The Radioactive Exchange®

To promote the exchange of views and information on radioactive waste management

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$499 MILLION FOR HLW PROGRAM EXPLORATORY DRILLING PROHIBITED

Under the Continuing Resolution adopted over the weekend (Oct. 19) Congress provided DOE with $499 million (only one million less than predicted by the EXCHANGE) for the High Level Waste Program for FY87. But even this amount came with several strings attached. Only $420,000,000 of the $499 million was made immediately available. The remaining $79 million is to be "available only subject to prior approval of the Subcommittees and Energy and Water Development Appropriations" of the Senate and House. To obtain this approval the Secretary of Energy must certify that "he has made a good faith effort to comply with the requirements" of the NWPA regarding "consultation with the states selected for site characterization." Furthermore the language of the Continuing Resolution states that **"No funds are provided for drilling of any exploratory shaft at any site in FY87."**

(See **Drilling** in **the HLW Focus)**

...Another EXCHANGE Exclusive Scoop!

"DRAFT" ABOVE-CLASS C WASTE REPORT RECOMMENDS FEDERAL INTERIM STORAGE

The EXCHANGE has learned that the "draft" report on "Recommendations for Management of Greater-Than-Class-C (GTCC) Low-level Radioactive Waste" now being reviewed by a DOE internal policy group and selected state officials, recommends "unrestricted federal acceptance of GTCC low level waste for storage without consideration of need while steps are taken to resolve the uncertainties in licensing requirements, waste definition and waste characteristics." This recommended option was one of three evaluated in the draft. The other alternatives were:

- limited federal acceptance of waste from those generators who could not provide adequate on-site capacity;
- mandatory shipment of all GTCC LLW to the federal government for storage and ultimate disposal. (See **GTCC** pg. 2)

See Meeting Notes on DOE Forum.. NRC-EPA Define Mixed Waste, EPA-NRC Conflict Over BRC Rules, BRC Economics, Disposal Technology Economics & more..

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(**GTCC** from pg. 1)

Volume of "Greater Than C" Small

One of the tasks undertaken to compile this report was a comprehensive survey of NRC and Agreement State licensees to identify and categorize the volume of GTCC. Though the survey data is not yet complete, the information received thus far puts the volume of GTCC currently in storage at 3,500 cu. ft. This does not include about 9,100 cubic feet of spent fuel hardware.

The projected volume of GTCC to be generated through the year 2030 is estimated to be 2,900 cubic ft. per year. This projected volume figure again excludes the volume of spent fuel hardware (estimated to be 260,000 cubic feet) that could result if all the spent fuel generated through 2030 was consolidated. This amounts to less than .1 percent of the current annual generation of Class A, B and C waste, excluding any spent fuel hardware.

Spent Fuel Hardware -- GTCC or HLW?

As indicated above the GTCC low-level waste projections in the draft exclude the waste that could result from the widespread use of new spent fuel storage technologies, particularly rod consolidation. The question of whether such waste will be included in the GTCC category depends on the Nuclear Regulatory Commission's just initiated rulemaking on redefining High Level Nuclear Waste, further evaluation of the Nuclear Waste Policy Act, DOE spent fuel disposal procedures, and other directly related NRC regulations. [Editor's Note: Under the Nuclear Waste Policy Act high level waste is "to include any highly radioactive material that NRC determines, through rulemaking, requires permanent isolation."]

According to the draft the projected volume of spent fuel hardware expected to be generated through 2030 is "about 260,000 cubic feet." Further addition to this volume could triple the "total projected volume of GTCC." Such increases in the volume of GTCC "change the various technical options for disposal...and the cost per unit volume of the waste."

Interim Storage Costs High

The draft makes no attempt to estimate the total costs for disposal of GTCC waste, saying only that the "total costs...can be developed only after uncertainties surrounding waste definition, waste characterization, and technical disposal requirements are resolved."

The costs for the recommended interim storage option "are estimated to range from $140/cubic foot to $1,900/cubic foot (constant 1986 dollars) depending on the storage technology to be used and the amount of waste to be stored." **

REACTOR DECOMMISSIONING OPTION -- LONG TERM IN-PLACE STORAGE

A recently released report by the New England Interstate Task Group on Decommissioning of Nuclear Facilities concluded that long-term-in-place-storage should be considered as an alternative to "decontamination" decommissioning. Members of the Interstate group represented state legislatures and executive agencies, utilities, industrial generators and environmental groups from the states of Massachusetts, New Hampshire, Maine and Vermont.

