The Senate Interim Committee on Natural Resources

Interim Report to the 77th Legislature

Storage and Disposal Options for Low-Level Radioactive Waste

November 2000

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NATURAL RESOURCES COMMITTEE

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November 1, 2000

The Honorable Rick Perry
Lieutenant Governor of Texas
Members of the Texas Senate
Texas State Capitol
Austin, Texas 78701

Dear Governor Perry and Fellow Members:

The Committee on Natural Resources of the Seventy-Sixth Legislature hereby submits its interim report including findings and recommendations for consideration by the Seventy-Seventh Legislature.

Respectfully submitted,

Senator J.E. "Buster" Brown, Chair

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LOW-LEVEL RADIOACTIVE WASTE

The benefits of activities that result in the production of low-level radioactive wastes are extremely important to our citizens. It is imperative that Texas determines a safe, reliable method for managing and disposing of these wastes.

Senator J.E. "Buster" Brown

We've got low-level radioactive waste stored all over Texas...right here in hospitals in Austin, Texas. We need a place to dispose of low-level radioactive waste in a way that prevents other states from using Texas as a dumping ground.

Governor George W. Bush

LOW-LEVEL RADIOACTIVE WASTE

INTRODUCTION

Waste, although not a particularly pleasant subject - is a fact of life. We can't make it disappear by wishing it away. We can't allow it to amass in large quantities. We must dispose of it - safely and permanently. Today's technologies make that possible. Even for the most ominous high-level wastes, David Leroy, federal "nuclear negotiator", remains confident that "there are engineered solutions that are vastly preferable to the hodgepodge collection of storage areas adjacent to rivers, seacoasts and major urban areas"[1].

While low-level radioactive waste is controversial by its very nature, the public benefits every day - usually without realizing it - from a product or service made possible by radioactive materials. Thanks to these materials, we enjoy clean electricity, we stay healthier, live longer, work smarter, and even look better than ever before. The responsible disposal of these wastes is a necessity to guarantee that the benefits will continue to be realized for generations to come.

Many questions remain about low-level radioactive waste. Where does low-level waste come from? Are there any risks to people and the environment? What are the federal and state governments - and users of radioactive materials - doing to protect people and the environment? Can this waste be transported safely? Can it be disposed of safely and permanently?

People often have misconceptions about nuclear waste. They may think it's ooze or slime that's out of control. Or they may think of piles of rusting old drums filled with corrosive liquid dumped in a hole in the ground. But it's not like that at all. First, low-level radioactive waste is always disposed of as a solid. And second, it is never - ever - just dumped. It is packaged in secure, sturdy containers, and disposed of in facilities expressly designed for that purpose.

Despite considerable prodding and pleading by Congress and federal energy officials, however, jurisdictions have vied to let the other guy deal with hazardous nuclear by-products[2].

DEFINITION

The Nuclear Regulatory Commission (NRC) and the State of Texas define low-level radioactive waste (LLRW) by explaining what kind of waste it is not, rather than what it is,[3] stating that LLRW is a radioactive waste that does not include high-level waste; spent nuclear fuel from commercial nuclear reactors; transuranic waste produced by the defense nuclear weapons program; tailings waste and other by-products of uranium mining and recovery; NORM waste; and oil and gas NORM waste.

LOW-LEVEL RADIOACTIVE WASTE GENERATION

LLRW is produced by various academic, medical, industrial, and utility facilities throughout the United States. Approximately 27,000 cubic feet of LLRW is generated each year.

Currently in Texas there are approximately 977 identified sites of Texas institutions - hospitals, medical research facilities, universities, industries, government facilities and electric utilities - that use radioactive material for beneficial purposes and that are potential generators of LLRW. The continuing use of radioactive material is essential in cancer diagnosis, treatment and research. All LLRW, regardless of its source, must be carefully managed to minimize risk to people and the environment.

In the process of generating electricity, waste is produced. Nuclear fuel that has been used in the generation process is called high-level radioactive waste. Solid waste that has not been in contact with radioactivity is disposed of as ordinary trash. Materials used in the power plant that have been contaminated with radioactivity, such as machinery parts, protective clothing

or gloves worn by workers, filters, or other materials used to treat radioactive liquids, are defined as LLRW.

Laboratories at universities and research institutions also produce LLRW through experimental activities. Typical low-level radioactive laboratory waste may include contaminated test tubes and glass containers, clothing, shoes or gloves worn by technicians and researchers, waste from animals used in experiments as well as other ordinary trash.

Medical facilities have grown to rely on the use of radioactive materials for diagnosing and treating patients. By using radioactive tracer elements, physicians can learn of the presence of disease. Radiation therapy is useful in controlling the spread of many types of cancer. Both of these activities result in the production of LLRW. Anyone with high blood pressure, arthritis, diabetes, or other health problems may have been helped by medicines that could not have been developed without radioactive materials.

