

LOW-LEVEL RADIOACTIVE WASTE IS A TECHNICAL ISSUE

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ABSTRACT

Low-level radioactive waste (LLW) management is a relatively simple technical matter. Engineering and management innovation have dramatically changed management options. Yet, in the past ten years, the issue has been removed from the technical/scientific arena and has become increasingly political, where it has fared less well. New LLW disposal facilities have not been built, as envisioned by the Waste Policy Act of 1980 (LLRWPA). Yet, we move on toward authorized closing of the currently operating facilities that have capacity for many more years of disposal.

Rather than officials examining the prevailing policy that is becoming more and more economically unrealistic, licensees are now told to prepare for the next generation of LLW management: interim long-term on-site storage. Licensees warn that such a move compromises the system of safe technology that has developed over the past forty years. These potential compromises are not acceptable to the broad public interest, and we urge action that leads to economically sound, solid technical solutions.

What can we do? We should return to technical and economic options for LLW management with scientific studies and analysis. Public policy for LLW management should reflect the past ten years of technical advancement. The mandate of the 1980 LLW Policy Act was to create disposal capacity, and that has been done through efficient and advanced waste management practices.

We urge that governors themselves conduct the debate that seeks renewed cooperation toward an appropriate mix of LLW management and disposal facilities. Furthermore we urge that the licensee community be involved in discussion of preferred LLW management.

Most importantly, we urge that a national program goal be established, and that the goal be SAFE MANAGEMENT of LLW.

A PUBLIC POLICY ISSUE

Public officials at a number of public meetings have declared that low-level radioactive waste (LLW) is a public policy issue. Indeed, it is, as policy that affects the broad public interest. The wide variety of goods and services that use radioactive materials and, thus, have some LLW by-product, contribute to the public good. Proper management and disposal of LLW protect public health and safety and the environment, and thus, are clearly in the broad public interest.

Now, how this public policy issue is administered is widely discussed. Some public officials tell us that as public policy, the LLW issue is not one of economics, nor is it a technical issue. And there I cannot agree. Responsible policy may not deny or ignore either technology or economics as it seeks to balance equality (fairness) and efficiency (economy).(1)

If we do think of LLW management and disposal as a technical issue, as a science, as it was cast twelve years ago when the Low-Level Radioactive Waste Policy Act (LLRWPA) of 1980 was conceived and passed, we can claim success!(2) Advancements in LLW treatment technology result in far less waste, in stable form, delivered to engineered facilities with state-of-the-art operating and monitoring equipment. Proposed disposal facility designs employ further advancement in engineering and technology.

As public policy implementation, however, the issue may claim little actual success. New regional disposal facilities - the expressed goal of the LLRWPA - have not been built. Yet, other conditions of the Act and 1985 Amendments (LLRWPA) move right on, such as closure of the currently operating facilities originally planned for sometime after new disposal capacity would be available. In fact, because new facilities are not operating and old facilities are closing, further implementation of that policy now threatens to impose technical and scientific compromise and economic imbalance. LLW program officials are giving notice to licensees to prepare for the next generation of LLW management: interim long-term storage. Both centralized and on-site long-term storage are contrary to both licensees' and regulators' preferred option of permanent disposal by isolation from the environment.(3)

Even when new facilities are finally operational, all the waste from throughout the country will not have access to disposal capacity, and licensees will not have the full array of treatment and disposal options to select from.

Something is not right here.

Despite the attention that LLW has had in twelve years, the number of meetings held in its behalf, the number of new state and regional LLW programs and agencies, and the number of assorted consulting businesses flourishing, the mission is quite unclear. In the past, many of us assumed that safe management of LLW was the goal of the program; now, however, with even regulators planning for on-site storage, and states and regions with very small amounts of

LLW, planning for disposal facilities, we have to ask "What is the goal of the program?" I fear that we cannot answer that. Paul H. Nitze and Michael F. Stafford, writing for the Washington Post, stated recently that, "One of the most dangerous forms of human error is forgetting what one is trying to achieve."⁽⁴⁾

Implementation of the LLRWPA has attempted to achieve fairness through distribution of responsibility for LLW disposal, by asking each state to take its "fair share" of disposal facilities. The result is that we now have an oversupply of proposed facilities to meet waste disposal demands for a decreasing volume of LLW. And as more time and resources are invested in facility development, the price climbs higher and drives LLW volumes even lower. To overcome the situation of too little waste for too many facilities, some states and regions are discussing renewed cooperation toward further consolidation... sometime in the future. In the meantime, all plans are urged to continue toward development. However, planning for cooperation in the future and moving toward facility development are not compatible activities - if LLW is committed to a regional or an in-state facility, it will not be available to negotiate later. At the same time, millions of dollars are spent on development plans; those will be sunk dollars, not available to invest in the cost-sharing of cooperative arrangements. We can't have it both ways.