The report, as released, is described as presenting current information and identifying issues relevant to decommissioning of nuclear facilities within the states represented on the Task Group. It is not intended "to develop or set policy."

Although the report identifies the utilities as preferring the decontamination approach to decommissioning, arguments are presented in favor of the NRC-defined long term storage in place alternative (SAFSTOR). (See **NRC Decommissioning Definitions in Information Brief.**) In the "Findings" section of the report the following statement is made: "...a case can be built for either option (DECON or SAFSTOR) based upon today's knowledge...a regional LLW plan should provide for scheduled DECON of reactors in the region

but should have a contingency plan for 50 year SAFSTOR."

Quantity of Waste Identified

According to the report, decommissioning, via the NRC decontamination approach, of the ten identified nuclear facilities in the five state region would generate 63,952 cubic feet of LLRW containing 188,422 curies. If the SAFSTOR option was utilized with the waste stored on site for 30 years the report estimates that the radioactivity of the waste would be "decreased by a factor of 20 or more" and "After 50 years SAFSTOR the volume requiring disposal as radioactive waste will have decreased by a factor of 10."

States' Say in Utilities' Plans

The Group's report recognizes that the role of the states with regard to deciding on decommissioning options is limited, with NRC having primary regulatory jurisdiction. However, it is pointed out that the states can work with licensees to make their preferences known. Specific mention is made of using the states' economic regulatory authorities via their respective public utility commissions to influence the choice of decommissioning options.

As stated in the findings: "The licensee's choice of decommissioning alternatives affects projected decommissioning costs and a public utility commission would...have to accept the alternative before rate adjustments to cover projected decommissioning costs would be approved."

DECON vs. SAFSTOR

The report avoids recommending the SAFSTOR option over DECON, remarking that sufficient information is not available to make a definite recommendation. In support of SAFSTOR the report says:

-- A 50 year SAFSTOR compared to DECON "would result in a significant decrease in both volume and curies as well as occupational exposure."

-- New technologies would be available for waste disposal and treatment during that time period.

While identifying the utilities' reasons for preferring the DECON option over SAFSTOR, the report also points out that a drawback to SAFSTOR is "the creation of a de-facto LLW site in communities that would no longer have the tax benefit of operating plants."

Utilities Preference for DECON

The basis of the utilities' preference for DECON are listed as:

-- more predictable costs with a high degree of confidence;
-- technology would be similar to todays;
-- an experienced work force familiar with the plant would facilitate dismantling;
-- the land could be returned to unrestricted use;
-- the management structure is already in place. **

FUTURE NY LLRW VOLUMES MAY NOT SUPPORT A STATE DISPOSAL SITE

A recently completed study of the volume and curie content of the LLRW expected to be generated in the New York State over the next ten years cautions that "volumes are dropping to the point where New York may not be able to economically operate a site for only its own waste."

The study, completed by the staff of the New York State Energy Office, projects the volume of waste generated in the state that will require disposal in 1986 as slightly over 100,000 cubic feet.

According to the analysis, the annual projected volumes during the three year period 1991-93 are predicted to be between 110,000-145,000 ft^3, depending on whether Shoreham and Nine Point Unit 2 are licensed to operate. If either one gets a license the volume is expected to be 128,000 ft^3. The new estimates of the volume figures are about 100,000 ft^3 below what was predicted in the State Energy Office's 1984 study. **

THE EIGHTH ANNUAL DOE LLW MANAGEMENT FORUM -- AN EXCHANGE SYNOPSIS: PART II

This is the second part of a two-part synposis of DOE's Eighth Annual Forum. Part I was printed in The EXCHANGE, Vol.5, No. 15. The topics covered in Part II are: Alternative Disposal Technology (performance and cost, NRC regulation, Pennsylvania's approach); Mixed-waste; Below Regulatory Concern (BRC) waste; plus a number of other issues raised in either speakers' presentations or in lengthy discussion periods.

ALTERNATIVE DISPOSAL TECHNOLOGIES

EPRI Project Following the EPA's Office of Radiation Protection presentation on the various analyses being conducted to support development of a Low Level Radioactive Waste Standard, Bob Shaw of the Electric Power Research Institute (EPRI) provided details on the progress of EPRI's low-level waste program's effort to assess the cost and performance of various disposal technologies. He reviewed for the attendees the "new" disposal technology classification scheme that EPRI has been promoting for the past year or so. He explained that the scheme allows description of diposal options in three distinguishable functional terms: Location relative to grade; Cover material; and Structure. Since absolute costs for various disposal alternatives were not yet available, he presented a scheme of relative costs.