Industrial processes are another source of LLRW. Radioactive materials are used extensively to measure the thickness of materials, as catalysts in chemical plants, as tracers in flowing streams, or to eliminate static electricity and dust build-up in plants. Oil field workers inject sand mixed with radioactive material into oil reservoirs to measure the flow pattern of the oil in the field, as well as to determine the type of rock in an oil field. Radioactive material is also used to measure the thickness of pipeline materials. The tires on your car probably were treated with radioactive materials to make them more durable and puncture-resistant. You may have driven across a bridge whose welds were safety-inspected with radioactive materials.

Agriculture depends heavily on radioactive materials. With radioisotopes, scientists can develop crops with higher yields, or crops which resist disease better. They use radioactive “tracers” to measure how plants absorb fertilizer, which allows farmers to reduce the amount of fertilizer required.

In addition to commercially generated LLRW, it is also generated as part of federal Department of Energy (DOE) and Formerly Utilized Sites Remedial Action Program (FUSRAP), and as Naturally-Occurring Radioactive Materials (NORM).

LOW-LEVEL RADIOACTIVE WASTE STORAGE

In Texas there are at least 53 identified sites where LLRW is temporarily being stored awaiting ultimate disposal.[4] Several small generators and one waste broker in Texas have gone out of business or gone bankrupt, leaving their LLRW in need of appropriate management. In some instances, this material has been discovered by unknowing private citizens or has even been stolen and sold for scrap metal. Some stolen sources of radioactive material that could be classified as LLRW have never been recovered. The Texas Department of Health has taken possession of a variety of radioactive materials in their regulatory capacity. They currently store over 150 sources of radioactive material at the state agency as the only option. The agency is not provided funding for out-of-state disposal of this material and has had to curtail taking possession of any new material. Therefore, a location where radioactive material is discovered or abandoned in Texas becomes a long-term storage facility by default[5].

These makeshift storage arrangements and abandoned sites, scattered throughout our cities and towns have resulted in unnecessary public exposure to radiation. Although there has been the potential for life-threatening exposures in Texas, the emergency response procedures have successfully minimized that potential,[6] however, these temporary storage sites escalate the need for final disposal options. *See Appendix A, LLRW Storage in Texas.*

COMPACTS

In late 1980, Congress passed the Low Level Radioactive Waste Policy Act (LLRWPA)[7]. This statute demonstrated an increasing Congressional preference for the restoration of a regional approach to LLRW disposal. The LLRWPA provided that LLRW produced by non-DOE activities would be managed on a state or regional level. It encouraged the formation of regional compacts in which one of a group of states in each compact would serve as the host of a disposal facility. As an incentive, it also stipulated that any regional compact could include a provision to exclude waste from outside compact state borders beginning on January 1, 1986.

Less than a year after the 1980 passage of the LLRWPA, many states had grouped themselves into regions and were moving toward obtaining congressionally approved compacts. The Northwestern states had ratified a regional compact and submitted the agreement for congressional approval in 1982. That same year, seven southeastern states formed a regional alliance, as had the Northeastern and Midwestern states.

California was looking at developing a California-only LLRW disposal facility, while several southwestern states had formed a region centered around the Rocky Mountain States. Many Plains and South-Central states were evaluating options for forming a compact or joining compacts in adjacent regions.

At the same time, Texas was looking to establish a Texas-only LLRW disposal site within its borders.

By the end of 1983, five compacts for the management or disposal of LLRW had been established, but none had been congressionally approved. The Texas Low-Level Radioactive Waste Disposal Authority (Authority) had begun siting activities for the planned Texas-only LLRW disposal facility. The states of Maine and Vermont had both been party to initial discussions for the formation of a compact between several states in the Northeast. By the end

of 1983, neither had joined a compact and both were engaged in examining their LLRW management and disposal options. Ultimately, the Texas/Maine/Vermont Compact was finally passed and signed into Federal Law on September 20, 1998, effective that date[8].

Under the LLRWPA, beginning in 1987, compacts with LLRW disposal facilities could exclude waste generated outside the region. With no new disposal sites developed, this exclusion provision meant that only generators in the Southeastern, Rocky Mountain, and Northwest compact regions would have had access to the existing disposal facilities. In order to mitigate the effects of the potential loss of disposal capacity as well as to provide a set of milestones, incentives, and penalties linked to the development of new LLRW disposal sites, Congress amended the LLRWPA in 1985 with the Low Level Radioactive Waste Policy Amendments Act (LLRWPAA)[9]. These amendments extended access to the three national operating facilities (Barnwell, SC; Richland, WA; and Beatty, NV) through 1992 and provided site development milestones to facilitate the timely development of new facilities.[10]

In 1993, the Richland disposal facility was closed to all LLRW from outside the Northwest and Rocky Mountain Compacts. Beginning July 1, 1994, the Barnwell facility prohibited non-compact waste from being disposed in their facility, however it was reopened in the mid '90s to outside waste. Currently the Barnwell facility accepts waste from around the country, but it has a remaining capacity of only ten years.

