The

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

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NO HIKE IN HLW FEE, REPORT TAKES INTO ACCOUNT MRS, DEFENSE FEE

The DOE Office of Civilian Radioactive Waste Management's soon-to-be released Fourth Annual Report on the adequacy of the fees charged utilities to support the Nuclear Waste Program recommends no hike in the fees for 1986 and incorporates in its analysis the contributions to be made by the federal government for the disposal of defense HLW and the costs of an MRS.

On the matter of the defense contribution the report does not provide an estimate of the monies involved. It does state that the contribution included in the analysis is based on the disposal of "16,000" canisters of defense waste, with the federal government's contribution covering "the estimated costs and fees" associated with disposal of this waste. The rate at which defense wastes will be received is estimated at 800 canisters per year, starting with the sixth year of operation of the repository.

Since the total life cycle costs included in the report also include new estimates based on improved information on the repository sites, it is not clear what the defense contribution is estimated to be. Having not yet released the long awaited recommendation on the defense contribution (it is still in OMB review, See update in **Wrap-Up (HLW)**), DOE was careful to not be specific. (See **Fee** in **the HLW Focus**)

MARYLAND MOVING TOWARD ACCEPTING APPALACHIAN COMPACT

According to reports from the State of Maryland, it is very likely that the State Legislature will ratify the Appalachian Compact and rescind the state's ratification of the Northeast Compact.

Apparently Pennsylvania officials have informed Maryland that it does not meet the criteria that is required to be a host state under the Appalachian Compact. [Under he terms of the Appalachian Compact, a member state must accept host state responsibility if it generates "25 percent or more of the volume of curie content of low-level waste generated by Pennsylvania, based on a comparison of averages over the three years 1982 through 1984."] Having this assurance state officials see membership in the Appalachian region as a way out of being considered as a possible host for a LLRW disposal facility with the Northeast Compact region.

The Appalachian Compact was, thus, introduced in the Maryland Senate about mid-February. Since then it has been reported out "favorably" by the Senate Environment Committee. It is expected to pass the Senate within the coming weeks, after which it will then be considered by the House. Action in the Legislature must be swift since adjournment is scheduled for April 8-9. **

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MASSACHUSETTS LLRW SITING BILL RECEIVES BROAD SUPPORT

Senator Carol Amick, Co-chair of the Massachusetts Special Commission on Low-level Radioactive Waste Management, and Co-chair of the Joint Standing Committee on Natural Resources and Agriculture, has to be feeling quite proud after receiving almost unanimous support, at her recent Committee hearing, for the LLRW siting bill developed by the Special Commission. Of the twenty-six witnesses testifying at her Senate Committee's February 24 hearing, twenty-five supported the bill. Only one, Al Giorodono, voiced opposition. Mr. Giorodono represents the group which includes the supporters of the "503" Referendum adopted by the voters that requires a state-wide ballot on compact membership and the siting of a LLRW facility in the state. However, support was voiced by the Sierra Club, the League of Women Voters, the Environmental Lobby of Massachusetts and several Massachusetts hospitals and medical institutions, as well as representatives of the state's utilities. Though most witnesses did express reservations over some provisions, it did appear that there would be sufficient support to get the bill passed.

The Referendum Issue

A key element of the siting process outlining in the proposed legislation is the inclusion of the "503" referendum process, providing for a state-wide ballot on the siting of a state disposal facility. In fact, twenty-one of the twenty-six witnesses urged that this language be eliminated. A good deal of attention is being paid to this issue, above all other aspects of the bill.

S.CAROLINA LEADS STATES IN RADWASTE DELIVERED FOR DISPOSAL IN '84

The "1984 State-by-State Assessment of Low-Level Radioactive Waste Shipped to Commercial Disposal Sites", recently published by the DOE National Low-Level Waste Program and conducted by the Conference of Radiation Control Program Directors, puts South Carolina back in the lead, after having lost that "position" to such states as Massachusetts, Pennsylvania and Illinois, for the past two years.

According to the report, the burial site at Barnwell accepted 1,232,000 cubic feet of waste in '84, while Beatty reported about 73,000 cubic feet and Hanford accepted 1,360,000 cubic feet. According to these figures, both Barnwell and Hanford are over the volume caps set by the Compact Consent Act, while Beatty is way under.

The figures compiled also report that, in 1984, Texas generators delivered less than one-quarter of the waste they sent to disposal sites in 1983, with Virginia and North Carolina also reported as significantly decreasing the volumes of waste their generators delivered for disposal from '83 to '84.

WORKSHOP ATTENDEES FIND SITED STATES IN CONTROL OF LLRW DISPOSAL

The RADIOACTIVE EXCHANGE Workshop on the Low-Level Waste Policy Act of 1985, held February 19-21, attracted some 130 key federal, state, and industry officials. The workshop provided the first opportunity for all affected parties to discuss the new responsibilities outlined in the Act, the issues yet to be resolved, and how implementation may be achieved.

Since negotiations on the bill continued right up to final passage, many participants welcomed the presentations of key Congressional staff members who formed the opening panel and explained many of the principal features of the Act. Principal concerns expressed by the participants ranged from possible discriminatory actions by the sited-states, feasibility of locating and licensing new sites, meeting and certifying milestones, the collection of surcharges and penalty surcharges, sited states' intent in implementing the Act's provisions, federal regulatory programs, and the lack of a solution to the EPA-NRC conflict over mixed-waste.

Comments made by several participants revealed that many had no idea of the degree of authority that the Act conferred upon the Governors of the sited- states.

Ratification of Compacts, Milestones

Because the Compact Consent conditions outlined in the new Act do have the effect of changing provisions of the regional compacts, there was concern expressed that they would have to resubmitted to state legislatures for re-ratification. Mixed opinions were expressed on this issue, though Congressional staff did not see any reason for this to happen.

Whether states will be able to meet milestones provided for in the Act was a concern to many attending. A related issue was who would be certifying the achievement of milestones. According to Congressional staff and federal agency officials the responsiblity lies with the sited-states.

Some concern was expressed that the mechanics for approving milestones were uncertain. David Berick of the Environmental Policy Institute said that the Act provided "very tight time schedules", adding that there is "no evidence that the time is going to be enough." Representatives from sited states indicated that they were working jointly to make the regional systems viable and were developing procedures that would be uniform in application.

