially nonradioactive and managed according to its nonradiological characteristics. Synonyms for this waste class include "below regulatory concern" (BRC) and below-threshold (BT) waste.

2. *Low-Level Waste (LLW)*: Maximum concentrations for wastes considered to be in this class are prescribed in 10CFR61 as wastes that can be disposed of by shallow land burial methods.

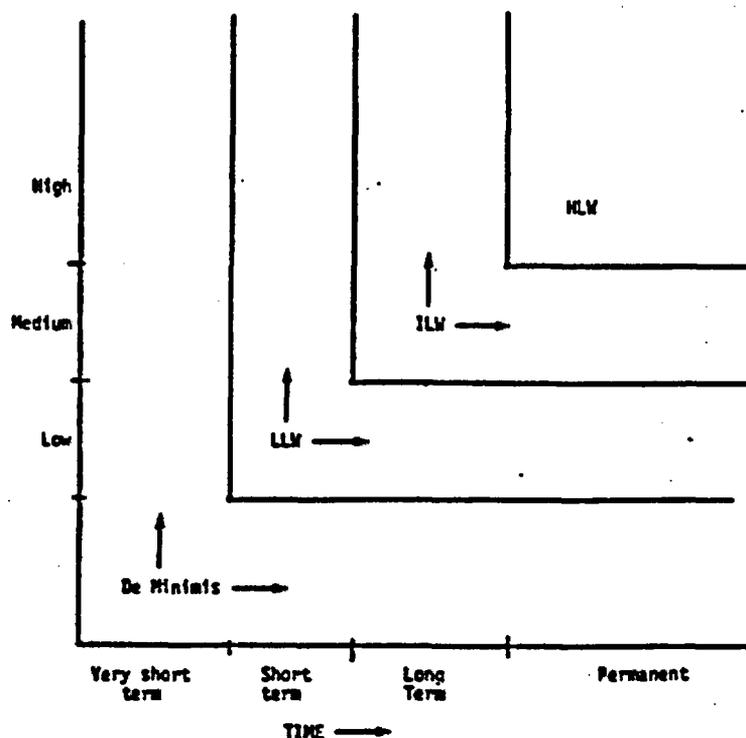


Fig. 1. Waste classification format. (Paper 7)

3. *Intermediate Level Waste (ILW)*: This category defines a class of waste whose content exceeds class C (10CFR61) levels, yet does not pose a sufficient hazard to justify management as a high-level waste (i.e., permanent isolation by deep geologic disposal). Some examples of waste that could be included in this class are transuranic waste, greater-than-class-C LLW, and naturally occurring and accelerator-produced radioactive materials (NARM).

4. *High-Level Waste (HLW)*: HLW poses the most serious management problem and requires the most restrictive disposal methods. It is defined in NWPA as waste derived from the reprocessing of nuclear fuel and/or as "highly radioactive wastes" that "require permanent isolation."

The attribute of "radioactivity" can be evaluated by any of several measures. These include specific activity (Ci/g, or Ci/m<sup>3</sup>), hazard indices (Ci/ALI, dilution volume, etc.).

TABLE I

	Boundary	Value
Time	Very short term/ short term	10 yr
	Short term/ long term	100 yr
	Long term/permanent	1000 yr
"Radioactivity"	Insignificant/low	1.0 nCi/g <sup>a</sup>
	Low/medium	100 nCi/g <sup>a</sup>
	Medium/high	10 000 nCi/g <sup>a</sup>

<sup>a</sup>Equivalent (in measure used) to <sup>239</sup>Pu concentration.

external radiation (R/h), pathway dose conversion factors (PDCF), and heat output (W/g or W/m<sup>3</sup>). Boundary values to differentiate waste classes can be determined on the basis of regulatory guidance (primarily 10CFR61), literature review (covering previous classification recommendations), and risk assessment applying calculational models.

For example, as a first approximation, boundary values can be established as shown in Table I.

A rationale for quantitatively setting the boundaries between waste classes based on both their "radioactivity" and persistence is discussed. Several waste streams have been eval-

uated according to this methodology using a variety of different measures of "radioactivity." For example, Fig. 2 presents the relationship for certain selected waste streams using concentration (Ci/m<sup>3</sup>) as a measure.

An unexpected result of this study is that the choice of measure selected to define the attribute of radioactivity does not appear to have a major impact on the resultant classification of specific waste streams. An advantage of this approach is that it can clearly and graphically distinguish waste classes and considers both the level of radioactivity (or hazard index) and its duration.