By the end of 1998, states, acting alone or in compacts, had collectively spent almost $600 million attempting to develop new disposal facilities. However, none of these efforts have been successful. Only California successfully licensed a facility, but the federal government did not transfer to the state federal land on which the proposed site is located, indefinitely stalling the development of the site. In three other states, candidate sites were rejected by state regulatory agencies. At this time, the efforts by states to develop new disposal facilities have essentially stopped.[11]

The lack of the successful development of new facilities by compacts or states raises the question of whether to retain or abandon the compact approach. Retaining the present system would allow compacts and individual states to continue to exercise substantial control over the management and disposal of low-level radioactive wastes but would also maintain a system that has not provided an ample, assured supply of future disposal capacity. Abandoning the compact approach could stimulate competition in the industry to meet the disposal needs of both commercial waste generators and the Department of Energy (DOE). However, states and opponents of new disposal sites could still oppose the private development of new disposal facilities, and Washington State might close the Richland facility rather than permit the facility to serve waste generators throughout the nation. Finally, DOE has sufficient disposal capacity to meet the needs of commercial waste generators; however, the most likely DOE facilities are located in Nevada and Washington, which appear to have little incentive to accept such an arrangement. Thus, any approach to providing disposal capacity for commercial waste generators will have to address the willingness - or unwillingness - of any state or states to serve as host for a disposal facility.[12]

TEXAS HISTORY

The Texas Low-Level Radioactive Waste Disposal Authority (Authority) was created in 1981 by the Texas Legislature to site, develop, operate, decommission, and close a low-level radioactive waste disposal facility for Texas-generated waste. The Authority was created to respond to the passing of the federal Low-Level Radioactive Waste Policy Act of 1980, which stated that LLRW was a state responsibility and encouraged the formation of regional compacts among states to handle the waste generated within their regions. The Authority was governed by a board of directors composed of six members appointed by the Governor and confirmed by the Senate. By the Fall of 1982, the Authority was staffed and in operation.

During the next few years, the Authority conducted various technical activities

and completed an extensive statewide screening of possible disposal areas and identified preferred regions that were relatively more suitable than others. In 1985, a site was proposed for McMullen County, approximately 70 miles south of San Antonio. Later that year, the legislature required the Authority to give preference to locating a disposal facility on state-owned land. Accordingly, the McMullen County site was abandoned and the Authority changed its search direction to far west Texas, where virtually all favorable state lands were located.

By 1989, two state land sites in Hudspeth County were selected for further analysis. In November 1989, the Authority formally designated a site near Fort Hancock in Hudspeth County as the state's preferred disposal site. Controversy ensued and the Authority was prohibited from continuing work and was sued in an El Paso district court by El Paso County, who ultimately won the lawsuit. The Authority filed an appeal in April 1991, to protect the state's interest, but nevertheless abandoned the Fort Hancock site.

In May 1991, the Texas Legislature further amended state law and designated a 400 square mile siting area ("the box") about 30 miles southeast of the Fort Hancock site but within Hudspeth County.

After studying two areas within "the box," the Authority's board designated a preferred site on the Faskin Ranch near Sierra Blanca. After considering the relevant technical information and comments at a public hearing, the Authority purchased the 16,000 acre Faskin Ranch and submitted a license application to the Texas Natural Resource Conservation Commission (TNRCC) in late 1992. After numerous revisions to the application, the TNRCC issued an environmental and safety analysis of the proposed facility in March 1996.

A contested case hearing on the proposed permit began before the State Office of Administrative Hearings (SOAH) in January 1998, and in July of that year the presiding SOAH judges issued their proposal for decision, recommending that the license not be approved based on the Applicant's failure to adequately characterize the fault directly beneath the site and the

Applicant's failure to adequately address potential negative socioeconomic impacts from the proposed facility[13]. A final decision was required by the TNRCC and in October 1998, the three member Commission voted unanimously to deny the Authority's license for the Sierra Blanca site.

During this period of time the Texas Compact ("Compact") between Texas, Maine, and Vermont was ratified and signed by President Clinton, requiring Texas as the host state to provide disposal for the LLRW created in these three states.

Through the Compact, it is the policy of the party states to encourage the economical management and disposal of LLRW. The Compact states that its purpose is to provide the framework for a cooperative effort; to promote the health, safety, and welfare of the citizens and the environment of the party states; to limit the number of facilities needed to effectively, efficiently, and economically manage LLRW and to encourage the reduction of the generation thereof; and to distribute the costs, benefits, and obligations among the party states[14].

The 76th Legislature examined several bills addressing different disposal options, including a relatively new alternative called "assured isolation." In 1995, the concept of an "assured isolation facility" was proposed as an alternative to a LLRW disposal facility.

