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REPORT

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- 2 Facility siting efforts
- 3 *Box: What Is Low-Level Radioactive Waste?*
- 3 For and against a disposal facility
- 4 *Box: Maine Withdraws from Disposal Compact*
- 5 Disposal options
- 6 Private facility issues

Low-Level Radioactive Waste: Beyond Sierra Blanca

Despite attempts spanning two decades, Texas has not established a facility for disposing of low-level radioactive waste generated by nuclear power plants, hospitals, universities, and industrial facilities. Proposals to build a disposal facility have sparked controversy since 1981 and are likely to resurface when the 78th Legislature convenes in 2003.

Each year, Texas generates about 36,000 cubic feet of low-level radioactive waste at 45 sites, according to the Texas Department of Health (TDH). The state's two nuclear power plants, Comanche Peak in Somervell County and the South Texas Project in Matagorda County, generate the vast majority of this waste and ship most of it out of state for disposal. About 13,000 cubic feet of waste is stored temporarily in more than 50 locations around the state.

Low-level radioactive waste falls under the jurisdiction of both TDH and the Texas Natural Resource Conservation Commission (TNRCC). TDH's Bureau of Radiation Control regulates and licenses the use, transport, and storage of radioactive materials, including low-level waste. TNRCC regulates the disposal of low-level radioactive waste and has the authority to issue a license for a disposal facility.

Efforts to establish a disposal facility for low-level radioactive waste have sparked controversy over two decades, and the 78th Legislature may confront related issues again.

In 1981, in response to federal pressure for states or multistate compacts to develop regional disposal sites, Texas lawmakers created the Low-Level Radioactive Waste Disposal Authority (LLRWDA) to develop and operate a facility. After the authority's failure in 1998 to obtain a license to operate a disposal facility near Sierra Blanca in Hudspeth County, the 76th Legislature abolished the authority and transferred its duties to TNRCC.



Bills introduced during the past two legislative sessions, while falling short of enactment, raised key issues in the debate over establishing a low-level radioactive waste disposal facility. These issues are likely to be the subject of scrutiny again during the 2003 session:

- Does Texas need such a facility? If so, should the waste be buried underground or isolated from the environment in an above-ground facility?
- Should the state or a private company hold the license to operate the facility? If a private company held the license, should it accept waste from the federal government?
- Should approval by local referendum be required before issuing the license?

Proponents of establishing a disposal facility say the absence of such a facility threatens the viability of medical and scientific research and nuclear power generation. They say that the current ad-hoc storage system poses safety and security risks and that containing all of Texas' low-level radioactive waste in a single facility would reduce these risks by isolating the waste from population centers. Opponents say that the volume of low-level radioactive waste in Texas is not large enough to warrant building a permanent disposal facility, but that licensing such a facility would invite waste generators from across the nation to dump their waste in Texas. They say that transporting radioactive cargo across the state to a single facility would increase security risks by creating an attractive target for terrorists.

This report presents a brief history of efforts to establish a low-level radioactive waste disposal facility in Texas, then explores issues surrounding whether the state should establish such a facility and, if so, how.

Facility siting efforts

In response to the federal Low-Level Radioactive Waste Policy Act of 1980, the 67th Texas Legislature in 1981 created the LLRWDA to site, develop, operate, decommission, and close a low-level radioactive waste disposal facility. The 1980 federal law and 1985 amendments (42 U.S.C., sec. 2021c) required states to arrange to dispose of low-level waste generated within their borders, other than nuclear weapons-related waste generated by federal facilities. States could form compacts to create a single disposal site and could refuse to accept waste from states outside their compact. Congress has

approved 10 multistate compacts that include all but nine states and territories and the District of Columbia. However, no state or compact has built a disposal facility since the law was enacted.

In 1993, Texas formed a compact with Maine and Vermont calling for Texas to host a facility to dispose of the three states' low-level radioactive waste. However, plans for the compact have stalled, and in April 2002, Maine announced plans to withdraw from the compact. (See box, page 4.)

The LLRWDA spent several years seeking possible sites for a commercial disposal facility. After abandoning several options because of local opposition, the authority chose a site near Fort Hancock in Hudspeth County, but neighboring El Paso County and other parties challenged this site in a lawsuit. In January 1991, State District Judge William Moody declared the site unsuitable and ordered work on it stopped. Later that year, the 72nd Legislature directed the LLRWDA to select another disposal site within a 400-square-mile designated area in Hudspeth County. The authority chose a site about five miles southeast of Sierra Blanca and applied to TNRCC for a waste disposal facility license in 1992. (For additional background, see HRO Focus Report 74-25, *Radioactive Waste: Texas Plan Advances*, September 13, 1996.)

The proposed Sierra Blanca site was the center of heated controversy. Opponents charged that the site selection was motivated by the surrounding community's lack of political clout and financial resources. They contended that the site was unsuitable for a waste disposal facility because of earthquake fault lines running beneath the site and because of the site's proximity to the Rio Grande, less than 20 miles away. Mexican opponents said that building a waste disposal facility on the site would violate a 1983 U.S.-Mexico agreement on border environmental quality.