DOCKET NUMBER  
PROPOSED RULE PR-68 (8)  
(52 FR 5992)

SECRET  
Bedford County Environmental  
Committee  
c/o Carolyn Fuller, President  
RD #1  
Six Mile Run, Pa 16679  
April 27, 1987

87 APR 29 P5:46  
OFFICE OF REGULATORY  
DOCKETING & SERVICE  
BRANCH

Secretary, USNRC  
Att: Docketing and Service Branch  
U S Nuclear Regulatory Commission  
Washington, DC 20555

COMMENT RE: DEFINITION OF "HIGH LEVEL RADIOACTIVE WASTE"

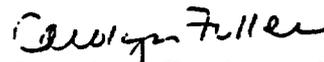
Our organization the Bedford County Environmental Committee, has been very involved in the attempt to provide for the safe handling of low-level radioactive waste in Pennsylvania. Based on our experience dealing with that problem and our study of the problems of high level waste, we offer the following comments.

There are no simple and sharp cut-off points in dealing with the hazards of radioactive waste. The hazards are a continuous spectrum dependent on many factors including curie content, half-life, volume, chemical composition and physical form. Appropriate measures must be used with each kind of radioactive waste.

The past and proposed rules do not adequately take the incremental nature of the hazards into consideration, but try to make broad categories of materials which will all be treated similarly. If this approach is taken then a bias in favor of safety must be made and materials should always be treated as if belonging to the most dangerous category they could possibly fit into. Thus, the rule should use both the source of wastes and the concentration of wastes methods in the final definition to include as much waste as possible within the high-level category.

Also, since the Commission has created such broad categories within its definition of low level waste, that waste which has been classified as low level class C should actually be included in the high level category. Pennsylvania can safely deal with low level classes A and B, but the attempt to deal with all class C wastes in the same system creates severe problems of safety and cost for our State. Therefore, until the Commission creates a more realistic classification system based on the real hazards of dealing with the different materials, class C wastes should be included in the definition of high level waste.

Sincerely,



Carolyn Fuller, President

Acknowledged by Card. MAY 08 1987

# New England Coalition on Nuclear Pollution, Inc.

Box 545, Brattleboro, Vermont 05301

JACKET NUMBER

Phone (802) 257-0336

PROPOSED RULE

PR-60. ⑨

(52 FR 5992)

April 28, 1987

87 APR 29 P4:36

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

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

Attn: Docketing and Service Branch

and

W. Clark Prichard, Division of Engineering Safety  
Office of Nuclear Regulatory Research  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Re: Federal Register Volume 52, No. 39 2/27/87 5992-6001  
Nuclear Regulatory Commission 10 CFR Part 60  
Definition of "High-Level Radioactive Waste"  
Advance Notice of Proposed Rulemaking

The New England Coalition on Nuclear Pollution, Inc. urgently requests a reopening and formal extension of comment period for the above cited proposed rulemaking, currently scheduled to expire on April 29, 1987. We recognize this as a rulemaking of far reaching consequence, requiring the thoughtful scrutiny and consideration of decision makers at all levels of governance and private or public enterprise, as well as all citizens concerned with and/or affected by its implications.

We hereby submit preliminary comments, reserving rights to amplify these with later submission(s) if such action meets with your pleasure.

## BASIS FOR COMMENTARY

THE NEW ENGLAND COALITION ON NUCLEAR POLLUTION, INC. is an independent, non profit membership organization, with trustees representing all New England states, and an international roster of respected science advisors. It is based in Brattleboro, Vermont, and has been prominent since 1971 as an intervenor in good standing in the nuclear regulatory process.

It has been obvious for some time that the variety in definitions for high level radioactive waste (HLW) is causing confusion both for the public and for lawmakers, politicians, and others whose jurisdictional authority requires them to carry out their appointed duties.

The Nuclear Regulatory Commission has been challenged by the wording of the definition of HLW in the NUCLEAR WASTE POLICY ACT of 1982 to amplify its codified definition. How it will exercise the statutory authority it has been given is a matter of critical importance.

*Educating the Public in Clean Alternatives to Nuclear Power*

Acknowledged by card... APR 30 1987

HISTORICAL PERSPECTIVES

1945-1970

There was no mention of atomic or radioactive waste made in the Atomic Energy Act of 1945 which marked the commencement of the Atomic Age, nor in its Amendment, enacted in 1954, which began the era of the PEACEFUL ATOM. This was the era of avoidance and neglect. With no statutory provision for the protection of public health and welfare, burial, dumping and dispersion of unwanted radioactive materials commenced. Its legacy is still with us.

1970-1980

This is the era in which atomic energy was developed and the radioactive waste problem was acknowledged.