> "Assured isolation can be relatively large or small...will have many robust features, such as concrete building and overpacks...[will] not rely on the long-term performance of the site...[will] take advantage of inspection and maintenance [that] will continue indefinitely...[will] provide...the multiple options of [(1)] continuing to monitor and maintain the system at a level justified by its past performance,...[(2)] clos[ing] and seal[ing] the facility partially or completely, or...[(3)] transfer[ring] the waste to another location and decommission[ing] the facility.[15]

Throughout the 76th legislative session, legislators were torn between the desire to permanently "landfill" dispose of LLRW or to utilize the more recently developed alternative of assured isolation. Some legislators were concerned that assured isolation had not sufficiently been tested and that its use would not meet the Compact's requirement to *dispose* of LLRW. Another issue legislatively debated was who should hold the disposal license: the state or a private entity. Many argued that if a private entity held the license the state would be unable to limit waste to just Compact waste.

In response to these questions, one legislator requested an Attorney General opinion as to whether assured isolation would satisfy the requirements of the Compact, and whether a state law restricting DOE waste would be valid.[16] On May 18, 1999, the Attorney General issued his Opinion that if the Compact is read broadly, assured isolation would meet Texas' obligation to manage Compact waste. It would not, however, meet the disposal requirement. Regarding DOE waste, the Opinion stated that a state law precluding private disposal of DOE waste could be challenged under the Supremacy Clause and the Commerce Clause. However, the Opinion submitted that a current state statute (Health and Safety Code, Section 401.203) is not unconstitutional simply because, in combination with DOE policy, it has the effect of precluding private companies from contracting with DOE for waste disposal.[17]

The 76th Legislature ended without a decision on these issues. The only legislation that was passed and signed into law regarding LLRW or the Authority was the abolishment of the Authority, with its functions transferred to the TNRCC. This abolishment was due in large part to frustration by many legislators that a site had not successfully been permitted during the life of the Authority, as well as the uncertainty of the future of disposal options in Texas due to the apparent inability to pass legislation dealing with LLRW.

Prior to its sunset, the Authority had spent approximately $53 million over 17 years trying to develop a disposal site.

The Authority started receiving state general revenue in 1982, a year after it was created. Beginning in 1991, major waste generators, primarily utility companies, were required to repay the State for all prior expenditures and began funding the Authority's ongoing efforts with Planning and Implementation fees, all with the expectation that a facility would be put into operation and title to the waste would belong to the State of Texas. That full cost of $53 million has been paid as fees by the utilities, which ultimately was passed along to the ratepayers, without the realization of a disposal site.

The Compact requires the states of Maine and Vermont to pay $50 million, $25 million upon Congressional ratification of the Compact, and $25 million upon completion of a disposal site and the receipt of the first shipment of waste. The Compact allows for the state to make available payment options to the two states. To date, no monies have been collected from either state.

LEGISLATIVE CHARGES

Acknowledging the continued debate regarding the future of LLRW in Texas, both the Lieutenant Governor and the Speaker of the House issued interim reports to the respective environmental committees in each House.

Lieutenant Governor Perry charged the Senate Natural Resources Committee to "[s]tudy the necessity for storage and disposal options for low-level radioactive waste. The Committee shall examine Texas' obligations under the Texas-Maine-Vermont Low-Level Radioactive Waste Compact, the status of other federally formed compacts, the practicality of assured isolation facilities, the feasibility of underground disposal operations, and the viability of public-private ventures and other licensing issues."

In response to the Lt. Governor's charge on low-level radioactive waste disposal, as well as other charges assigned to the Committee, hearings were held throughout the interim in Austin, Amarillo, Brownsville, Corpus Christi, Dallas, El Paso, Galveston, Houston, Midland, San Antonio and Victoria, with

a special emphasis on the low-level charge at the Midland, El Paso, and Amarillo hearings.

House Speaker Pete Laney charged the House Committee on Environmental Regulation to "determine the ramifications surrounding the handling, processing and disposal of low-level radioactive waste within the borders of the state as they relate to compact waste, non-compact waste generated by the federal government, mixed waste, and licensing of a private or state entity. Review policies of the Department of Health related to extremely low-level radioactive waste to determine consistency with other states regulations."

The House Committee on Environmental Regulation held hearings in Houston, Dallas and Austin to take testimony on their interim charge.

In addition, the legislature required the TNRCC to "investigate techniques for managing low-level radioactive waste including, but not limited to, aboveground isolation facilities."[18] The agency commissioned a study from Rogers and Associates Engineering Branch of the URS Corporation to provide relevant technical services in support of this charge. The report had two major objectives: (1) to review the history and current practice of LLRW generation in the U.S. and in the Texas Compact states, and (2) to identify, describe, and evaluate LLRW management alternatives available for possible implementation in the State of Texas. This report:

- Reviews the history of LLRW management in the United States and within the Texas Compact.
- Identifies and defines radioactive wastes that might be managed at a LLRW management facility.
- Describes LLRW generation and waste management activities in the Texas Compact and projects total LLRW generation for the next 35 years.
- Surveys alternative LLRW management concepts including LLRW storage, assured isolation, LLRW disposal, and other possibilities.
- Presents a technical definition of the assured isolation concept.
- Reviews the existing regulatory framework that might be useful in

developing regulations for assured isolation facilities.