According to the data presented, with a reference disposal ratio of 1.00 given to Part 61-buried emplacement of waste in 250,000 cubic meters of disposal facilities, the cost of disposal in buried or covered structures of the same capacity is 1.4, and while in buried module facilities it reaches 1.5. Mr. Shaw explained that EPRI's performance assessment will be based primarily on the release rate of radionuclides from the site. And, because a major component of current alternative site designs is concrete, EPRI has done a significant amount of work on concrete degradation, which will be incorporated into the performance model.

NRC Regulatory Focus NRC waste management staff emphasized again the need to "standardize" alternative disposal approaches. It was announced that a Standard Format and Content Guide and Standard Review Plan addressing improved shallow-land burial (SLB) without engineered structures will be available by January, 1987. The staff informed the group that **NRC's effort in the immediate future will primarily focus on "alternative concepts incorporating cementitious materials with earthen cover."** Only minimal guidance will be developed for above-ground vaults or mined cavities.

The NRC officials also made it clear that the agency "does not intend to develop criteria for functional requirements that lie outside Part 61." For example, it was noted no technical guidance would be developed for retrievability.

Pennsylvania Disposal Technology Criteria In a definite departure from the technical experts' presentations on the cost-benefits of various disposal technologies, Bill Dornsife from Pennsylvania's Bureau of Radiation Protection exclaimed that all the cost-benefit studies will not influence the public's intent to make sure the best technology is utilized. He emphasized that it was the public who had to be satisfied and then explained how his Department was trying to determine an acceptable technology by attempting to identify the minimum safety requirements of a LLRW disposal concept acceptable to the citizens of Pennsylvania.

The first step in the process was the development of a staff list of eighteen critical technical requirements. This list was based on public comments received through the State's Public Advisory Committee on LLRW. The second step will be to have these

requirements reviewed and prioritized by the Committee. Then, they will be incorporated into the design for the State's LLRW disposal facility. Included in the eighteen listed technical requirements are that:

-- the technology must be such that it is licensible and can be operable by 1/1/93;
-- the design concept must include dedicated engineered barriers;
-- recovery of the waste (at least through the end of the institutional control period) must be incorporated into the design concept;
-- long term stability of the disposal cells must be assured (Class A waste 100 years, Class B waste 300 years, Class C waste 500 years);
-- the design must be capable of accepting a limited quantity of mixed waste in a solidified form.

MIXED WASTE

The management and disposal of mixed waste was a prominent topic of papers and discussions. Though EPA-RCRA staff did not participate as expected, NRC gave a full briefing on their ongoing interagency discussions and agreements. DOE officials and contractors provided some very interesting perspectives of the far reaching impacts of RCRA requirements on DOE LLRW disposal activities.

DOE's Jim Dieckhoner reported that at DOE facilities:

- The management of "pure" hazardous waste will be in accordance with RCRA;
- The management of mixed waste that is determined to be subject to RCRA will be in accordance with RCRA;
- In most cases, any mixed waste that is determined not to be subject to RCRA will also be treated in the same manner as RCRA mixed waste, except for the formal permitting; and,
- The managment of "pure" LLW will be in accordance with the relevant EPA standards and DOE orders.

He also predicted that the "administrative and jurisdictional problems surrounding the management of mixed LLW will be resolved during the next year."

NRC presented a **working definition of "mixed waste"** and provided guidance to "generators on identifying mixed waste." According to the NRC-EPA agreed upon definition:

> **"Mixed LLW is defined as waste** that satisfies the definition of low-level radioactive waste (LLW) in the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPAA) and contains hazardous waste that either (1) is listed as a hazardous waste in Subpart D of 40 CFR Part 261 or (2) exhibits any of the hazardous waste characteristics identified in Subpart C of 40 CFR Part 261."

In order to ascertain whether an unlisted hazardous waste was hazardous, NRC advised generators that the determination should be based on: (1) an assessment of the hazardous characteristics of the LLW based on the generator's knowledge of the materials or processes used in generating the LLW or (2) testing the LLW in accordance with the methods identified in Subpart C of Part 261.