The atomic industries, based more on hubris and euphoria than substantial data, leapt into the generation of atomic wastes with significant investments, which they are still, understandably, loath to write off.

With the expectation that all spent fuel generated at commercial nuclear power stations could be economically reprocessed and recycled, a commercial reprocessing center was contracted for in West Valley, New York, in 1968. It was this empirical experience that prompted the first codified mention of "high level liquid radioactive wastes" by the Atomic Energy Commission, which was later broadened to include spent fuel itself and made statutory in the enactment of the Marine Protection, Research and Sanctuaries Act of 1972.

Thus a tradition was established for using the term HLW, short for high level wastes, to refer specifically and exclusively to reprocessing wastes. This is most confusing to an uninitiated public, which quite naturally assumes the high level refers to the intensity of a radioactive waste.

The West Valley experience established another milestone in the history of HLW definition. The plants failure, brought about by technical and economic difficulties, led to the enactment of the West Valley Demonstration Project Act in 1980, which added to the previous definition the first statutory mention of "other" radioactive wastes by adding "such other material as the Commission designates as high level radioactive waste for purposes of protecting the public health and safety."

The incongruity that exists between the definition of HLW in this act and ensuing definitions in the NRC Codes and the Nuclear Waste Policy Act of 1982 is a key concern of the authors of the proposed rulemaking on which we are commenting.

In 1974 the Energy Reorganization Act split the old Atomic Energy Commission into the Nuclear Regulatory Commission to regulate commercial facilities, and what is now the Department of Energy (DOE) that incorporates R & D and military operations under its wing.

The 1980's

This is an era marked by a multiplication of codes and statutes and assignment of classifications and responsibilities for different aspects of the still unresolved radioactive waste problems.

All of these are reviewed in your advanced notice on proposed rulemaking. They have added to the confusion, not only of the public, but of all the people in governance who must deal with them.

IDENTIFICATION OF PRESENT PROBLEM AND ITS SOLUTION

The Commission's current definition of HLW in 10 CFR Part 60 reads:

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

The Nuclear Waste Policy Act of 1982, however, defines it as

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

B. other highly radioactive material that the Commission consistent with existent law determines by rule requires further isolation"

It is in answer to clause B that you are addressing your attention in the present rulemaking. You offer the following definition as a possible solution:

"High-level radioactive waste" or "HLW" means (1) irradiated reactor fuel (2) liquid wastes resulting from the recycling of first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel.(3) Solids into which such liquid wastes have been converted, and solid radioactive waste from other sources, provided such solid materials contain both long-lived radionuclides in concentrations exceeding values of Table 1 and short-lived radionuclides with concentrations exceeding the values of Table 2. [of 10 CFR Part 61]"

PARTIAL COMMENTARY BY THE NEW ENGLAND COALITION

- \* This option, favored by the Commission will further confound and disenchant the public and the States, whose support for both the military and the peaceful atom is waning.
- \* Chernobyl, military landfill contamination, political decisions by the DOE in its handling of the HLW repository questions, Iranscam, and other such continuing bad news have educated today's public to be properly wary.
- \* The option chosen by defining HLW to be both highly radioactive and requiring permanent isolation opens the door to calling wastes that are partitioned ~~for~~<sup>in</sup> reprocessing to be classified as Low Level Waste. This enhances the generation of more nuclear waste at a time when the ambivalence of all humanity toward use of nuclear power and arms calls for a halt in the generation of all three.
- \* An honest definition of High level Waste as suggested by the West Valley Demonstration Project Act would be an appropriate response to the challenge of NWPA's Clause (B). It would reassure a doubtful public that the NRC was regulating in the interests of the public health and welfare rather than serving the vested interests of the atomic industry.
- \* We have learned a great deal about atomic power and arms in the last half century, but what we still don't know can hurt us irrevocably. By adding to background radiation by producing new emitters without the capability of reversing radioactive toxicity, we are perhaps fulfilling the prophecy of The late James Bryant Conant, noted chemist educator and President of Harvard University in the first years of atomic power. He said that nuclear power was the systematic poisoning of our descendants. If there is even a chance that this may be true, and a paper entitled "Childhood Cancers in the U.K. and their Relation to Background Radiation" by G.W. Kneale and A.M. Stewart, delivered at the Proceedings of the International Conference on the Biological Effects of Ionizing Radiation at Hammersmith Hospital in London on November 24-25, 1986, indicates that there might be, no statesmen or their agents should in good conscience promote the generation of more emitters until or if this question is put to rest.
- \* The authors of the proposal appear to have taken upon themselves a decision making charge that is more properly the province of lawmakers. We recommend that Congress should itself resolve whether and which wastes should be retrievable when they are disposed of. It is more important to regulate the nuclear industry in the best interests of the public than to help it to meet milestones prescribed by Law which Congress itself can amend.