- Evaluates the technical bases for design and development of an assured isolation facility and recommends technical requirements for a Texas assured isolation facility.
- Presents and describes an assured isolation facility conceptual design that would satisfy recommended technical requirements in Texas.
- Compares the LLRW management alternatives of LLRW storage, assured isolation, and LLRW disposal.[19]

LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT OPTIONS[20]

The purpose of waste disposal is simple: to isolate the waste from the environment until it is no more radioactive than our normal surroundings. Thirty years of experience has taught us the safest and most effective way to do this. This method combines natural and man-made protections - including the geological stability of the site, the solid form of the waste itself, the design and operation of the facility, and long-term surveillance and monitoring by a government agency.

Various types of LLRW management alternatives have been practiced in the United States or have been considered for development. The most recognized alternatives for managing LLRW are LLRW processing and storage facilities and LLRW disposal. The assured isolation concept has been described by its developers as having desirable characteristics of both LLRW disposal and LLRW storage.

Processing and Storage

LLRW processing and storage facilities generally are designed to receive and store waste for a few decades at most. While the licenses for these facilities may be renewed many times, the facilities are not intended or licensed to contain or isolate the same LLRW for longer periods of time. Storage facilities

are designed to facilitate waste retrieval.

It is important that a LLRW storage facility be part of a total system for LLRW management. This means that those who propose to store the LLRW must be able to show how the LLRW will be managed when the storage facility is closed.

Assured Isolation

Assured isolation is defined as "an integrated management system for safely isolating waste, while preserving options for its long-term management, through: robust, accessible facilities; planned preventive maintenance; and sureties adequate to address contingencies or implement future alternatives." Physically, assured isolation is above-grade, concrete vaults.[20]

An assured isolation facility initially would be built for the long-term isolation of LLRW, generally for several centuries. The facility may be sited, designed, constructed, and operated with the intent of preserving the options to retrieve LLRW after long-term isolation for management at another licensed facility or to license the facility for LLRW disposal at some later date.

The radiological hazard of LLRW in isolation decreases with time as the radioactive constituents decay.

Currently, regulations for the licensing of assured isolation facilities do not exist either in federal or Texas law. There are regulations for the licensing of processing and storage facilities. While these regulations were not developed to account for the long time periods of waste isolation and inspection anticipated for assured isolation facilities, they do provide a baseline for developing rules for licensing such a facility. Requirements beyond those of a LLRW processing and storage facility are advisable because of the long service life required of an assured isolation facility.

Siting, design, and construction of an assured isolation facility with the intent to maintain an option to convert it into a disposal facility should be done with

the same care that would be taken for a facility that would be licensed from the start. Emphasis should be placed on quality assurance and quality control, and the planning and execution of operations at such a facility should be conducted to ensure that the facility's future as a licensable disposal facility is not compromised.

Disposal

A LLRW disposal facility is a facility that provides permanent placement for LLRW. Barring the detection of any unforeseen and significant release of contaminants into the environment, the waste would be placed in a disposal facility for permanent isolation. A typical disposal facility is designed to provide that the waste is placed in concrete canisters that are positioned in a large engineered trench constructed below the natural grade. Once sections of the trench are filled with canisters, the space between the canisters is filled and an engineered cover is placed over the waste.

Current disposal regulations require environmental monitoring for up to 100 years after facility operations cease and closure is complete. Current financial assurance requirements for a disposal facility dictate that sufficient funds be available to correct any deficiencies in the performance of the facility, up to and including the 100 year post-closure period.

The monitoring of the environment (air, groundwater, surface water, etc.) around the disposal units will probably be more intensive than for an assured isolation facility because the assured isolation facility concept presumes that the inspections inside the isolation units will prevent most potential releases into the environment.[21]

PUBLIC VS. PRIVATE

One issue hotly debated is whether the state should hold the license of a LLRW facility or if a private company should be allowed to be the permittee. While state law currently requires the state to hold title to the waste, at least

one private company has lobbyied to allow a private company to pursue a license for operating a disposal facility in Texas. They argue that the private sector can operate more efficiently than a state agency and can get a site licensed in less time with less expense to the taxpayers. Others believe that the safe disposal of radioactive waste is an operation that must be conducted by government institutions[22].

However, a federal review of a 1980 law to establish regional compacts for disposal of commercial LLRW found that nearly $600 million had been spent and very little accomplished in almost two decades. The General Accounting Office (GAO) report states that at this time, there is no serious effort to develop a new disposal site anywhere in the United States because no state wants one. The GAO outlined several options to deal with the problem, including repealing the law that set up the compacts, and then letting private industry take over.

In the Department of Energy's *1995 Annual Report on Low-Level Radioactive Waste Management Progress*, the agency noted developments in the private sector. The report states that "new initiatives by the private sector may signal the beginning of a more hybrid system in which efforts by the private sector to meet market demands for waste management coexist with the government/compact processes."