David Osborne tells us in his forthcoming book, Reinventing Government: In Search of Excellence in the Public Sector, that new kinds of public sector organizations, those of the '90's, are flexible, adaptable, and quick to adjust when conditions change.⁵ In such a climate, responsible public policy does not dismiss technical and scientific reality and sound economics; especially, not those fostered by the policy itself. It is time for another look at the LLRWPA, to seek excellence in implementation of a law written to be flexible. It is time to bring the issue institutionally into conformance with the state-of-the-art of the attendant management technology and practice. LLW policy must adapt to the reality of 1991. That will require cooperation among state and regional and federal officials, licensees, and the assorted vendors who have contributed to LLW management successes.

For now, we need a common goal. I suggest that in the broad public interest, the goal be SAFE MANAGEMENT of LLW.

A Technical Issue

If the goal is indeed safe management of LLW, we have long been on our way to achievement. State regulators at the disposal facilities required licensees to package LLW more securely. Licensees responded with improved LLW containers, and entrepreneurs developed a new generation of packaging technology. The Nuclear Regulatory Commis-

sion (NRC) issued site selection guidance, 10CFR Part 61, and consulting engineering and state and regional siting processes became an art form of high technology. 1985 Amendments of the LLRWPA set volume quotas that required waste reduction. Waste volume was reduced at the point of generation and contracted for further reduction (a ratio of 4-100 to one reduction) by super-compaction and incineration at centralized facilities. Washington, Nevada, and South Carolina, the states with disposal facilities, set restrictive guidelines and standards for LLW delivered to those operations. The result is highly sensitive monitoring equipment, advanced facility engineering and operations, and an admirable record of proper management. LLW disposal has been a good neighbor because LLW management technology and practice has been successful.

A large part of that record of success in good management practice and technology can be attributed to the licensees and their work. Uses of radioactive materials are technical and scientific by nature, selected only after careful benefit analysis. Use of radioactive materials is by condition of safe management, explicitly stated in the license. Waste management is an extension of licensees' precise technical application and good business practice.

Tightened management practices, dictated by both law and price, have yielded an impressive waste volume reduction curve. In 1980, combined uses of radioactive materials throughout the country resulted in 3.8 million cubic feet of LLW. Volume was predicted to continue to increase. Planning for new facilities in the country reflected that prediction. But then the effects of regulation, national policy, and cost took over, and LLW volumes headed down. In 1985, the total volume from the country was 2.7 million cubic feet; in 1986, it was 1.8; in 1989 1.6 million, and in 1990 just over one million cubic feet.⁽⁶⁾

Those collective figures reflect several thousand success stories in LLW management and technology. During the same period of time, uses of radioactive material has increased as research and development in biotechnology; life sciences; disease detection, diagnosis and treatment; and health care laboratory work has increased.⁽⁷⁾ A company in Massachusetts now manufactures six million radioimmunoassay tests each month. These are shipped throughout the world to diagnose and monitor endocrine, reproduction, cardiac, and blood functions in humans. Companies that develop pharmaceuticals for AIDS and cancer research, and a system of therapeutic drug delivery to the brain, all use radioisotopes, and were not even in design stages when the LLRWPA was written. Although each generally has a small amount of waste, collectively they add to the LLW volume.

A major eastern university reports three times as many research labs now using radioactive materials as in 1980, with more than ten times as many investigators doing the

research. At the same time, the LLW shipped for disposal from that university is now less than 5% of the 1980 volume, the reduction explained by careful management in the laboratories and on-site waste reduction technology, requiring less off-site disposal. However, the number of people employed in waste management has tripled in the same length of time.

One after another, companies and institutions report vastly reduced volumes of LLW, and use of one or more contracted treatment services for further volume reduction. At the same time they report increased management costs along with increased use of radioactive materials. Most importantly, however, they report increased concerns over their important operations that depend on having radioactive materials available. Another university expresses fear that cost-saving plans may remove their whole radiation safety program. That would require their discontinuing all use of radioactive materials, including their research and assistance in the Boston Harbor clean-up, where radioisotopes are used to identify and trace harbor pollutants

A scientific technology needs assessment conducted in 1991 probably would show demand for a mix of treatment and disposal facilities quite different from the single purpose disposal facilities envisioned in the early stages of implementation of the LLRWPA in 1980. Regulators and licensees, alike, rely on the newly developed treatment facilities for LLW volume reduction and waste form stabilization, thereby, reducing demand for disposal capacity.

I suggest that such an assessment be done by the technical/scientific community - namely, by the Research Council of the National Academy of Sciences.