RESPECTFULLY SUBMITTED

CORNELIA W. ISELIN

PUBLIC EDUCATION CHAIRPERSON

WARREN A. BISHOP  
Chairman



DOCKET NUMBER PR-60 (10)  
PROPOSED RULE (52 FR 5992)

DOCKETED  
USNRC

STATE OF WASHINGTON

NUCLEAR WASTE BOARD

Mail Stop PV-11 • Olympia, Washington 98514 • (206) 459-6670

'87 APR 29 P3:23

April 28, 1987

OFFICE OF THE  
DOCKETING AND  
SERVICE BRANCH

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

Attn: Docketing and Service Branch

Dear Mr. Secretary:

Please find enclosed the state of Washington's comments on the February 27, 1987 Federal Register Notice regarding an Advanced Notice of Proposed Rulemaking for changes to 10 CFR Part 60 on the Definition of High-Level Radioactive Waste. These comments were developed by the state's Nuclear Waste Board under their authority to develop state policies relating to the management of radioactive wastes and represent the citizens of Washington State in these issues.

As noted in our comments, the brevity of the comment period has not allowed for an intensive review of the consequences associated with this proposal. Therefore, the state requests the Commission to consider additional comments submitted after the April 29, 1987 deadline.

Thank you in advance for your consideration of the state's concerns associated with this proposed rulemaking.

Sincerely,

Warren A. Bishop, Chair  
Washington State  
Nuclear Waste Board.

WAB/JS:ht

Enclosure

MAY 08 1987



STATE OF WASHINGTON  
NUCLEAR WASTE BOARD

Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6670

**COMMENTS ON  
THE NUCLEAR REGULATORY COMMISSION'S  
ADVANCED NOTICE OF PROPOSED RULEMAKING**

**DEFINITION OF HIGH-LEVEL WASTE**

**Introduction**

The Washington State Nuclear Waste Board developed the following comments on the Federal Register Notice dated February 27, 1987 regarding an Advanced Notice of Proposed Rulemaking for changes to the 10 CFR Part 60, Definition of High-Level Radioactive Waste. Washington State legislation gives the Nuclear Waste Board the responsibility for developing state policies related to the management of radioactive wastes, evaluating federal actions, and serving as a spokesman on behalf of Washington State citizens.

The Board's principal focus in the comments is on the impacts that waste definitions will have on the disposal of reprocessing wastes presently stored at Hanford, and on the requirements for the geologic repository system.

While the Board accepts the principle that disposal standards should reflect the risks and hazards associated with the wastes as attempted in the Commission's proposal, redefinition of waste classes, as proposed, may fail to achieve this goal due to several legal and jurisdictional constraints. Therefore, the Board cannot support the high-level waste definition proposed in the Advanced Notice due to numerous unresolved issues and the lack of specific information. As Commissioner Asselstine points out, the proposed definition creates a high potential for confusing the waste disposal issue.

The future of the Hanford tank wastes is of particular concern. These tanks present a unique situation in that these wastes are a complex mixture of chemical and radioactive materials unlike others in the country. The search for a conceptual definition of high-level wastes should not interfere with the timely and proper disposal of these wastes. Irrespective of the definition, we need to assure that the risks posed by these wastes are matched by an appropriate disposal medium. The Commission's definition could cast the future disposal of these wastes into a legal maze.

In addition, the brevity of the comment period has not allowed for an intensive review of the consequences of this rulemaking, and the state requests the Commission to consider additional comments submitted after the deadline.

The Board's major concerns center on four points: (1) Modifications to the Scope of the Commission's Authority, (2) Conflicting Definitions of High-Level Waste, (3) Impacts on Regulatory Authorities of Other Agencies, and (4) Lack of Information Necessary to Evaluate the Impact of the Commission's Proposals.

1. Modifications to the Scope of the Commission's Authority

The development of a definition for high-level waste should not alter the Commission's existing authority to license Department of Energy "Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste" under the Energy Reorganization Act of 1974 (42 U.S.C. 5842 (4)).

Any wastes understood to be high-level wastes at the time of this Act, including the Hanford tank wastes, must be disposed of in facilities licensed by the Commission. As stated in the proposal, any classification of wastes as non-HLW on the basis that they do not contain "sufficient concentrations" of fission products would be irrelevant in determining whether such wastes must be disposed of in licensed disposal facilities. For example, if DOE were to pursue its proposal for in-place stabilization of the Hanford "tank" wastes, most or all of the disposal "facilities" for those wastes would need to be licensed by the NRC.