Many feel that the site would be better regulated if it was a state-owned facility. However, there are numerous other hazardous environmental and health related programs regulated - but not owned or operated - by our state agencies. Indeed, state regulators will tell you they'd much rather live near a low-level nuclear waste site themselves than the hazardous chemical dumps they supervise[23].

Regardless of the outcome of this issue, the citizens of the state are owed the assurance of a facility designed, built and operated in a manner that ensures the surrounding communities and the environment will not be detrimentally affected by the presence of such a facility. Such confidence could be

provided by enhanced inspection and enforcement policies at the state and local levels, along with financial assurance requirements that would guarantee that monies would be available to ensure adequate oversight throughout the operation and post closure of the facility.

SITING

A few years back, then-Idaho Governor Cecil Andrus ordered state troopers to stop trains in an effort to keep them from bringing more high-level military wastes across the state border. In Boyd County, Nebraska, billboards were chopped down and gunshots were fired as residents debated a proposed disposal site for slightly contaminated gloves and other equipment from power plants, hospitals and laboratories throughout a five-state region.[24]

Under the direction of the federal Low-Level Radioactive Waste Policy Act of 1980, most states formed regional clusters or compacts to address disposal needs. States and compacts have used different methods in searching for a suitable location to site a disposal facility, but a series of challenges and barriers have arisen in each case.

In the 1980s, some states and compacts established siting processes that followed a “decide, announce and defend” approach. A state agency or contractor would screen the state for potential sites, choose one that met technical requirements and announce to the community that it had been chosen to host a LLRW disposal facility. Such a process often was employed for siting other projects that may be considered undesirable by a community. The “decide, announce and defend” approach eliminated the need for community support, but often generated hostility and a general distrust of government by the community. Three states chose this approach with varying degrees of success. California has a licensed facility but construction is on hold due to the federal government’s refusal to transfer the chosen land parcel. Both Texas and Nebraska had applications for licensed facilities denied at their chosen sites. None of these states required the support of the

local host community for ultimate construction of a disposal facility. [25]

Other states and compacts stipulate that a disposal facility may only be located within a community that volunteers to be a host. Volunteer siting processes were established in the initial stages (mid- and late- 1980s) of LLRW disposal development in some states; other states changed their processes to incorporate volunteer siting after attempting a top-down approach. Getting communities to volunteer often requires marketing plans and incentive packages to entice communities to host a disposal facility or even to consider doing so.[26]

Barriers to finding a volunteer community are numerous. A lack of financial and political will is an obstacle for many states and compacts. Access to disposal in another state often dissuades support at the state and local level. If sufficient pressure and desire to site a facility do not exist in the legislature or amongst state and local officials, then the project likely will not succeed.

Public demand is also a factor. Generally, the public does not perceive LLRW disposal as a pressing need - or a desirable neighbor. A general fear and distrust of nuclear waste and radiation is a problem that is not easily overcome.

People cite various reasons for not wanting to host a disposal facility in their community; health and safety concerns often head the list. Efforts to educate citizens about technology that aims to ensure health and safety can be exacerbated by a general distrust of government, siting board officials, and the industries that generate the waste. The negative effect a disposal facility may have on property values and on tourism, and demands placed on transportation infrastructure are also common concerns.

In many cases, community activists opposed to a LLRW disposal site have been successful in mobilizing community opposition. Moreover, anti-nuclear and environmental groups from outside the community often become involved in debate over a proposed facility.

To successfully site a LLRW facility requires several elements; education, political will, public participation and benefit packages are necessities to gain the acceptance of a community. Strong political support at the local and state level must be garnered from the onset. Community members need to feel they have a choice. Public participation is crucial to establish a two-way dialogue to air concerns and questions. Once a community is convinced that health and safety provisions are adequate, a comprehensive benefits package can assist in swaying a community toward ultimate acceptance.

Finally, states have indicated that costs - projected to be more than $100 million for most compacts - makes forging ahead with disposal development a risky venture. The expense and difficulty of siting and building disposal facilities, coupled with current access to disposal facilities and declining volumes of waste, have simply placed too many obstacles in the siting process for some states and compacts.[27]

FINDINGS

This nation has many years' experience with LLRW disposal. The first commercial disposal sites were established more than 30 years ago. These operations have never caused any public health or safety problem. It is true, however, that there have been minor releases of radioactive materials at eastern sites with high annual rainfall and shallow groundwater. Programs are underway to close and stabilize these sites, to ensure no problems in the future.

Experience with these sites has taught us a great deal about the safe disposal of LLRW - how to package waste properly, choose suitable disposal sites, build well-engineered facilities, and operate them safely.

However, finding an acceptable location to build a LLRW disposal facility is a task plagued with numerous challenges. States that have succeeded in designating a preferred site have done so by seeking, but not requiring, the support of the nearest community. Many believe that finding a volunteer

community - no matter how difficult that may be - would be the only equitable way of selecting a location. Volunteer siting may be a frustrating process, but if it is the political will of the local and state officials, the site proves environmentally sound, and the process is steeped with communication, education and adequate benefit packages, it is the most just process identified to date.