[Those who would like a copy of this paper should contact Ron Starmer, Michael Weber or Sher Bahadur of NRC. (301) 427-4069]

On the regulation of **mixed waste at existing facilities,** NRC's Sher Bahadur revealed that a RCRA permit for all facilities will be required by November, 1988. He reported that NRC is currently discussing the matter with Washington State officials.

Mr. Bahadur announced that:

-- "dual regulation [of mixed waste] is technically achievable but procedurally complex and burdensome."

BRC WASTE

NRC staff reviewed the NRC BRC policy and EPA reviewed their efforts to incorporate a BRC standard into the LLRW standard. EPA reported that Carbon-14 is the most dominant radionuclide in potential BRC waste streams and presented a table comparing various alternative criteria for BRC standards (See below).

Evaluation of Alternative Criteria for BRC Standards

BRC Standard CPG Dose (MREM/yr)	BRC Waste (Percent of Total Volume)	Net BRC Savings ($ Millions)	Additional Health Effects	Marginal Cost-Effectiveness ($ Millions Per Avoided HE)
15.0	43%	690	460	
4.0	34%	540	85	0.4
1.0	30%	470	30	1.3
1.0*	28%	430	<1	1.3
0.1	25%	380	<1	>5000

*** At This Level, Wastes That Either Exceed the 1 mrem/yr Criterion or are Cost-Effective to Regulate are Excluded from BRC (i.e., Regulated).**

Though it would seem that EPA and NRC are on the same track, with regard to BRC waste that is not entirely the case. A **major controversy on BRC exemptions** is already brewing. Under NRC policy a BRC rulemaking can be petitioned to proceed for a particular waste stream. However, EPA radiation standards will probably be set to allow no more than 1 millirem exposure from non-regulated disposal facility to the Critical Population Group (CPG). **Under EPA's BRC standard for non-regulated disposal facilities, it is possible that disposal of NRC-approved BRC waste streams in particular facilities would be limited.** This limitation would come into play when the cumulative effect of NRC BRC waste streams proposed to be disposed of in a geographic area would be over the EPA set CPG dose limit!

EPRI's Bob Shaw reported that if NRC used a 1 mrem/year exposure rate to determine a BRC waste stream for disposal, a possible savings of $99,000 per PWR plant and $316,000 per BWR facility could be achieved.

ECONOMICS, VOLUME REDUCTIONS, ETC.

The economics of alternative disposal technologies, volume reduction and the costs to develop new disposal capacity were discussed heatedly and long during the four day session. The liveliest (and the longest) discussion was perhaps at the end of the session where state and compact officials reported on their progress toward developing new disposal capacity. When the state and compact officials were confronted with the question

of whether costs of alternative disposal technologies were discussed at their public hearings or within their planning activities, the response was "hardly at all" because the public didn't view cost as a primary concern. **More than one state official said "that if costs are a problem it is up to the generators to bring the issue to the table For the most part none are doing it."** Utility representatives in attendance expressed their intent to discuss costs. One state official remarked that utility representatives commented to him that **cost would not be an issue until the average per cubic foot charge got to be around $80.00.** The main concern was available disposal capacity.

In a discussion of the cost effectiveness of volume reduction (VR), the point was made that **for utilities VR was not cost effective.**

Illinois Director of Nuclear Safety, Terry Lash, explained that the State expects to spend $2 million per site to characterize four sites, plus another $2 million for added staff to support site selection activities -- a total of $10 million. That will have to be contributed by the generators over and above current fees.

Wrap Up (LLRW)

IN THE MIDWEST

The **Midwest Compact Commission** will hold public hearings to receive comments and address questions the public may have on the Commission's draft Regional Management Plan at the following locations. Two sessions will be held on each day, one beginning 2:00 p.m. and one at 7:00 p.m. **November 10, 1986:** Red Carpet Hotel, North New Orleans Room, 4747 South Howell Avenue, Milwaukee, WI 53207; **November 12, 1986:** State Office Building, Room 10, 435 Park Street, St. Paul, MN 5515; **November 13, 1986:** Wallace State Office Building, Auditorium, 900 East Grand, Des Moines, IA 50319; **November 17, 1986:** Dept. of Environmental Mgt., First Floor Hearing Room, 105 South Meridian St., Indianapolis, IN 46225; **November 18, 1986:** Hilton Inn University, 3110 Olentangy River Road, Columbus, OH 43202; **November 20, 1986:** Holiday Inn, I-70 at Cave Springs Road, St. Charles, MO 63301; **November 25, 1986:** Law Building Auditorium, 525 West Ottawa, Lansing, MI 48933.