It is useful in this respect to examine NRC's previous comments about these wastes, made in response to the DEIS on Hanford wastes (DOE/EIS-0113). Mr. Robert Browning, NRC's Director of Waste Management, wrote: "it appears that the Hanford 'tank wastes,' which from the information presented in the draft EIS would have been regarded as HLW when the Energy Reorganization Act was passed, remain HLW for purposes of determining whether or not NRC has such jurisdiction . . . . [L]icensing of Hanford wastes tanks for HLW disposal will be procedurally complex because of the need to develop appropriate standards and procedures, the existing fait accompli status of the waste tanks, and the difficulty in reasonably evaluating alternatives . . . as required by the National Environmental Policy Act . . . [W]e believe establishing the feasibility of [in situ] disposal as technically adequate to protect the public health and the environment will be exceedingly difficult and may not be achievable.", (see also DOE/EIS-0113, Vol. 1, 6.11).

In this regard, the Board is interested in the Commission's plans for licensing of any facilities for the disposal of high-level wastes that are not geologic repositories. The proposed rule should discuss the Commission's authority to license and regulate alternative disposal, given that the Nuclear Waste Policy Act does not authorize the DOE to construct or operate facilities for the disposal of high-level waste by means other than deep geologic.

In addition, this proposal should review Commission authority over the long-term storage of these wastes. At what point in the defense waste storage at sites around the nation does the Commission's licensing authority begin? Could these wastes be "stored" for hundreds of years without entering into the licensing process for disposal? The consideration of this information is important in evaluating the effect of any high-level waste definition.

## 2. Conflicting Definitions of High-Level Waste

In Section II B 3 of the Advanced Notice the Commission proposes a conceptual revised definition for high-level wastes as follows:

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

In this definition the Commission classifies solidified reprocessing wastes as high-level only if they contain both short- and long-lived radionuclides in concentrations greater than the Class-C low-level waste standards of 10 CFR Part 61. The Board feels that the adoption (and application) of this definition, as is, would not resolve our present difficulty and in fact, fails to recognize the realities of reprocessing waste management, especially as they pertain to Hanford and its tank wastes.

However, before elaborating on this position, it is important that the reader recognize two key elements in the genesis of the HLW definition as it stands today. These are:

- a) The Atomic Energy Commission's 1970 definition of HLW in 10 CFR 50, Appendix F, which included:

*"... those aqueous wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles ..."*

(This was the definition in use when Congress passed the Energy Reorganization Act of 1974. The Board believes that the intent of the Congress under the Energy Reorganization Act was clearly to define reprocessing wastes as high-level, and that long-term storage of these wastes were to be licensed by the NRC. A rulemaking by the Commission that overrides the definition assumed within the Energy Reorganization Act is clearly suspect); and

- b) The Nuclear Waste Policy Act of 1982, in which Congress defined HLW as

*"(A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation."*

We feel that in these two successive definitions, Congress intended reprocessing wastes to be included within the HLW category and to force these wastes to a repository in toto. (See the following section for further comments.)

From a historic perspective, we find the only real reference to waste concentration criteria for inclusion in a high-level waste definition to be within Clause A of the NWPA, which requires "fission products in sufficient concentrations". In its proposed definition, the Commission appears to be using the authority granted in the NWPA Clause B to include solids into which reprocessing wastes have been converted.

As stated in the introduction to these comments, the Board understands and accepts the concept of structuring waste disposal standards according to the hazards those wastes present. However, the Commission appears to be going beyond the intent of Congress by including their proposed requirements for the classification of solidified reprocessing wastes as high-level. A rulemaking of the type being proposed, without changes to the definitions within Congressional acts, may not be legal and could be fruitless.

### 3. Impacts on Regulatory Authorities of Other Agencies

One of the key deficiencies which we find in the Commission's Advance Notice of HLW is that no stance has been taken, or information offered, regarding the degree to which this proposal would affect the regulatory responsibilities (or programs) of other state and federal agencies.

We have already noted our understanding of Congress' initial intent (to classify Hanford's reprocessing wastes as HLW, and force them, as generated, to a repository). However, since this initial stance, we have gained a significantly improved understanding of the waste streams in question. There appears to be a misconception on the part of the Commission, as evidenced by their statement on page 5994 of the Advanced Notice that:

*"Wastes which have historically been referred to as HLW (i.e. reprocessing wastes) are initially both intensely radioactive and long lived."*

This statement is not consistent with our knowledge of the approximately 27 waste streams routed to Hanford's double shell and single shell tanks. The majority of these waste streams contain relatively low levels of radioactivity (less than Class-C). Only three have been identified as having significant concentrations of long-lived isotopes. DOE's plans for separation, vitrification, and disposal in a repository encompass only these three waste streams. The remainder are scheduled for surface solidification and disposal as generated.