Site proponents argued that the facility would create new jobs and attract support businesses to an area with otherwise limited financial resources. They said the risk from underground fault lines was negligible, as the waste would be secured in reinforced concrete containers capable of withstanding the strongest earthquake ever recorded in Texas. Supporters also contended that the arid climate and deep underground water table at the site would ensure that waste disposed of at the site would pose minimal risk to human health.

In 1998, the State Office of Administrative Hearings (SOAH) began a contested case hearing on the license application. SOAH judges recommended denying the license on grounds that the application lacked information on the fault line beneath the site and failed to address adequately the facility's potential negative socioeconomic impact on the local community. TNRCC commissioners agreed and denied the license application.

The 76th Legislature in 1999 considered several bills related to low-level radioactive waste disposal. HB 1910 by Chisum, as reported from the House Environmental Regulation Committee, would have authorized a facility to bury the waste underground or store it in above-ground containers with the intent of long-term management or disposal, and it would have prohibited issuing the license to a private entity. However, the prohibition against licensing a private entity was removed during House floor debate, and the bill died in the Senate Natural Resources Committee. HB 1171 by Chisum, as amended by the Senate, would have allowed TNRCC to issue a disposal license to a private entity, but the bill died late in the session when the House did not consider the Senate amendments. Ultimately, lawmakers enacted HB 2954 by Gray, which abolished the LLRWDA and transferred its powers to TNRCC.

In 2001, the 77th Legislature took up many of the same issues. As introduced, SB 1541 by Duncan would have allowed TNRCC to issue a license to a private entity for a radioactive waste disposal or above-ground isolation facility. The Senate Natural Resources Committee's substitute version would have authorized the license holder explicitly to dispose of noncompact waste from the federal government, and it would have required the host county to hold a public referendum to approve a facility if at least 20 percent of the county's registered voters signed a petition requesting an election. SB 1541 passed the Senate and, as substituted by the House Environmental Regulation Committee, would have tightened restrictions on the license holder's acceptance of federal waste. However, the bill died in the House Calendars Committee.

For and against a disposal facility

Supporters of establishing a disposal facility say:

The absence of a low-level radioactive waste disposal facility in Texas threatens the viability of medical

What Is Low-Level Radioactive Waste?

Low-level radioactive waste includes common materials such as paper, plastic, glass, and metal contaminated by radioactive material; equipment and tools used in certain industrial and medical processes; resins and filters used to purify water at nuclear power plants; clothes, syringes, test tubes, and other equipment used in handling radioactive materials; and animal carcasses, equipment, and products used in biomedical and pharmaceutical research. It does not include spent fuel from nuclear reactors, nor radioactive waste with high concentrations of uranium and plutonium.

The atoms that make up radioactive materials are unstable. To become more stable, the atoms must release their excess energy in a process known as "decay." Eventually, radioactive atoms will decay enough that the radiation they release is less than background levels — the amount of radiation to which humans are exposed every day from naturally occurring sources, such as radon gas seeping from cracks in the earth's crust, and from manmade sources, such as X-ray machines or household smoke detectors.

Because of the diversity of low-level radioactive waste, the amount of time necessary for a given item of waste to decay to background levels varies. Some items may decay within seconds, while others may require millions of years. In general, however, the majority of the radioactive atoms in low-level waste will decay to background levels within 100 years, according to the Texas Natural Resource Conservation Commission.

and scientific research, life-saving medical procedures, and nuclear power generation. Texas has nearly 1,700 licensed users of radioactive materials, including medical research facilities, hospitals, public universities, and electric utilities, that could generate low-level radioactive waste.

The current ad-hoc system, in which waste is stored temporarily at more than 50 sites across the state, poses safety and security risks. Many temporary

Maine Withdraws from Disposal Compact

Texas formed a compact with Maine and Vermont in 1993 — ratified by Congress in 1998 — under which Texas is to host a facility to dispose of low-level radioactive waste generated in the three states. A compact commission, with six members appointed by the Texas governor and one member each from Maine and Vermont, is to determine the total amount of waste to be disposed of at the facility over 50 years. Maine and Vermont each agreed to pay \$25 million to Texas; half would be due upon congressional ratification of the compact and the other half would become due once the facility opens. The compact also calls for Maine and Vermont each to pay \$2.5 million for community assistance projects in the host county. Under a “gentlemen’s agreement” among governors, however, the compact commission has not been appointed, allowing Maine and Vermont to avoid paying money due to Texas in 1998, when Congress ratified the compact.

In April 2002, Maine repealed the law that authorizes its participation in the compact. As reasons for Maine’s withdrawal, state officials cited the closure of the state’s largest generator of low-level radioactive waste, the Maine Yankee nuclear power plant, and Texas’ inability to develop a facility in a timely manner. Maine Yankee closed in 1997, and dismantling and decommissioning is more than 50 percent complete. Commercial disposal facilities in South Carolina and Utah have contracted to dispose of the remainder of the waste from decommissioning.