Information Needs, Mixed Wastes

Considerable attention was directed to the information needs of states and generators in order to have a workable allocation and monitoring system. It is expected that a comprehensive information system will be developed for use by all parties to provide current data on volumes, allocation status, volume reduction activities, and other aspects. While no final answers were forthcoming on dealing with the mixed wastes issue, there again appears the possibility that NRC and EPA will work out an arrangement for licensing which will provide protection equal to RCRA for mixed wastes. House Congressional staff reported that a joint hearing of Congressmen Markey's and Florio's Subcommittees on mixed waste was likely.

Sited States in Control

The single most important point made by the Congressional staff and the Federal Agency officials was that the sited-state governors were now in control of low-level radioactive waste disposal.

REPORTS OF NOTE (LLRW)

Consolidation and Shear Failure Leading to Subsidence and Settlement: Part I; (LA-10261-MS) Los Alamos National Laboratory, Los Alamos, New Mexico 87545; W. V. Abeele; Subsidence and settlement are phenomena that are much more destructive than generally thought. In shallow land burials they may lead to cracking of the overburden and eventual exposure and escape of waste material. The primary causes are consolidation and cave-ins. Laboratory studies performed at Los Alamos permit us to predict settlement caused by consolidation or natural compaction of the crushed tuff overburden at shallow land burial sites. Shear failure characteristics of crushed tuff that may lead to subsidence were investigated. Examples of expected settlement and subsidence are calculated based on the known geotechnical characteristics of crushed tuff. The same thing is done for bentonite/tuff mixes because some field experiments were performed using this additive (bentonite) to reduce the hydraulic conductivity of the crushed tuff. Remedial actions, i.e., means to limit the amount of settlement, are discussed. Comments are provided on the current field experiment, which studies the influence of subsidence on layered systems in general and on biobarriers in particular. (Available from Los Alamos or the **Exchange's Readers' Report Service** for a copy charge of $4.00 plus postage.)

The 1984 State-by-State Assessment of Low-Level Radioactive Wastes Shipped to Commercial Disposal Sites; (DOE/LLW-50T); Conference of Radiation Control Program Directors, Inc., 71 Fountain Place, Frankfort, KY 40601; Available from NTIS or from the Exchange Readers' Report Service for a copy charge of $8.50 plus postage.

DR. TERRY LASH, DIRECTOR, ILLINOIS DNS... ON ALTERNATIVE DISPOSAL TECHNOLOGIES

The following "press conference" was held with Dr. Terry Lash, Director of the Illinois Department of Nuclear Safety, prior to the convening of the International Conference on the Development of Alternative Technologies for the Disposal of Low-Level Radioactive Waste that his Department sponsored on February 27 - March 1, 1986.

Terry, Illinois State law bans the use of shallow-land burial for disposal of low-level radioactive waste. What alternative technologies are you considering?

Well, right now we're completely open and looking at every alternative that either exists or has been planned in other countries, or proposed by companies in the United States. These range from mined-facilities such as the Swedish approach to the French system of above-ground disposal.

In your view is the Westinghouse SURPAK approach an enhanced shallow-land technology that would be acceptable in Illinois?

Well, first of all, I don't see it as enhanced shallow-land burial. I see it as an engineered concept that potentially provides an alternative that can be considered in Illinois.

One of the purposes of the activities of our Department is to judge that option compared to others to see whether it is sufficiently attractive. But in my view, the concrete and steel aspect of the SURPAK puts it in the range of a facility which is sufficiently different from traditional shallow-land burial and it can be considered for Illinois.

Would you consider going as far as the French have gone and use something like the earth mounded-concrete bunker?

Yes, we will consider going to the type of facility they built and are going to build again in France. I don't think it is necessarily the ultimate type of facility, either in terms of cost, or using what I call above-ground disposal. We also will be considering essentially permanent storage in a facility that has no earth protection put over it.

This permanent above-ground storage concept, has a vendor presented a design for your review?

No. This is a long-term storage concept, essentially storage for decay of even the long-lived radionuclides. This approach is of great interest to the public in Illinois, who are most concerned about the hazards posed by low-level waste. It's one that has to be looked at. One of the disadvantages of such a facility, of course, is the requirement that you maintain it for a long period of time.

Could such a facility be licensed under the current version of Part 61?

Well, I think it's possible to license such a facility, but not under Part 61, since Part 61 was developed to license a land burial facility. But, an above-ground facility could be built that would meet the basic radiation standards embodied in Part 61. It would, however, take some ability to assure maintenance to protect the public for a long period of time.

Does that mean if Illinois becomes an Agreement State that you'd go through a rule making on a design criteria, or standards for such facility? Or would you rely on NRC for the licensing requirements?

The Department of Nuclear Safety would have to promulgate regulations to govern the licensing of such a facility. As I say, though, we're just in the early stages of evaluating alternatives so I don't know whether we're going to go that route or not.

Are there any American firms in addition to Westinghouse who have approached you with engineered design concepts ala the French or better?

Yes, we've been approached by at least two other private companies who would be interested in building an advanced above-ground or near-ground facility.

Will the State be able to meet the Compact Consent Act deadline and have a disposal site in operation on January 1, 1993?

Yes. There is a very high probability we will have a facility operating by January 1, 1993. We have a schedule that contemplates an extensive licensing period but it has some cushion time built in. I'm confident that we can make the 1993 deadline. We are certainly committed to that.

In considering various disposal concepts, will the costs be a factor in the decisionmaking process?

Well, the primary concern for the Department of Nuclear Safety has to be protection of the public health and safety, and assure that there will be no contamination of the environment. On the other hand, there can be no ignoring the cost of the facility. I wouldn't put it in terms of cost benefit ratios, but I think the economics of the approach chosen by Illinois will be a significant factor after basic safety is assured.

We hope to select and license a facility based on performance criteria, primarily, and to allow the private sector to to put forward the most cost effective approach for the long term safety of the Illinois public.

Will you actually pre-select a design concept for a facility before you name a site or select an operator?