The Board feels that the Commission's proposed redefinition has not incorporated adequate consideration of the realities of the Hanford situation. No consideration has been given to the mixed waste nature of these reprocessing wastes, or USDOE's many existing or planned facilities for the surface disposal of these wastes. It is the Board's firm conviction that if these wastes are treated, stored, disposed, or otherwise managed using means outside the repository program, then they should be subject to state and federal hazardous waste management programs. The DOE should not be allowed exclusion from these regulatory structures as well as exclusion from geologic disposal.

Draft legislation in the United States House and Senate is attempting to address this issue by excluding only wastes disposed via the repository program from EPA's RCRA program, or authorized state programs. This approach stems from the assumption that a repository will afford equivalent or greater environmental protection than a RCRA facility.

DOE Hanford staff have also begun working in this direction, with specific activities including detailed chemical waste analyses and the development of draft RCRA permit applications for facilities planned for solidification and land disposal of Hanford's reprocessing wastes. Unfortunately DOE Headquarters staff continue to press for exclusion from regulation of Hanford reprocessing wastes. We find these attempts unjustified and highly improper.

The Board also notes that DOE planning is going forward to decommission Hanford's old federal reactors. These activities will generate a wide range of wastes, including substantial volumes of wastes greater than Class-C. The timing of the Commission's present proposal and its implications may have a major impact on these activities. The proposed rulemaking should describe in greater detail the Commission's estimate of the definitions impact and how it would be implemented in regard to these particular Hanford programs.

4. Lack of Information Necessary to Evaluate the Impact of the Commission's Proposal

The Commission should provide estimates of the costs necessary for disposal and the volumes of additional high-level wastes that would be included under Clause B and intended for deep geologic disposal. The definition proposed in the Advanced Notice may include significant quantities of wastes that are not presently considered by nuclear utilities to be destined for permanent isolation in a geologic repository. The costs for disposal of these additional wastes may not be covered by established contractual arrangements with DOE, and the volumes these wastes represent may not be included in total repository volume estimates. This type of information is necessary to evaluate the impact of the Commission's proposed rulemaking.

In order to evaluate the adequacy of 10 CFR Part 61 standards as a dividing line between low-level wastes and wastes with "fission products in sufficient concentration" and the need for "permanent isolation", more information is necessary. The Board feels that the use of those low-level standards is probably a conservative approach in trying to establish boundaries between what is allowed for shallow land burial and what requires additional controls. However, the Commission should provide assessments of the protection afforded, and costs incurred by using enhanced disposal systems for above Class-C wastes as well as protection afforded by deep geologic disposal.

These assessments could then be used to estimate concentrations of radioactive wastes that could safely be disposed of in a given system. The differences in concentrations and types of wastes that could be disposed in enhanced systems could be compared with what is allowed in shallow land burial. This comparison would provide insight into cost/benefit analyses on the use of the low-level standard, particularly in terms of total program costs and repository waste capacities. This approach may provide information on the need for another set of standards for Above Class-C (intermediate level wastes), and the associated costs for developing a disposal program, including the licensing of sites.



COMMONWEALTH OF PENNSYLVANIA  
DEPARTMENT OF ENVIRONMENTAL RESOURCES  
Post Office Box 2067  
Harrisburg, Pennsylvania 17103

DOCKETING & SERVICE  
BRANCH

April 28, 1987

717-787-2814

The Secretary

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

ATTN: Docketing and Service Branch

Dear Secretary Chilk:

The Pennsylvania Department of Environmental Resources appreciates the opportunity to offer comments on the advance notice of proposed rulemaking published February 27, 1987 on the definition of "high-level radioactive waste".

The major points we make in our comments are:

- The Department supports classifying waste by concentration (NRC's first option) and believes a minimum total quantity limit would be useful;
- Any waste requiring permanent isolation should be classified as high level waste, regardless of the concentration of short-lived isotopes;
- It would be more efficient for the federal government to take responsibility for disposal of Class C waste because of its physical similarity to waste that the federal government already has responsibility for;
- Naturally-occurring or accelerator-produced radioactive materials (NARM) should be included in the analysis for reclassification of high level waste, since it is not included in the current statutory definition of low-level waste.