In the SOAH decision, the administrative law judge wrote "there is a need for the facility, in that the only other facility currently available to dispose of much of the projected waste stream cannot be relied upon to meet long-term disposal needs. No preferable alternatives to the proposed facility have been established".[28]

If we fail to meet our waste disposal responsibilities, everyone will pay a heavy price. Generators will be faced with the decision to keep storing LLRW on their own grounds, or to stop using the radioactive materials that produce the waste.

Hospitals and clinics could be forced to stop nuclear medicine procedures to diagnose heart disease, detect cancerous tumors or cure thyroid disease. Patients needing these procedures could be turned away.

Medical research to find cures for cancer, AIDS, Parkinson's disease, diabetes and other illnesses could suffer. So could agricultural and environmental research.

There is a great deal at stake. Unless the companies, hospitals and universities that use radioactive materials have affordable, dependable access to low-level waste disposal facilities, the ability to continue their work is jeopardized. Texas has an obligation to our LLRW generators to provide safe storage and disposal.

Finding safe disposal options for this waste today - and not leaving it for future generations to deal with - is the environmentally responsible thing to do.

RECOMMENDATIONS

- Meet the management and disposal requirements of the Texas/Maine/Vermont Compact
- Allow a private company to obtain license for the disposal of LLRW
- Allow assured isolation with the conversion to or future plan for permanent disposal
- Require sufficient financial assurance to ensure a well-maintained site well beyond post-closure
- Allow only one assured isolation/disposal site to be developed in the state
- Provide mechanism for ensuring community acceptance
- Develop a plan that would set limits on amount of DOE waste that could be disposed at a Texas site

1. Arrandale, Tom, "The Radioactive Hot Potato", Governing Magazine, November, 1997

2. *Id.*

3. NUREG/CR-1005; Texas Health & Safety Code §401.004.

4. Ratliff, Richard A. Testimony before the Texas Senate Natural Resources Committee, February 9, 1999.

5. Texas Low-Level Radioactive Waste, Legislative Briefing

6. Rogers & Associates Engineering Branch, URS Corporation, "Texas Compact Low-Level Radioactive Waste Generation Trends and Management Alternatives Study: Technical Report", August 2000, TNRCC Contract No. 582-0-30229

7. Public Law 96-573; 42 U.S.C. §§ 2021b-2021j

8. Texas Low-Level Radioactive Waste Compact Consent Act, Pub. L. No. 105-236, 112 Stat. 1542 (1998)

9. Public Law 99-240 and 42 U.S.C. §§2021b - 2021j

10. Rogers & Associates Engineering Branch, URS Corporation, "Texas Compact Low-Level Radioactive Waste Generation Trends and Management Alternatives Study: Technical Report", August 2000, TNRCC Contract No. 582-0-30229

11. United States General Accounting Office, Report to the Chairman, Committee on Energy and Natural Resources, U.S. Senate, Low-Level Radioactive Waste; States Are Not Developing Disposal Facilities, September 1999

12. *Id.*

13. SOAH Docket No. 582-96-1042; TNRCC Docket No. 96-1206-RAW

14. Texas Low-Level Radioactive Waste Compact Consent Act, Pub. L. No. 105-236, 112 Stat. 1542 (1998)

15. Newberry, William F., Thomas A. Kerr and Davis H. Leroy, "Assured Storage Facilities: A New Perspective on LLW Management," Radwaste Magazine, September 1995.

16. Letter dated March 3, 1999, from the Honorable Gary Walker to the Honorable John Cornyn, Attorney General of Texas.

17. Attorney General Opinion No. JC-0052, issued May 18, 1999, to the Honorable Gary L. Walker.

18. Article VI, Rider 3, House Bill 1, 76th Texas Legislature

19. Rogers & Associates Engineering Branch, URS Corporation, "Texas Compact Low-Level Radioactive Waste Generation Trends and Management Alternatives Study: Technical Report", August 2000, TNRCC Contract No. 582-0-30229

20. Texas Low-Level Radioactive Waste, Legislative Briefing

21. *Id.*

22. NCSL Legislative Brief, Vol. 5, No. 28, June/July, 1997

23. Arrandale, Tom, "The Radioactive Hot Potato", Governing Magazine, November, 1997

24. *Id.*

25. NCSL State Legislative Report, Vol. 24, No. 3, The Challenge of Siting Low-Level Radioactive Waste facilities, February, 1999