An Issue of Economics

However, such an assessment has not been conducted; and states and regions move ahead with individual proposals for a supply of LLW disposal capacity that may far exceed any demonstrated demand. That situation may have serious economic implications. Sound economics and adequate cash flow are necessary to ensure the health and safety features of proposed facilities.

All the facilities now proposed employ comprehensive site selection processes and the engineering and mechanical technology that has emerged in the last several years. The sum of the technology and the process included in these proposals makes them very costly, estimated to be from 40 to 75 million dollars for each proposal - before construction begins! The combined cost of proposed facilities is somewhere over half a billion dollars. Construction cost estimates have not been circulated, and operating and maintenance costs have not been announced. This spending is at no demonstrated additional public health and safety

protection, at a time when states and licensees are examining budgets for cost saving potential.

Who pays these costs that result from implementation of policy that was established years ago, in another era of LLW management? The same companies and institutions who have paid for the dramatic advances in management and technology, the same who have reduced the LLW volume only to experience increases in disposal fees per unit of waste to meet facility operations costs. These are the same licensees now being told to prepare for on-site, long-term LLW storage, requiring additional space, personnel and operating equipment. They are already paying surcharges of over \$300 a barrel for access to disposal facilities, authorized by the LLRWPA. In turn, licensees either pass these costs on to customers, patients, or ratepayers, or they withdraw services and products that require radioactive materials from the market. In the end, everybody pays.

Furthermore, long-term viability of the disposal facilities is not guaranteed. The financial demands are enormous, including the following: LLW program and facility planning, preparation and development; environmental and public health and safety protection provisions; negotiated benefits to neighbors; regulation, monitoring and enforcement costs; maintenance, closure and post closure funds; and profit to the facility developer operator. The only source of revenue to pay for those assorted facility benefits is the LLW delivered for disposal. Economic analysis to show projected solvency of any one of the proposed facilities - or all the facilities - have not been done. We do not have assurances that the 40,000 or 150,000 cubic feet of LLW per year per facility will sustain the disposal operation and associated demands. Currently, three disposal facilities accommodate the LLW that will have to support the proposed facilities.

That analysis should be done for all proposed facilities, both individually and collectively. One of several federal agencies could conduct such a cost analysis: Office of Management and Budget (OMB), Office of Technology Assessment (OTA), or the LLW Program within the Department of Energy (DOE). Clearly, national public interest is at stake in the question of the long-term viability of any waste disposal facility.

The Mission of the LLW Policy Act

Few would argue that the LLW situation in 1979 and 1980 required attention. The 1980 LLW Policy Act captured attention and started action toward relief of the full responsibility borne by the three states with disposal capacity - South Carolina, Nevada, Washington.

However, from thereon, the true measure of success of the Act is not clear. If additional LLW disposal capacity by 1993 was indeed the goal, the Act has succeeded by having

less waste. If the goal was new facilities, the Act has not succeeded. However, if the goal was fairness, a large measure of success has been achieved through regulation and cost sharing, often the case when a trade-off between efficiency and equality is necessary.(1)

If the goal was advancement in LLW management and disposal technology, the Act has been successful. On the other hand, if the goal was safe waste management, success is debatable as we face long-term LLW storage at hundreds of licensee facilities across the country.

The LLRWPA itself changed the LLW scene. The expressed goal of several new facilities, regionally distributed, does not fit the circumstances and demand of 1991. Government intervention is no longer necessary for safety reasons, or to avoid abuse.⁸ In fact, the private sector has responded to the new circumstances with willingness and capability to meet the demands for a new generation of LLW management and technology. The resulting mix of available services appears to meet the demands of 1991 better than a nationwide distribution of disposal facilities. Circumstances, LLW itself, and technology have changed since 1980.

What Can We Do?

Implementation of the LLRWPA has gone awry. The result is compromises in LLW management and economic imbalance that may affect public health and safety and environmental protection. The course set in 1980 does not apply in 1991; that was then; this is now, and there may be a better way.

The first step toward remedy is public admission that a change should be considered.

Secondly, unless the LLRWPA is changed by Congress, state responsibility must be expressed by governors themselves. The level of cooperation necessary to allow an appropriate mix and number of LLW management and disposal facilities requires governor to governor discussion, with a broader array of negotiable items than distribution of LLW disposal facilities. We cannot create national fairness with a single issue that is nationally, relatively insignificant: LLW. In a broader context, LLW management and disposal facilities are among several services that might be provided by cooperative agreements.

Governors will need the findings of a technical needs assessment and an economic analysis to make a decision on a change in direction for the LLW program.

The licensee community, with training and experience in radioactive materials and waste management, who disposes the LLW and pays the bills must be included in policy debate. Their technical judgement is critical to resolution of this issue that truly is technical, and manageable, if the parameters are in fact scientific. A national program goal must be set. I urge that goal be SAFE MANAGEMENT of LLW.

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