**THE COMMONWEALTH SUPPORTS A CONCENTRATION-BASED DEFINITION**

The method for classifying materials as High Level Waste (HLW) should be based strictly on the concentrations of long-lived radioisotopes for both Clause A and B of the Nuclear Waste Policy Act. In the final analysis, it is the long-lived radioisotopes that create the hazard and not the process by which the waste happens to be generated. In addition, for practical reasons, it would be useful to specify some minimum quantity of total activity in the waste so

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that very small but highly concentrated sources would not unnecessarily be required to be disposed of as HLW. For example, the small sources in some smoke detectors could have concentrations that exceed the Class C limit. The minimum activity limits may need to be established on a specific waste stream basis.

If a waste requires permanent isolation, it should be classified as HLW. Under this premise, if the concentration of the waste exceeds the Table 1 values, regardless of its Table 2 concentrations, it should be classified as HLW. There should also be some upper limit on the concentration for those wastes that only contain Table 2 isotopes. This upper limit could be based on such considerations as heat generation rate, toxicity after 500 years, and external radiation levels.

#### IMPLICATIONS FOR DISPOSAL

There is no good technical reason that all of the HLW that would be newly classified under this definition must be disposed of by isolation in a geological repository. There may be other appropriate disposal techniques which isolate the waste from the environment for an acceptable period of time. As NRC acknowledges, these alternative facilities do not now exist. Therefore, from a political and economic standpoint, it probably makes the most sense to plan for the eventual co-disposal of this material with spent fuel in a geological repository.

In a similar vein, we urge the NRC to support the removal of Class C low-level wastes from state responsibility. This very small volume of waste constitutes the most hazardous of the low-level waste stream and, as such, requires significantly different handling, containment and disposal technologies than the other classes of low-level waste. We think the economic and scientific evidence supports the view that Class C wastes require an institutional control period better suited for the federal government. All agree that the federal government is the appropriate caretaker for long term isolation, and that the number of disposal sites for these wastes should be very limited -- one, two, or three. Requiring the several compact sites to proceed with the disposal of Class C wastes also requires the proliferation of extremely ~~uneconomical~~ facilities.

The preliminary data which my department collected from generators in Pennsylvania for 1984 indicates that shipments of Class C waste represented about 0.1 percent of the volume, but 95 percent of the radioactivity in the low-level waste shipped for disposal from Pennsylvania in 1984.

It is estimated that probably greater than 90 percent of Class C waste will be in the form of irradiated core components. About 95 percent of the activity in Class C irradiated components is due to relatively short-lived gamma-emitting isotopes. This creates difficult handling and occupational exposure problems which will be unique to Class C for state low-level waste sites. We must, therefore, devise special procedures at our site for this very small amount of waste.

From a disposal standpoint, it is of even more concern that these irradiated components contain significant quantities of long-lived isotopes, such as Nickel-59 with an 80,000 year half-life. The high concentrations of long-lived isotopes place most of these particular components in the upper range of the Class C waste category. Class C wastes in general, and irradiated components in particular, create a very long-term hazard potential and monitoring responsibility more appropriate for disposal in federal waste sites.

This very small volume of Class C waste will represent all of the significant long-term hazard potential from low-level waste disposed of at a regional facility. The remaining 99.9 percent of the volume of the low level waste stream has a significant hazard potential of less than 200-300 years, with most being less than 100 years. A low level waste disposal facility that did not have to accept Class C waste could then be reasonably cared for and monitored by the states until the residual hazard potential was insignificant.

**NARM SHOULD BE INCLUDED IN NRC ANALYSES**

It is strongly recommended that NARM be included in the analysis for reclassification of HLW. Since NARM is not included in the current definition of low-level waste in the Low Level Waste Policy Amendments Act or in the State compacts established under that Act, the future disposal of this material is at best uncertain. In order to resolve this problem and also to provide more uniform regulation of its use, it is strongly recommended that the Commission consider proposing an amendment to the Atomic Energy Act that would include this material under NRC regulatory jurisdiction.

We hope you will take our comments into consideration.

Sincerely,

*Arthur A. Davis* ⊗

Arthur A. Davis  
Secretary

1  
*Nez Perce*

TRIBAL EXECUTIVE COMMITTEE



NUMBER PR-6 (12)  
PROPOSED RULE (52 FR 5992)

(208) 843-2253

April 28, 1987

OFFICE OF THE SECRETARY  
DOCK LINDSAY SERVICE  
BRANCH

87 APR 29 P 1:39

DOLMETEC  
USNKC

Secretary of the Commission  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Re: Comments on Federal Register Notice Definition of  
"High-Level Radioactive Waste"

Dear Secretary:

Enclosed are the Nez Perce Tribe's Comments on the  
NRC's Proposed Rulemaking for 10 CFR Part 60, Definition  
of "High-Level Radioactive Waste."