26. *Id.*

27. *Id.*

28. SOAH Docket No. 582-96-1042; TNRCC Docket No. 96-1206-RAW

Appendix A

August 15, 2000

Texas Low Level Radioactive Waste Status

Generator or Storage Location	Generated Annually (cubic ft.)	Volume in Storage (cubic ft.)	Primary Isotopes	License Number
Alcon Laboratories Inc., Fort Worth	15			L01281-000
Aronex Pharmaceuticals Inc., The Woodlands	7.5	0	C14, H3	L04784-000
BF Goodrich Aerospace Component., Austin	1.84	4	Ra-226	L03372-000
Baylor College of Medicine, Houston	25	4	Cl36, H3, Na22	L00680-000
Chaparral Steel, Midlothian	0	32,000	Cs137 contaminated K061	L02015-000
Diagnostic Systems Laboratories, Webster	0	4	H3	L03084-000
Gammatron, Houston	7.5	65	Cs137, Am241	L02148-000
Gulf Nuclear of Louisiana, Houston		5,000	from Gamma Industries site	L03378-000
Gulf Nuclear, Odessa		520		L01622-000
Gulf Nuclear, Webster		45		L02995-000
Institute of Biosciences and Technology, Houston	15	45	C14, H3	L04681-000
International Isotopes Inc., Denton	1	15	Co60,Fe55,Zn65,Mn54,Na22	L05159-000
Iso-Tex Inc., Friendswood	0	75	Sr90, Cs137, Radium	L01937-000
Methodist Hospital, Houston	7.5	0		L00457-000
Nuclear Sources and Services, Houston	7.5	3.0	H3, C14, Co60	L02991-000
Nuclear Sources and Service, Houston (waste)	100	75	Cs137, Co60, Unat, Thorium	L01811-000
Osteoscreen Inc., San Antonio	15	0		L04308-000
Physician's Reliance Network Inc., Harlingen		7.5	Ra226	L00154-000
Positron Corp., Houston		7.5	germanium	L03806-000
Protechnics, Kilgore		150		L03835-004
R/A Services Inc., Midland		300		L03010-000
Ramco Laboratories Inc., Houston	15	15		L02172-000
Rhodia Rare Earths Inc., Freeport	3,600	10,800		L02807-000
Shell Chemical Corp., Houston	15			L04933-000
S.W. Foundation Biomedical Research, San Antonio	150	450		L00468-000
Solutia, Alvin	7.5	15	Th232	L00219-000
Southwest Research Institute, San Antonio	75	75		L00775-000
St. Lukes Episcopal Hospital, Houston		37.5		L00581-000
Texas A&M Nuclear Science Ctr, College Station	4	15	Cs137, Co60	NRC R-83
Texas A&M University, College Station	56	0		L00448-000
Texas Biotechnology Corporation, The Woodlands		45	H3 (solid)	L04568-000
Texas Children's Hospital, Houston		112.5		L04612-000
Texas Christian University, Ft. Worth	7.5	0		L01096-000
Texas Dept. of Health, Austin	0	90	Ra226	
Texas Eastman Division, Longview		5	sealed sources	L00301-000
Texas Instruments Inc., Dallas		7.5	a few small sealed sources	L05048-000
Texas Tech University, Lubbock	**35**	**22**	**H3, C14**	**L01536-000**
Texas Tech Health Science Center, Lubbock	7.35	0	H3, C14	L01869-000
Texas Tech Health Science Center, Amarillo	4	0		L01869-001
Texas Tech H.S.C., School of Pharmacy, Amarillo	40	14.7		L01869-005
Thermoquest / CE Instruments, Austin	1	1	Ni63, H3	L01186-000
TN Technologies, Round Rock	180	18	sealed sources	L03524-000
U.T. Austin	37	66	for 5 sites under this license	L00485-000
U.T. at San Antonio	45	54	H3, C14	L01962-000
U.T. Southwestern Medical Center, Dallas	14.7	504.25	H3, C14	L00384-000
U.T. Health Science Center, Houston	7.5	2	Na22	L02774-000
U.T. Health Science Center, Houston	2	2	activation products	L03685-000
U.T. Health Science Center, San Antonio	75	105		L05217-000
U.T. M.D. Anderson Cancer Center, Houston	37.5	90		L00466-000
U.T. Medical Branch, Galveston	102.9	529.2		L01299-000
U.T. System, Ft. Stockton	**0**	**948**		**L04648-000**
University of Houston, Houston	22.5	7.5		L01886-000
University of Houston, Clear Lake	0	14.7	C14, H3	L02108-000
University of North Texas, Denton	45	67.5	C14, H3	L00101-000
Waste Control Specialists, Andrews	5000	6431	H3, Th232	L04971-000
Western Atlas, Conroe	15	180	H-3	L00446-045
Westhollow Technology Center, Houston	7	14	C14, H3	L02116-000
*H.L.&P., South Texas Project, Bay City	16,103	1500		NRC License
*TXU, Comanche Peak, Glen Rose	11,800	1500		NRC License
Totals	**37,714.29**	**62,058.35**		

In addition to the above, there may be up to 250 Medical licensees, and up to 550 Industrial licensees with radioactive material that could be classified as waste at some point in the future. Information updated since the previous report (8/3/2000) is listed in **bold** font.

*These facilities make multiple shipments per year. The waste inventory typically ranges from 0 ft^3 to 3,000 ft^3, so a 1500 ft^3 average is used.