The Commission will also accept written comments on the draft Regional Management Plan until December 1, 1986. For more information contact the Commission staff at (612) 293-0126.

IN TEXAS

In the Vol. 15, No. 14 edition of The EXCHANGE it was reported that the Texas LLRW Authority had petitioned the Texas Department of Health for a rulemaking on a proposed amendment that would allow Texas radioactive materials licensees to dispose of certain radionuclides in a Type I state licensed municipal landfill. The radionuclides proposed for disposal in this manner are defined by concentration and total curie limits. The list and concentrations are included in a report compiled by the Authority and filed with the Department of Health in support of the proposed Rule. The report can be obtained from: Lee H. Mathews, General Counsel, Texas LLRW Disposal Authority, 7703 North Lamar Blvd., Suite 300, Austin, Texas 78752.

IN THE INDUSTRY

Hansa Projeckt of Hamburg, Germany has delivered to **US Ecology Nuclear,** now a Division of US Ecology, a 2,200 ton supercompactor that can reduce the volume of waste to 10-to-1 or more. The one-million dollar trailer-mounted compactor is currently undergoing tests at the firm's Louisville headquarters. For more information call US Ecology Nuclear at (502) 426-7160

NUCLEAR FACILITY DECOMMISSIONING STUDY

Warren F. Witzig, P.E.; James K. Shillenn; John R. Vincenti
Penn State University

The following is a synopsis of a paper presented at the Spectrum '86 Decommissioning and Radioactive Waste Meeting in Niagara Falls, NY.

INTRODUCTION

A number of nuclear facilities in the United States have become, or are about to become, likely candidates for decommissioning over the next five years. In order to acquire data on the status of decommissioning plans for nuclear facilities over the next 15 years a survey was conducted for UNC Nuclear Industries, Inc., by Warren F. Witzig, Phd.D., P.E., James K. Shillenn, and John R. Vincenti. The survey principally focused on commercial nuclear power reactors but also included a sampling of selected research, training, testing and production reactors.

The survey was sent to 93 nuclear power facilities and 29 research and test reactors. In addition to the mailed questionnaire, the literature was researched and a visit was made to the Nuclear Regulatory Commission.

SUMMARY OF FINDINGS

Commercial Power Plant Reactors

Survey Sample Of the 93 questionnaires mailed out to nuclear power facilities, 75 responses were received for an 81 percent response. Of those who responded, 66 reactors provided varying amounts of data relating to the questionnaire, while three utilities representing nine reactors declined to provide data. One utility provided general information on their facility which is in a SAFSTOR.* There were 18 reactors operated by 14 utilities which did not respond in any way to the survey.

With the exception of EBR-II, a DOE operated reactor (which was not surveyed), responses were received from all power reactors licensed before 1970 that have not been already decommissioned. This provides a very high reliability for analyzing the decommissioning trends for the next five years and some excellent perspectives of decommissioning plans for the next 10 to 15 years. The following discussion will deal only with the 66 power reactors responding to the survey.

Timetable Of the 66 power reactors responding to the survey, three reactors have already been decommissioned to a SAFSTOR mode. One of these reactors is considering decommissioning to the DECON* or dismantlement and decontamination mode. Two of the reactors surveyed, with a total of 265 MWe capacity, plan to decommission to the SAFSTOR mode in the next five years.

Over the next 10 years, there are no additional reactors planning to proceed with decommissioning activities, while two additional reactors, representing 125 MWe of capacity, do plan to decommission in the next 15 years. This suggests that by the year 2000, only four commercial reactors will be added to the list of decommissioned facilities.

(*See **NRC Definition** at end of this article)

During the period 2001 to 2005, eight reactors with 5,133 MWe capacity are considering decommissioning with eight additional reactors representing 5,949 Mwe of capacity planning for decommissioning during the period 2006 to 2010.

The largest number of reactors from the survey plan to decommission during the period 2011 to 2015. Fourteen reactors are tentatively planning for decommissioning during this period. It should be noted that 28 reactors had not determined the exact year when they might decommission. However, they indicated that it would not be within the next 15 years of before the year 2000.