No. We're not going to select a design in advance of site selection, and in advance of selecting a contractor. We want to give the contractor, the private sector, as much flexibility as possible, in both finding a site and designing a facility consistent with that site. However, we want to evaluate, and publish the evaluations, of different design concepts as thoroughly as possible to give guidance to the contractor and to the public.

How are you going to deal with cost factors in the final decision when the public seems to be demanding protection without regard to cost?

Well there's no way to avoid publically dealing with the cost factor. If cost isn't a factor, you can build many redundant barriers. You can do whatever you want if you have unlimited funds. We clearly don't have unlimited funds and that wouldn't make sense to society as a whole. We will have very strict criteria that assures public health and safety, and protection of the environment, but within that restraint there are probably different approaches to achieving our objectives, and we should choose the approach that utilizes the funds of the Illinois citizens most efficiently.

Given the possible higher cost of disposal for alternative technologies, is any consideration being given to special rates for medical generators?

Well, one question we have to ask first, is whether all waste will be treated in the same way. If we go to storage for instance, long term storage, special storage for decay, the hospital research waste, typically would not have to be stored nearly as long as waste from reactors before it decays to background levels. So the costs for disposal of hospital waste might be significantly less than the disposal cost for reactor waste. That's something we'll have to take a look at. I'm not predetermining now that all waste will be treated identically when there might be more than one concept for different types of waste.

LOW-LEVEL RADIOACTIVE WASTE AND EPRI

Robert A. Shaw

You may wonder "What is EPRI and why is it being discussed here in The Radioactive Exchange?" EPRI (Electric Power Research Institute) was formed about a dozen years ago to meet the research needs of the electric utility industry. We do so by funding research contracts with various organizations covering a large variety of topics of direct interest to the U.S. electric utility industry: transmission and distribution; coal combustion; advanced power generation techniques; environmental effects; energy demands; and nuclear power generation.

Low level radioactive waste (LLW) is one of the topics that falls within the purview of the Nuclear Power Division at EPRI. Beginning with this column, we'll be reporting periodically on our research in this area to the readers of **The Radioactive Exchange.** Basically, we'll be presenting in more detail the results and the implications of research carried out at EPRI on LLW topics.

The key objectives of EPRI's LLW program are to enhance the cost-effective processing and disposal of LLW, to minimize the impact of regulatory compliance over LLW, and to investigate and develop advanced technology in the treatment, monitoring and disposal of LLW.

There are a number of important issues involved in EPRI's LLW program. To begin, a reduction of the amount of waste generated within the plants can reduce the cost of LLW disposal. Techniques under investigation can range from the obvious, such as separating non-radioactive from radioactive "trash", to sophisticated methods such as identifying resin forms which preferentially remove the chemicals with the predominant radioisotopes, such as cobalt and cesium.

Advanced processing techniques for reducing the volumes of radioactive wastes include improved separation techniques such as filtration and ion exchange, along with sophisticated techniques such as incineration and brute force techniques such as super compactors. EPRI's research encompasses this full spectrum of technology, ranging from developing processing techniques to economic analyses of various volume reduction techniques to the analysis of the design and the subsequent operational experience of more advanced volume reduction techniques at plants.

At the same time, the present version of 10CRF61 has required utilities to conduct much more detailed assays of wastes that are shipped off sites than was previously required. EPRI research has recently focused on correlations which can be used to relate difficult-to-measure radionuclides with easy-to-measure radionuclides, thereby reducing the frequency and effort that must be applied to measuring the difficult alpha and beta emitters. In addition, EPRI research has demonstrated direct assay techniques for transuranics and for gamma ray spectroscopy on waste packages where sampling is either very difficult or next to impossible.

With the recent signing by President Reagan of the legislation on LLW disposal sites, the next few years become very important ones for U.S. utilities as states scramble to form compacts and identify disposal sites within their compacts for LLW. Accordingly, an EPRI contract is underway to assess the various technologies associated with LLW waste disposal including shallow land burial, concrete vaults, and concrete trenches. This research is identifying the generic features of such disposal technologies. From these generic features, designs will be developed for the various disposal technologies. In turn, the cost and performance of these technologies related to radioisotope transport will be determined as well.

(Continued next pg.)

The results of the EPRI research projects are presented in research reports. In future columns on selected specific topics, pertinent EPRI reports will be identified. In addition, EPRI arranges seminars and workshops to disseminate these research results and makes a number of presentations at various national and topical meetings. It's our hope that this column in Radioactive Exchange will serve as an additional vehicle for communicating with many of you who may not otherwise be aware of the scope and results of our research.

Future columns will delve into a bit more detail of various research topics and reports from EPRI meetings on LLW. You can always address comments and suggestions on future columns to the Publisher of The Radioactive Exchange.

REPORTS OF NOTE (LLW

Plants and Their Relationship to Soil Moisture and Tracer Movement; (LA-10216-MS); Los Alamos National Laboratory, Los Alamos, New Mexico 87545; B. Perkins and G. L. DePooter; This report details the findings of a study undertaken to obtain a better understanding of the mechanisms for possible movement of radionuclides or other toxic materials from water burial sites in arid to semiarid regions, changes in soil moisture and tracer (Co, Cs, Sr, and tritium) movement in bare vs. vegetated soils. The results reported thus far show that during the course of two growing seasons, comparing vegetated with bare soils, plant transpiration processes significantly reduced the soil moisture. In the vegetated soils, most of the Co, Cs and Sr remained in the region of original emplacement. In bare soils, Co anc Cs underwent minimum movement, but the peak concentration of Sr moved downward. For all tracers in the vegetated soils, there was some evidence that slight amounts of tracer had been absorbed in the plant roots and brought to the surface through plant translocation processes. In all cases, there was no significant upward movement of Co, Cs and Sr. For tritium, the vegetated soils, compared with the bare soils, retained the maximum inventories near the original emplacement location. Although all soils showed some tritium loss, it was greatest in the vegetated soils.

A literature review associated with the experiment indicated that plant species alone does not determine rooting depth, rate of transpiration, nutrient uptake, and other plant-associated processes. Environmental conditions are just as important as plant species and must be included in modeling plant-related effects. Available from Los Alamos.