The Tribe's attorney, B. Kevin Gover, will be submitting  
a legal review in the near future.

Sincerely,

*J. Herman Reuben*  
J. Herman Reuben, Chairman

*Elliott L. Moffett*  
Elliott L. Moffett, Secretary

JHR:ELM:ceg

cc: Ronald T. Halfmoon, Manager, NP-NWPA  
B. Kevin Gover  
CERT  
CTUIR  
file

MAY 08 1987

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DOCKETED  
USNRC

PART 60  
87 APR 29 P1:40

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

OFFICE OF PUBLIC AFFAIRS  
DOCKETING SERVICE  
BRANCH

INTRODUCTION

The Nuclear Regulatory Commission (NRC) has previously adopted regulations for disposal of high-level radioactive wastes (HLW) in geologic repositories as prescribed in 10 CFR 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 advance 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 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 Nez Perce Tribe look forward to the prospects for a more technically precise definition of HLW and, subsequently, to constructive changes in NRC's 10 CFR 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 10 CFR 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 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 10 CFR 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 10 CFR 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 10 CFR 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 10 CFR 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 10 CFR 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 10 CFR 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 10 CFR 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.

11. 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 will be forwarded under separate cover by the tribal legal representative.

# Bethlehem Steel Corporation

BETHLEHEM, PA 18016

'87 APR 29 P6:03

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

April 27, 1987

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

Dear Sirs:

In response to the Federal Register Advance Notice of Proposed Rulemaking - Definition of "High-Level Radioactive Waste", Bethlehem Steel Corporation is issuing the comments presented below prior to the April 29, 1987 deadline. Bethlehem Steel holds NRC licenses for radioactive material and would be impacted by the proposed rules. The comments are numbered according to the numbering of the nine issues for comment listed on Pages 5998 and 5999 of the Federal Register.

1. Bethlehem has no experience in the reprocessing of high level wastes and offers no comments on this issue.
2. Please refer to Issue #5. Bethlehem suggest this as the primary approach; however, if this approach is not taken, the following alternative to the use of the current Class C concentration limits in 10 CFR Part 61, is offered.

Table 1 - That intact sealed sources containing AM-241 be listed as a specific radionuclide with a concentration limit greater than 100 nanocuries per gram.

With a limit of 20,000 nanocuries per gram, all Americium 241 sealed sources routinely used in gauging devices within the steel industry would be eligible for shallow disposal as Class C waste in reasonably sized containers. At 200,000 nanocuries per gram, sealed sources as large as 20 curies, which are used in some well logging devices, would be disposable as Class C waste.

The Commission has already set a precedent for downgrading the risk from Americium 241 when it chose to deviate from the format used to determine the limits for Type A quantities of special form in 10 CFR Part 71 at 20 curies.

Since the Commission licenses and approves the wide-spread distribution of these sources for general gauging applications without any indication that they are "so hazardous as to require permanent isolation" when they are no longer needed, the Commission should apply common sense to the question of

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disposal policy and permit disposal that is comparable in protection to the use.

3. With the exception of the comments presented in (2) above, Bethlehem feels that the use of concentrations exceeding Class C, as presented in Tables 1 and 2, is appropriate for requiring permanent isolation.
4. Bethlehem offers no comments on this issue.
5. Bethlehem recommends that the Commission set maximum limits for intact, sealed sources which can be disposed of as low level waste. With respect to beta or gamma emitting sources, a limit of 30 curies is suggested. With respect to alpha emitting sources, a limit of 20 curies is suggested. These limits should apply to both Commission licensed radionuclides and NARM.

Sources of these activities are widely distributed as gauging devices requiring minimal radiation protection programs for their routine use. Why should they be placed in the same category as irradiated reactor fuel simply because they are no longer needed? With proper packaging, such intact sealed sources would offer less environmental impact than smaller quantities of the same radionuclides as loose radioactive waste incorporated with rags, clothing, etc. contained in a 55-gallon drum.

6. Bethlehem offers no comment on this issue.
7. Bethlehem recommends that the Commission establish performance criteria for waste types and not attempt to define methods of disposal for each waste type.
8. As stated in our response to Issue #5, Bethlehem recommends including NARM along with by-product, source and special nuclear material. The mere fact that a radionuclide is physically produced in an accelerator, or occurs naturally has no bearing on its potential impact on the environment when ultimately disposed.
9. Bethlehem offers no comment on this issue.

We request that our comments and suggestions presented above be given serious consideration in the development of the final rule on this matter.

Sincerely yours,



T. E. Kobrick,  
General Manager  
Occupational Health &  
Safety Services