Decommissioning Mode Most power reactors responding, 31 or 47 percent of the respondents to the survey, did not indicate the mode of decommissioning that would be used. Of the 25 reactors who had given some consideration to this issue, there were 21 reactors, or 32 percent of the respondents, planning the DECON decommissioning mode. There were 12 reactors, or 18 percent of the respondents, who are planning SAFSTOR, and two reactors, or about three percent, presently planning the ENTOMB (entombment) option.

Decommissioning Management In-house management of decommissioning is the overwhelming preference of the utilities who responded to this question. Thirty of the 66 or 45 percent, of the respondents are planning in-house management of decommissioning while only five of the 66, or less than eight percent, are considering awarding a separate contract for management of their decommissioning activities. Many facilities, 31 of 66, or 47 percent, had not determined this aspect of decommissioning or did not respond to the question.

Decommissioning Engineering Most of the respondents to this question on decommissioning engineering are planning to have a general contractor conduct this aspect of decommissioning. There were 25 of 66, or 38 percent, of the facilities that are presently planning on having an outside contractor perform this service. They were fairly evenly divided on whether or not the general contractor would have overall management responsibility of the engineering. Fifteen of 66, or 23 percent, favored the engineering contractor to have overall management responsibility and ten of 66, or 15 percent, preferred that the engineering contractor not have overall management responsibility.

Only one operator is planning in-house engineering and one operator is considering multiple subcontractors for this phase of decommissioning. There were 36 of 66, or 54 percent, of the respondents to the survey who had not determined this aspect of decommissioning or did not respond to the question.

Decommissioning Operations Operations of decommissioning are being planned by 22 out of 66 (or 33 percent) of the operations being done by general contractors with or without overall management responsibilities. Seven operators of 66 (11%) are considering multiple subcontractors and 36 operators of 66, or 54 percent, of the respondents had not determined this aspect of decommissioning or did not respond to the question.

Financing Twenty-one of the 66, or 32 percent, of the respondents had estimated the costs of decommissioning their facility. The costs ranged from $14,000,000 for SAFSTOR of a facility of under 100 MWe to $170,000,000 (in 1981 dollars) for a facility of over 1,000 MWe. Of these 21 facilities, 13 indicated that either a sinking fund or escrow is presently in place for decommissioning needs.

Research, Training, Test and Production Reactors

Responses were received from 21 of the 28 research, test and production reactors surveyed. Of those surveyed, three facilities are presently considering decommissioning while the remaining 18 have either completed decommissioning to the SAFSTOR mode and do not intend any further decommissioning activities or have no plans to decommission.

SUMMARY AND CONCLUSIONS

Decommissioning of nuclear power facilities will be a very small part of the nuclear industry's activity over the next five years and virtually non-existent during the following 10 year period. This is contrary to several studies which have concluded that the nuclear industry will be experiencing significant decommissioning activity before the year 2000. Of all the power reactors in the United States, only four are planning some kind of decommissioning operation before the turn of the century and these plants represent only 390 MWe of capacity.

The 1954 Atomic Energy Act has specified a nominal license term of 40 years for nuclear reactors. A large number of reactors will be approaching this 40 year term after the turn of the century. There are 16 plants representing over 11,000 MWe which are presently planning decommissioning for the period 2002 to 2010. Whether or not these plants are decommissioned according to the present planning of the operators will be dependent upon technical as well as regulatory factors. If the present trend of no new plant construction continues, many utilities may consider plant refurbishment and other technical options to extend the life time of their present plant an economic as well as a necessary option.

The survey results from research, training, test and production reactors show no clear trends on the part of operators for decommissioning. For the most part, these are small reactors associated with universities or industries and long-term planning for decommissioning does not appear to be a priority among these organizations.

* **--- NRC Decommissioning Definitions ---**

DECON: This is the alternative in which the equipment, structures, and portions of a facility and site containing radioactive contaminates are removed or decontaminated to a level that permits the property to be released for unrestricted use shortly after cessation of operations.

SAFSTOR: This is the alternative in which the nuclear facility is placed and maintained in such condition that the radioactive contaminates can be safely stored and subsequently decontaminated (deferred decontamination) to levels that permit release for unrestricted use.

ENTOMB: This is the alternative in which radioactive contaminates are encased in a structurally long-lived material, such as concrete. The entombed structure is appropriately maintained and continued surveillance is carried out until the radioactivity decays to a level permitting unrestricted release of the property. This alternative would be allowable for nuclear facilities contaminates with relatively short-lived radionuclides such that all contaminates would decay to levels permissible for unrestricted use with a period on the order of one hundred (100) years.