Consolidation and Shear Failure Leading to Subsidence and Settlement: Part I; (LA-10261-MS) Los Alamos National Laboratory, Los Alamos, New Mexico 87545; W. V. Abeele; Subsidence and settlement are phenomena that are much more destructive than generally thought. In shallow land burials they may lead to cracking of the overburden and eventual exposure and escape of waste material. The primary causes are consolidation and cave-ins. Laboratory studies performed at Los Alamos permit us to predict settlement caused by consolidation or natural compaction of the crushed tuff overburden at shallow land burial sites. Shear failure characteristics of crushed tuff that may lead to subsidence were investigated. Examples of expected settlement and subsidence are calculated based on the known geotechnical characteristics of crushed tuff. The same thing is done for bentonite/tuff mixes because some field experiments were performed using this additive (bentonite) to reduce the hydraulic conductivity of the crushed tuff. Remedial actions, i.e., means to limit the amount of settlement, are discussed. Comments are provided on the current field experiment, which studies the influence of subsidence on layered systems in general and on biobarriers in particular. (Available from Los Alamos or the **Exchange's Readers' Report Service** for a copy charge of $4.00 plus postage.)

IN NEW YORK

The **New York Legislature** is still in a stalemate on proposed legislation to establish a siting process for a state low-level radioactive waste disposal facility. The bill, resubmitted by Governor Cuomo earlier this month, does not include any provisions calling for an interim storage facility at West Valley. Again, as during the last session, the stumbling block is a disagreement among House and Senate members over language that would require transporters of LLRW to obtain state permits. The House leadership continues to press for such requirements. It appears that action on the bill may be delayed until June.

New York, having thus far elected not to join a compact, will have to either pass the siting bill or have the Governor "certify" to Governors Riley, Gardner and Bryan that the state will develop a disposal facility to take care of its waste, in order to meet the Compact Consent Act's July 1986 milestone. Failing to accomplish either, the states' generators would face a penalty surcharge and possibly lose the right-of-access to any of the operating facilities.

IN CALIFORNIA

Representative Steve Peace has introduced a two-state compact bill proposing a California-South Dakota Compact. Arizona is not mentioned as a member.

IN THE INDUSTRY

Philadelphia Electric Company has awarded the **Quadrex Recycle Center** a contract for containerization, transportation, decontamination and disposal of 52 large spent fuel rack modules. This effort begins in late February and will run through year-end. **Northeast Utilities Services Company** has also awarded the Quadrex Recycle Center a contract for containerization, transportation, decontamination and disposal of ten large spent fuel racks for the Millstone 2 Nuclear Station.

A "Research Report" issued by **First Boston Corporation** on **Waste Management, Inc.**, the parent company of Chem-Nuclear Systems, Inc., projects that Chem-Nuclear will improve its revenues in 1986 with "price increases" for its services averaging 17% in 1985 and "possibly around 10% in 1986." The report estimates that Chem-Nuclear's revenues will increase to "$88 million in 1986, a 10% gain over First Boston's projected 1985 number of $80 million.

Niagara Mohawk awarded **NUS Process Services Corporation** a two-year contract to process and solidify radwaste at Unit 2 of the Nine Mile Point station. A Liquid Abrasive Decontamination unit was also delivered to the Robert E. Ginna station in early February to support the spring outage. The plant has used the NUSPSC LADS system during past outages. This year the NUSPSC LADS unit at Ginna is equipped with a scaffold pole or pipe cleaner which can deconaminate pipes up to 12 feet long. The system should be available for use by other companies after the Ginna outage is over.

ON THE MOVE

Dr. Ralph R. DiSibio has been appointed Manager, Business Development for the Westinghouse Advanced Power Systems Divisions Business Unit. The operating divisions of the Business Unit include Waste Technology Services Division, Advanced Energy Systems Division, Resource Energy Systems Division, Westinghouse Hanford, Westinghouse Idaho Nuclear Co., and Westinghouse Materials Company of Ohio.

Sherman Naymark, Chairman of the Board of **Quadrex** Corporation, announced his intention to retire from this position effective June 11, 1986. Mr. Naymark founded the company 15 years ago. **Bob Hamilton,** formerly President of Quadrex HPS Inc., has accepted a new assignment as the Corporate Vice President of Marketing. **David Fowler,** co-founder of Quadrex HPS and former Vice President of Engineering, has been appointed President of Quadrex HPS. **Art Maquardt,** formerly with GE joined the company on February 10, 1986 as Vice President of Quadrex Corporation and President of Quadrex Energy Services Corporation, which is responsible for the Company's operating support services, training services and maintenance services.

(**Fee** from pg. 1)
DOE officials contacted by the EXCHANGE also cautioned that it was not possible to estimate what the defense contribution is by comparing last year's estimated program costs [which did not include a defense contribution] with this year's, because several new assumptions were also made.

Indexing Fee to Inflation Recommended

Though the report does not recommend an increase in the fee for 1986, it does suggest indexing the fee for inflation within the near future. The principal findings are that:

- The current 1.0 mill per kwh fee is projected to produce revenues sufficient to offset estimated total system life-cycle costs for a reasonable range of program cost, nuclear electric generation, and interest rate forecasts as detailed in the report.

- Many of the cost and revenue forecasts analyzed, particularly those for the U.S. Energy Information Administration's (EIA) Mid Case generation forecast that includes no increased fuel burnup, show margins of revenues over costs. These margins indicate that, if cost and commercial nuclear electric generation estimates are correct, the cumulative program costs could be recovered by a reduced fee, or that program costs higher than the current estimates could be recovered by the 1.0 mill kwh fee. However, these margins are within the uncertainty bounds of the electric generation and program cost estimates, so a fee reduction is not warranted at this time. Fee revisions may be recommended within a few years, when more accurate program cost estimates will be developed as the program matures from its present conceptual design phase to the engineering design phase.

- Future program cost increases due to general inflation or real price increases could be recovered by indexing the fee to an inflation or other cost index. Based on current estimates, the margins of revenues over costs provided by the 1.0 mill kwh fee could provide a buffer so that indexing at the inflation rate would not need to begin immediately. The date when indexing would be needed varies with the system configuration, with nuclear electric generation growth rates, and with the rates of interest and inflation. The need to index the fee to take account of the effects of inflation could occur as early as 1986 if no additional nuclear plants will ever be ordered, but not until 1989 or later if the nuclear electric growth rate matches that portrayed by the Mid Case. Indexing is merely an alternative to larger, less frequent fee adjustments, so this analysis does not provide a compelling case for initiating indexing in 1986, especially since it will not be clear then whether additional new nuclear plants will be ordered in the future.

