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Low-Level Radioactive Waste Management in the United States: What Have We Wrought?

By Lawrence R. Jacobi Jr.

In 1979, radioactive waste disposal was an important national issue. State governors were closing the gates on the existing low-level radioactive waste (LLRW) disposal sites, and the ultimate disposition of spent fuel was undecided. The next year, the U.S. Congress thought they had solved the problem by passing the Low-Level Radioactive Waste Policy Act of 1980, which directed that each state was responsible for disposing of its own LLRW. The law also provided that the states could establish a network of regional compacts for LLRW disposal. Compacts established pursuant to the act and subsequently ratified by Congress could exclude waste produced outside the compact. Upon passage of the acts, state, regional, and federal officials went to work.

It didn't take long for the best laid plans of the 1980 act to fall apart. Congress took longer than expected to ratify the initial compacts. The selection of new disposal sites in the individual states ran into unexpectedly vicious pubic opposition. And compacts were soon mired down in expensive site selection programs.

To add incentives to get the job done, Congress amended the act in 1985 to establish milestones for action and financial penalties for inaction. Most critically, Congress imposed a "take title" provision that required states to take possession of waste if they failed to achieve the milestones set out in the act. In 1996, the U.S. Supreme Court struck down that provision.

In the meantime, several independent states and regional "host" states began pursuing the development of new disposal facilities. Four states—Texas, Nebraska, California, and Illinois—submitted applications to construct and operate new facilities. Only California was successful in this effort, but even that new facility failed to operate due to other factors. Ultimately, all the siting and licensing efforts failed. Texas alone embarked on a renewed effort to construct and operate a new disposal facility. That disposal facility began operating in April 2012.

Here we are, some 30 years later, with little to show for our combined effort. A couple of new LLRW disposal facilities have opened since, but neither was the result of efforts under the act. A disposal facility at Clive, Utah, was opened in 1987 for disposal of naturally occurring radioactive material, a waste stream that was not even contemplated under the policy act. The Utah facility morphed over the years into a site that could offer disposal not only for bulk class A and containerized class A waste, but also for disposal of "11e(2)" by-product material waste—i.e., mill tailings. It is also an important facility for the disposal of mixed waste. The new facility at Andrews County, Tex., provides similar disposal options as well as the all-important disposal pathway for class B and C waste.

The Utah facility was developed outside the compact system. The Texas facility was developed in spite of the compact system. In both cases, the regional compact system was not a catalyst for the facility. The other two operating facilities—at Richland, Wash., and at Barnwell, S.C.—were operating well before the implementation of the compact system. The facility at Barnwell had stepped in and out of the compact constraints for

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several years before it was finally converted to a compact-only facility. Now, it limps along from year to year struggling to survive on a small waste input. Richland seems to be surviving, but only because the compact under which it operates has joined with another to create sufficient volume. And, it doesn't hurt that the Richland facility is the repository of choice for discrete radium waste.

How Did We Get Here?

The purpose of the Low-Level Radioactive Waste Policy Act was to provide for more LLRW disposal capacity and to distribute the obligation for disposal on a state or regional basis. Despite a great deal of effort on the part of dedicated individuals in both the public and private sectors, however, not one new disposal site has been opened as a result of the act. So, has the interstate LLRW disposal compact system been a total failure? The answer is no.

Those who weren't around in 1980, when the Low-Level Radioactive Waste Policy Act was enacted, probably don't appreciate that there was virtually no guidance on siting, operating, decommissioning, and closing a radioactive waste disposal facility. When the states began looking for places to build regional facilities, neither the federal governments nor state governments had promulgated rules for site selection and operation. No guidance documents existed. Little by little, new rules, techniques, guidance, and methods came into existence. Over a period of a few years, the states, with the help of the federal government, worked out new site selection procedures, facility design parameters, and financial security mechanisms.

Site after site failed to be selected, almost exclusively due to political pressure resulting from public opposition. It soon became clear to state and compact officials that more attention to socioeconomics, public affairs, political process, and media relations was required. The U.S. Department of Energy adjusted its support to address these important issues. The DOE organized workshops dedicated to working with the media, provided witness training, and prepared guidebooks on socioeconomic analysis and reporting.

The net effect of this was to shift the emphasis from finding the most technically suitable site to finding an adequate site with wide public support and some political acceptance. As the millennium drew to a close, so did the efforts by the states to build new disposal facilities. Waste generators, watching the state and compact programs from afar (and paying for most of them), soon realized that new disposal facilities were not going to be built any time soon.

As the uncertainty increased, so did disposal prices. When these price increases became exponential, waste minimization practices became more cost-effective. Thus, waste volumes fell precipitously in the two decades after the 1980 law was enacted. The urgent need for additional waste disposal capacity waned, as did the urgency for new disposal facilities. Several states and compacts suspended or terminated their site selection processes.

Will another disposal facility—compact or not—ever be opened? The answer is no. Development of a disposal facility from start to finish takes far too long and costs far too much. The most recent facility to open at Andrews County, Tex., took 16 years and reportedly $500 million to complete, after an additional 16 years and $55 million were spent by the state of Texas on a failed effort to open its own facility. All the other projects—in Nebraska, North Carolina, Pennsylvania, California, and Illinois—failed after almost $1 billion was spent trying to develop new sites. There is little doubt in this author's mind that no one will ever successfully undertake to build another LLRW disposal facility in this country.

Then there is the question of whether additional disposal capacity is actually necessary. Will the waste volumes in this country support more than two disposal facilities? Once again, the answer is no. Since 1979, waste volumes have declined steeply. Waste management methods have improved and are still improving. Waste brokers and processors are employing methods not considered necessary 30 years ago when waste disposal costs were a mere fraction of what they are today. Furthermore, nuclear utilities, the largest source of low-level waste, both by volume and radioactivity, are much more cautious about the generation and handling of their radioactive waste products. They have entire staffs whose sole purpose is to make decisions about waste processing and disposal options.

On the other hand, small generators, such as well logging operations, industrial facilities, medical facilities, and universities, do not have the resources to support large waste management staffs. As the complexity and expense of handling small volumes of radioactive waste increases, the regulatory burden imposed by the act serves to make the management and disposal of radioactive waste more

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There are occasional calls for amending or repealing the Low-Level Radioactive Waste Policy Act. None have been taken seriously. Some support the continued compact system because they have a vested interest. Others like the political cover provided. Those who need to dispose of waste, and pay for it, are less enamored.

However, the last three decades have not been a total loss. A great deal has been learned about radioactive waste disposal since 1979, and the efforts of the public and private sectors have shaped and focused the work to be done in the future. So, this writer asks the question: "What have we wrought?" to which he provides his recommendations for radioactive waste management policy for the next 30 years.

What Can We Do?

The purpose of the regional compact commissions should be reconsidered. It is no longer probable that the commissions will pursue new disposal facilities, and it is no longer reasonable to believe that waste disposal responsibilities can be equitably distributed on a regional basis. Given these considerations, the following are recommended:

- *Own up to the failure of the regional disposal system.*

One thing the difficulties and failures of the last 30 years have clearly shown is that in the absence of a clear national mandate, LLRW disposal on a regional basis is not possible.

- *Eliminate obstructionist policies of the regional compacts.*

Import and export restrictions should be eliminated or relaxed to reflect the realities of the actual disposal situation in the United States.

- *Restructure the purpose of the compact commissions.*

If the compact commissions cannot be discontinued, then they should be restructured. The commissions can be a catalyst for assisting waste generators in their respective regions to manage or dispose of waste. ■

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