The findings were based on a cash flow analysis that utilized methods very similar to those employed in previous fee adequacy studies. Refinements were made in the area of system logistics, repository acceptance schedules, repository operating profiles, real interest rates, inflation rates, and the estimation of costs for transportation and repositories in differing host rocks.

Total Life Cycle Costs

In developing the finding regarding the fee, the report estimates overall program life cycle costs to range from $23.1 to $31.8 billion from the referenced Mid Case without and MRS (i.e., no net future cancelations of present construction projects, with commercial nuclear power growing at a moderate rate from 1990 to 2020, resulting in an increase of installed nuclear capacity, from 110 gigawatts electrical (GWe) in 1990 to 248 GWe in 2020), to $25.7 - $33.4 billion for the Mid Case with an MRS, to a high of $32 to $40 billion for the Mid Case if a repository system including an MRS is delayed for ten years. The projected increase in life cycle costs that are attributed to the MRS range from $1.6 to $2.6 billion, with the greater difference between the two estimates occurring between the low estimates of the two different deployment schemes. This is within the incremental cost estimates of $1.5 to $2.3 billion reported earlier (EXCHANGE Vol. 4, No. 16). Copies of the Fee Adequacy Report should be available from OCRWM within the coming weeks. **

FEDERAL STORAGE PLAN FOR SPENT FUEL UNCLEAR, NO SITES NAMED

The Department of Energy's "Implementation Plan for Deployment of Federal Interim Storage Facilities for Commercial Spent Nuclear fuel" (DOE/RW-00045) does not include a specific list of federal facilities that could be used for the interim storage of spent fuel from commercial reactors. Under the Nuclear Waste Policy Act (NWPA), the DOE must provide storage capacity to a utility requesting same, upon NRC's determination that the petitioning utility cannot reasonably provide the required storage capacity and is diligently pursuing licensed alternatives to Federal Interim Storage (FIS). The report again emphasizes that, though FIS capacity could be developed at a commercial reactor site, such action is not contemplated because "utilities could develop these capabilities as quickly as the Department." It points out that an FIS facility at a reactor location "requires an NRC license for construction and operation" and would also require the participation of states, local governments and tribes, while a utility, pursuing the development of identical on-site capacity, would be subject to "less stringent procedures."

Preferred Options?

The preferred "near-term" option for FIS, as identified in the report, is limited to "the use of available existing storage and hot cell facilities." Though the report recognizes the possibility of "storing spent fuel in shipping casks at a federal site," it cautions that "such storage would be very limited and very costly due to the limited number and capacity of existing casks."

However, having stated that the preferred option for the near-term is to use existing storage and hot cell facilities, the report then states that because "there are no [such] potential federal sites" in the eastern United States, it has considered adding such capability to federal sites in the eastern part of the United States. According to the report this possibility is under consideration because "the utilities that may need FIS are in the East and thus transport requirements and costs would be minimized."

Need for FIS Unclear

The report emphasizes again that "increased storage capacity at-reactor sites, through the use of yet-to-be-licensed technologies, could also result in further reductions in, or **even the elimination of, requirements for FIS.**" However, according to the earlier released "Spent Fuel Storage Requirements Report" published by the DOE Richland Office (DOE/RL-85-2), storage capacity at some reactor facilities is "inadequate to handle projected spent fuel discharges." The facilities that were identified by the Richland Report, as having inadequate storage in the near-term were: Millstone-2 in 1985; Surry 1&2 in 1986; and Palisades, St. Lucie-1, Millstone-1 and Peach Bottom-2. And, though this same report also revealed that the latest estimate of spent fuel storage capacity increased over last year's estimate by 4714 assemblies with

"near-term requirements continuing to decline rather than increase," there are "still significant requirements for additional storage capacity over the next decade."

Possible FIS Actions?

Trying to assess what may occur with regard to the deployment of FIS, given the spent fuel requirements report findings and the released deployment plan, is not easy. It would seem that, given the inadequate storage capabilities at the facilities listed in the Richland Report, coupled with its finding that in the next ten years there is a need for significant additional storage, there could be a near-term need for deployment of FIS. On the other hand, given the requirements of the NWPA that inter-utility transfer of spent fuel be considered as a means to fully utilize on-site storage capacity, and the continuing "revelations" that spent fuel storage capacity seems to increase with every estimate taken, it may be possible to alleviate the near-term problems without FIS, possibly by just deploying a crew of agents to go out and "find" more space and utilize it. **

NEVADA SEEKS CONTRACTOR TO DEVELOP QUALITY ASSURANCE PROGRAM

In the February 21, Commerce Business Daily, the state of Nevada Nuclear Waste Project Office announced its intention to issue a contract to a qualified company to develop a comprehensive quality assurance (QA) program for the Office relative to its review of the DOE HLW activities in the state. The stated purpose of the QA program would be to assure "the quality of all information collected and considered by the State in its review." The Nuclear Project Office's objective is to make sure that any state-developed data meets, at a minimum, the requirements of the Nuclear Regulatory Commission and would be "admissable in any licensing proceeding."

According to the announcement, the State QA program would consist of the development of a plan, program, and office procedures. This would be followed by "indoctrination and training of office personnel in quality assurance procedures." Proposals will be judged on (1) the basis of the qualifications of personnel committed to the contract, (2) experience and demonstrated ability of the contractor. Responses to this announcement are due by April 30, 1986. For more information write: Carl Johnson, Chief Technical Programs, State of NV, Agency for Nuclear Projects, Capitol Complex, Carson City, NV 89710 or call (702) 885-3744. **

REPORTS OF NOTE (HLW

Flooding Studies of Proposed Repository Locations in the Palo Duro Basin of the Texas Panhandle; (BMI/ONWI-574); Office of Nuclear Waste Isolation, Battelle Memorial Institute, 505 King Avenue, Columbus, OH 43201-2693. Available from NTIS. This report contains the result of flooding studies of those stream channels that drain the locations of the proposed high-level nuclear waste repository in Deaf Smith and Swisher Counties, Texas.

Origin of Fluid Inclusion Water in Bedded Salt Deposits, Palo Duro Basin, Texas; (BMI/ONWI-569); Office of Nuclear Waste Isolation, Battelle Memorial Institute, 505 King Avenue, Columbus, OH 43201-2693. Available at NTIS. Salt horizons in the Palo Duro Basin being considered for repository sites contain fluid inclusions which may represent connate water retained in the salt from the time of original salt deposition and/or external waters which have somehow penetrated the salt. The exact origin of this water is important to the question of whether or not internal portions of the salt deposit have been, and are likely to be, isolated from the hydrosphere for long periods of time.

IN THE OCRWM

MRS Submission of the DOE's proposed MRS plan to Congress continues to be delayed by the injunction issued by Judge Wiseman of the Federal District Court for the Middle District of Tennessee. The Department of Justice, on behalf of the DOE, has filed an appeal in the Cincinnati Sixth Court of Appeals requesting that Judge Wiseman's Order be overturned and that the stay be lifted. As expected (EXCHANGE Vol.5, No.2), the Sixth Court of Appeals has consolidated all the suits on the MRS proposal (the question of the Federal District Court's jurisdiction, the substance of Tennessee's challenge, the injunction and DOE's request for a stay) into one. The first briefing is not expected to be scheduled until April or May. At this time no separate action is expected on the DOE request for a stay of Judge Wiseman's injunction.

DEFENSE HLW FEE DOE's recommendation on Defense's contribution to the Nuclear Waste Trust Fund to cover the cost of emplacing defense waste in the commercial HLW repository is still being held up by the Office of Management and Budget. DOE staff forwarded a list of responses to OMB questions just this past week (Feb. 24) and, under the regulatory procedures, OMB now has 60 days to review DOE's response. As noted previously, one of the contentious issues is that, under the proposed defense fee, the defense program would be "obligated" to pay from General Funds into the Nuclear Trust Fund. The issue causing contention is the legality of obligating the appropriation of monies from the General Fund to be transfered to the Nuclear Waste Fund without prior Congressional approval, or obligating a future Congress's appropriation from the General Funds.

IN THE NRC

The NRC staff has notified the Commissioners that it is rescinding the long-awaited Advanced Notice of Proposed Rulemaking on the Definition of HLW as a result of the enactment of the Low-Level Radioactive Waste Policy Act Amendments of 1985.

UPDATE

STATUS OF UPCOMING REPORTS AND MILESTONES OF THE OCRWM
(2/28/86)

Project Decision Schedule -- Should be released by 3/15/86.

Proposal for Defense Contribution to the HLW Fund -- (Hopefully) to be published in the **Federal Register** 5/86(?). Delayed by OMB.

Transportation Business Plan -- 2/86. (Released and available from DOE-OCRWM).

Environmental Assessments for First Repository -- Spring '86.

MRS Proposal and Environmental Assessments -- submit to Congress 2/86. Delayed because of Court Order 2/7/86.

Fee Adequacy Report -- submit to Congress week of 3/1/86.

Report To Determine P-A Liability Limits For HLW Repository -- (?).

Nominations and Recommendations on Sites for Characterization for 1st Repository -- Spring '86.

Annual Report to Congress -- Signed off 2/26. Released by 3/15/86.

PERSPECTIVES ON QUALITY ASSURANCE IN THE DOE HLW REPOSITORY PROGRAM

Robert Loux
Director, Nevada Nuclear Waste Project Office

Introduction

In my view there is one single factor that accounts for much--if not all--past and present turmoil in federal high-level waste disposal efforts. That common element is the lack of commitment to an adequate and comprehensive quality assurance system. Quality assurance in all aspects of the waste disposal program means good and effective management. And good management is the key to success, not only in the technological components of the undertaking, but in the economic, political and other areas as well. Good management means competence, and competence translates into appropriate, solid, and defensible decisions. Quality assurance, then, is the cornerstone of the entire waste management program and the bedrock upon which public confidence in the effort must rest.

NRC Definition of Quality Assurance

The Nuclear Regulator Commission defines quality assurance as all planned and systematic actions necessary to provide adequate confidence that a structure, system or component will perform satisfactorily in service. The key word here is **confidence.** The entire waste disposal effort will only succeed when there is confidence on the part of states, tribes and the public that such a facility is safe. A strong DOE commitment to a rigorous quality assurance system will go a long way to help instill public confidence in the program. Equally, a strong NRC commitment to actively inspect and enforce quality assurance requirements will also contribute to the development of public confidence.

In 1983 Public Law 97-415, The NRC Authorization and Appropriation Act, directed the NRC to conduct a study of existing and alternative programs for improving quality assurance and quality control in the nuclear power plant industry. Congress, at the time, questioned the industry's ability to safely design, construct, and operate reactors and the NRC's ability to provide effective regulatory oversight of these activities. The resulting "Ford Amendment" study was a milestone in identifying major quality-related problems and recommending improvements in both industry and the NRC. From a State's perspective, we see the Department of Energy heading down the same path as the nuclear reactor industry, a path which can only lead to delays, loss of public confidence, and ultimate failure. The public will not tolerate Zimmer, Diablo Canyon, or Three-Mile Island type problems with the nation's first waste repository.

Problems with DOE QA Program

What are the potential quality-related problems we see in DOE's current program? The Ford Amendment study concluded that the root cause for major deficiencies in quality involved the failure or inability of management to effectively implement a management system that ensured adequate control over **all** aspects of the project. In October of 1985, the NRC staff came to a similar conclusion as part of their review of DOE's quality assurance plan for siting and characterizing high-level radioactive waste repositories. I quote "The staff believes that the DOE has relegated the quality assurance organization to a position **too far down** in the organization and the result will **not** be a strong management-oriented quality assurance program which is paramount for the success of this project."

In October of this last year, DOE issued a document entitled "Quality Assurance Management Policies and Requirements." Though the Preamble expresses a strong commitment to the highest principles of quality assurance, the document itself does not in any way reflect the commitment. A review of the quality assurance management structure outlined in the

document indicates that QA policy and management has been relegated to a third level in the management structure of OCRWM, certainly not a position from which QA will be able to readily influence program decisions, provide independent oversight for program activities, or maintain direct access to the OCRWM Director for reporting and issue resolution. This is hardly the management commitment to excellence in quality assurance described in the preamble. As a matter of fact, DOE is now petitioning NRC to exempt the waste package from QA requirements.

Expertise with Contractors, Not DOE

It is instructive to note that the Ford Amendment Study cited lack of management experience in constructing and operating nuclear facilities as another cause for major quality related problems. Obviously, individuals with experience in constructing and operating a high-level nuclear waste repository are few in numbers, since one has not yet been built in the United States. However, this Country does have a wealth of experience in constructing other types of nuclear facilities. I do not see any of this construction experience in the top management structure of OCRWM or in the project field offices. The bulk of relevant experience seems to rest with contractors and subcontractors hired at the project office level. This may well become a recipe for program failure. The Ford Study concluded that many failures or quality-related problems could be traced to management systems with little in-house experience which relied almost totally on the expertise and experience of architect/engineers and nuclear contractors. It would seem extremely prudent of DOE to employ individuals with nuclear licensing and construction experience at key decision-making levels within DOE headquarters as well as at the various project offices. Such action can only enhance the possibility of project success.

A State Role in QA

In addition to the necessity of DOE strengthening its QA expertise, it is important to recognize that states have a role to play in quality assurance. Their role would not be with regard to the quality of DOE's data, but the scientific quality of site characterization overall. The Ninth Circuit Court of Appeals, in its opinion on Nevada's right to perform independent technical studies, strongly affirmed an independent oversight role for the states and Indian Tribes, as envisioned by Congress. The court went on to state that the independent oversight and peer review which only the states are poised to provide would immeasurably "promote public confidence" and provide reasonable assurance that the public health and safety as well as the environment will be adequately protected from the hazards posed by high-level radioactive waste disposal. The State of Nevada intends to exercise that oversight and peer review role relative to the proposed Yucca Mountain site to the maximum extent possible. We intend to conduct our own technical studies of the site (both prior to and during site characterization, above and below ground), to verify and validate DOE's conclusions about the site. If, at the completion of site characterization, we believe that there are technical issues still unresolved, we fully intend to take our case and the technical evidence to the NRC during the licensing process. We want assurances that, if Yucca Mountain is selected as the nation's first high-level nuclear waste repository, it will be shown to be, technically, the best site which could have been selected, and that protection of public health and safety and the environment is assured. A complete and thorough scientific assessment of the site will help achieve that assurance.

QA and Public Disclosure

We believe strongly that the state has a responsibility to its citizens to keep the public informed with regard to all aspects of the high-level waste disposal program and to provide channels for ready public access to needed information. QA definitely has a role in the public information/public access question. Both DOE and the NRC have openly committed to having local document depositories accessible to the general public. I would submit that each such depository should contain complete data records for the project, including QA

records. Those records should be current so the public may review and evaluate technical data or QA records on a timely basis, not one-to-two years later when it appears in a contractor report or in some obscure technical journal. The state has a separate obligation to review the QA record to assure that DOE and its contractors are in compliance with approved standards and procedures.

It is our understanding that once site characterization is initiated, DOE will provide technical updates every six months on the progress of characterization. These updates will be available to the NRC, states, tribes, and the public. We think those updates should also describe progress on quality assurance. The NRC, states, tribes and the public have a right-to-know what the quality-related problems are and what steps DOE is taking to remedy those problems. Such state and public scrutiny must extend down to the contractor level so a complete picture of the managerial and technical competence of the project can be ascertained. All this information must be timely and easily accessible to all parties.

QA Beyond Technical Developments

Concerns over quality assurance for the most part are regarding the technical aspects of siting, licensing, constructing and operating a high-level waste repository. However, one important requirement of the repository program has been almost forgotten, namely, the Environmental Impact Statement (EIS). The EIS may well draw more public attention and possibly more intervenor action that repository licensing. There could be literally hundreds of intervenors involved in the EIS process, all clamoring for FOIA's and right of discovery. There will be obvious questions of data analysis, data interpretation and study quality. In anticipation of such an eventuality, I suggest that DOE's quality assurance be expanded to include the complete program, not just technical. Public confidence in DOE's program would be enhanced if the public was assured that the environmental and other aspects of the program were subjected to the same standards of quality demanded by the technical elements of the undertaking.

Conclusion

In short, this is not a project that can be entrusted to a business-as-usual attitude. If DOE is to be successful in its role as implementor of Nuclear Waste Policy Act objectives, it must fully commit itself to go beyond what may be minimally required and dedicate itself to a level of excellence and competence that is commensurate with the magnitude of the undertaking. Nowhere is this commitment more critical than in the area of quality assurance.

The Nuclear Regulatory Commission, which Congress has entrusted with a major portion of the responsibility for overseeing the adequacy of DOE's waste disposal efforts, cannot afford to approach this project with anything less than a full commitment to requiring the most comprehensive and completely adequate quality assurance system.

The nuclear industry, likewise, has a major stake in seeing that the entire repository program is not only technically and managerially competent, but that it also promotes the level of public confidence and acceptance that will be essential if a repository is to be successfully sited, constructed and operated. Failure on DOE's part could very well prove to be fatal to the future of nuclear power in this country.

Finally, the magnitude of the repository program and the gravity of the consequences of failure--for present and future citizens--require that states such as Nevada exert a vigilance over the entire DOE undertaking that is likewise unique. As guardians of the public interest, states cannot--in the words of the Ninth U.S. Circuit Court of Appeals--"permit DOE to guard the chicken coop alone." For in the final analysis, it will be citizens and institutions at the state and local levels who will bear the brunt of any failure of effort or of will in the nation's nuclear waste disposal program.

Calendar

March

2-6 Conference: Waste Management '86; Spons: University of Arizona; Nuclear Engr. Dept., Tucson, AZ 85721; Contact: Roy Post, (602) 621-6158.

4 **Hearing: House Subcommittee on Energy and Research and Production; Chair: Rep. Marilyn Lloyd, DOE HLW Program; Contact: (202) 225-2884.**

3-7 Symposium: International Symposium on Repository Site Selection and Technical Design, Hannover, Federal Republic of Germany. Contact: Conference Service Station, IAEA, P.O. Box 100, A-1400, Vienna, Austria.

10 **Hearing: House Appropriations Subcommittee on Energy and Water; Chair: Rep. Tom Bevill, DOE HLW Budget; Contact: (202) 225-3421.**

12(tent) **Meeting: NE Compact Commission (Contingent upon selection of a new "Chair".)**

13 **Hearing: Senate Appropriations Subcommittee on Energy and Waster; Chair: Senator Mark Hatfield; DOE Nuclear Programs, including waste; Contact: (202) 224-7261.**

17-18 Potential Bidders Meeting: Spent Fuel Cask Acquisition Information Meeting; Sheraton, Salt Lake City, Utah; Contact: Tom Howell, EG&G-Idaho (208)526-9877).

18-20 Seminar: Packaging and Transportation of Radioactive Waste Material; Las Vegas, Nevada; Spons: US Ecology; Regis: $525; Contact: Peggy Thompson, (800) 626-5334.

23-27 Seminar: Nuclear Power Plant Maintenance; Spons: American Nuclear Society; Little American, Salt Lake City, UT; Contact: Wayne Lehto, Argonne National Lab, P.O. Box 2528, Idaho Falls, ID 83415, (208) 526-7369.

27-28 Conference: Membranes for the Nuclear Industry; A two-day coverage of the latest developments in membrane separation technology for the nuclear industry; Clemson University, Clemson, SC; Spons: Clemson University Mechanical Engineering Department and Chemistry Department; Regis: $365 or $195 per day; Contact: Program - Dr. J. L. Gaddis (803) 656-3294; Regis. - Cynthia Gaines, (803) 656-5563.

24-26 Meeting: NAS Board on Radioactive Waste Management. Second session to review DOE HLW siting methodology, Washington, D.C.; Contact: Peter B. Meyers, Staff Director, (202) 334-3066.

April

3-4 Meeting: South East Compact Commission; Contact: Kathryn Visocki, 3901 Barrett Drive, Suite 100-B, Raleigh, NC 27609. (919) 781-7152.

17-18 Meeting: Fourth Annual Spring Meeting CALRAD Forum; El Rancho Hotel, Sacramento, CA; Spons: CALRAD; Contact: Jean Parker, P.O. Box 40279, San Francisco, CA 94140.

17-18 tent. Meeting: First Round HLW Repository State and Tribe Meeting, with DOE Officials; Alburquerque, NM, Contact: John W. Green, Mississippi Department of Energy and Transportation, Jackson, Mississippi (601) 961-4733.

21-23 Conference: American Power Conference; Chicago, IL; Spons: Ill. Institute of Technology; Contact: R.E. Armington, IIT-127 Siegel Hall, Chicago, IL 60616, (312) 567-3406.

22-25 Conference: The 5th Annual Conference on the Incineration of LLRW; Coordinated by Univ. of California at Irvine, in cooperation with DOE, ASME and chapters of the Health Physics Society; Charlotte, NC, Sheraton Airport Plaza Hotel (704) 392-1200; Contact: Charlotte Baker, LLW Projects Coordinators, EH&S, UCI Irvine, CA 92717 (714) 856-7066.

22 Release of technical ranking of SE compact states on host state selection.

May

13-15 Conference: Nuclear Power Assembly; Washington D.C.; Co-Spons: American Nuclear Energy Council, American Nuclear Society, American Public Power Association, Atomic Industrial Forum, Edison Electric Institute, National Rural Electric Cooperative Association and U.S. Committee for Energy Awareness; Contact: Conference Office, Atomic Industrial Forum, 7101 Wisconsin Ave., Bethesda, Md. 20814-4891, (301) 654-9260.

20-21 Seminar: Packaging and Transportation of Radioactive Waste Material; Hartford, Conn; Spons: US Ecology; Regis: $425; Contact: Peggy Thompson, (800) 626-5334.

20-23 THE SECOND RADEXCHANGE DECISIONMAKERS' FORUM: MOVING TOWARD NEW DISPOSAL CAPACITY UNDER REGIONAL COMPACTS; Spons: The Radioactive Exchange; WILD DUNES, S.C., The number of participants will be limited to 140; Registration Fee: Subscribers $595.00, after 4/20/86 - $635; Non--Subscribers $650, after 4/20/86 - $690.; Contact: Carole, (202) 362-9756.

June

1-6 Meeting: ENS-FORATOM Enc-4; Geneva, Switzerland; Spons: European Nuclear Society; Contact: Harry Cartwright, Tibbits Hill House, Corfe Castle Warham, Dorset BH 20 5HZ ENGLAND.

15-20 Meeting: American Nuclear Society Annual Meeting; MGM Grand, Reno, NV; Spons: ANS; Contact: ANS Meeting Dept. (312) 352-6611.

July

20-23 Conference: ASME/ANS Bi-Annual Nuclear Power Conference, Safe and Reliable Nuclear Power Plants; Philadelphia, PA.; Spons: American Society of Mechanical Engineers, American Nuclear Society; Contact: Dave Ciarlone, Philadelphia Electric Co., 2301 Market Street, Phila, PA 19101, (215) 841-4807.

22-23 Seminar: Packaging and Transportation of Radioactive Waste Material; Louisville, KY; Spons.: U.S. Ecology; Regis: $425; Contact: Peggy Thompson, (800) 626-5334.

August

September

7-10 Conference: Second International Conference on Radioactive Waste Management; Winnipeg Convention Centre, Winnipeg, Manitoba, Canada; Spons.: Canadian Nuclear Society; Co-Spons.: American Nuclear Society; Contact: Dr. T.S. Drolet, 2700 Lakeshore Road West, Mississauga, Ontario, Canada, L5J 1K3; (416) 823-6654, TLX: 06-982333 or Eva Rosinger, Canadian Nuclear Society, 111 Elizabeth St., Toronto, Ont., Canada, Cable: 0623741, CAUCA.

(Changes from previous calendar in bold print)

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