Under the compact, Maine’s withdrawal will not take effect for two years, during which time Maine will remain liable for any payments due under the compact.

storage sites are in densely populated areas, near water sources, or in areas prone to natural disasters. For example, the basement in which low-level waste is stored at the University of Texas Health Science Center in Houston flooded during Tropical Storm

Allison in 2001. Fortunately, waste normally stored in the basement recently had been shipped off-site for disposal, and no contamination occurred. Also, security procedures at some of the temporary storage sites may not be adequate to protect low-level radioactive waste from falling into the wrong hands — for example, terrorists wishing to use the waste in a so-called “dirty bomb.”

Containing all of Texas’ low-level radioactive waste in a single facility would allow isolation and disposal away from the state’s population centers. The licensing process would provide full scrutiny of the risks posed by site characteristics, and public hearings would enable local residents to add their input.

The clock is ticking for development of a low-level radioactive waste disposal facility. Under current law, it would take an estimated five to seven years to site, design, license, build, and open such a facility. Only two disposal sites in the nation — in Barnwell, S.C., and Clive, Utah — accept low-level radioactive waste from Texas generators. Beginning in 2008, the Barnwell site no longer will accept waste from states outside of the Atlantic low-level waste compact (New Jersey, Connecticut, and South Carolina). The Utah site accepts only the least radioactive class of low-level waste. Without a facility in Texas, many users of radioactive materials may find themselves forced to store radioactive waste on site indefinitely.

Nuclear power plants are not suitable storage sites for low-level waste. The federal government licenses these sites to generate electricity, not to accept waste for disposal. The criteria for licensing a nuclear power plant differ markedly from the requirements for a waste disposal facility. Although nuclear power plants have stored their high-level waste on site temporarily, this waste will be removed after 2010 if the federal government opens the national high-level waste repository beneath Yucca Mountain, Nev., as projected. Also, under federal law, low-level radioactive waste is the responsibility of the states. Passing the buck to nuclear power plant operators, as some advocate, would be unwise and irresponsible.

The compact agreement simply and clearly authorizes the compact commissioners, by majority vote, to enter into an agreement with a person, state, regional body, or group of states to deliver low-level waste to the compact facility for management or disposal.

This provision gives the commission the flexibility to deal with potential emergencies or other needs that may arise — for example, to dispose of lost or abandoned low-level radioactive materials from outside the compact that were found in Texas. Moreover, Texas holds six seats on the eight-member commission, and a commission dominated by appointees of the Texas governor would not be likely to allow Texas to become a “national dumping ground” for radioactive waste, as opponents claim.

Opponents of building a disposal facility say:

The volume of low-level radioactive waste in Texas and the other compact states is not large enough to justify building a disposal facility, especially now that Maine has withdrawn from the compact. Supporters of a disposal facility greatly exaggerate the problem of managing this waste. Most licensed users of radioactive materials in Texas do not generate low-level waste, and many of these materials are sealed sources, such as measuring gauges or other diagnostic tools, that are sent back to the manufacturer for reuse or disposal. Other materials may be processed on site to safe levels and then disposed of down a designated drain or at a municipal landfill.

Texas’ two nuclear power plants generate 96 percent of the low-level radioactive waste generated in the state. The amount of waste generated annually by universities, medical facilities, and industries barely would fill a small garage. Most medical procedures generate small volumes of waste, much of which is radioactive for only hours or days.

Instead of spending money on a disposal facility for which there is insufficient demand, low-level radioactive waste should be stored at the two nuclear power plant sites. Since these plants generate the vast majority of this waste, they should be responsible for storage and long-term management. The plants already store their own high-level waste that will remain radioactive for millions of years. The amount of low-level waste from other sources is so small that the cost to store it too would be negligible over the long term. Phasing out nuclear power production and expanding energy production from renewable sources, such as wind power, would eliminate nearly all of the already limited demand for a low-level radioactive waste disposal facility in Texas. Closed

nuclear plants would be appropriate facilities for the long-term management of their own waste and the small amount of waste from other sources.

Concerns about terrorism and safety do not necessarily justify a centralized disposal facility for low-level radioactive waste. In fact, trucks or trains crisscrossing the state with radioactive cargo en route to a disposal facility would provide easier targets for terrorists.

Licensing a waste disposal facility for the compact could expose Texas to importing unlimited amounts of waste from other states or private companies, turning Texas into a national dumping ground for radioactive waste. Under a loophole in the compact agreement, the compact commission may enter into a contract with any out-of-state entity to deliver low-level radioactive waste to a Texas facility. The compact does not limit the amount of waste that can be shipped to Texas under the loophole.

Disposal options

Radioactive materials, including low-level waste, emit radiation that can harm the human body, and some of this material may remain hazardous for long periods of time, possibly for millions of years. Because radioactive particles can reach humans through the air, water, or the food chain, isolation and long-term planning are important considerations in evaluating how to manage radioactive waste.

The broadest distinction among waste-management facility alternatives is whether the facility is below or above ground. Below-ground facilities have been used for permanent disposal of radioactive waste in the United States since the 1960s. Most feature an engineered trench designed to contain the waste at a site with favorable geologic and hydrologic conditions for long-term disposal. Waste may be placed in the trench in sealed containers such as steel drums, or the trench may be lined with durable plastic to prevent seepage of the waste. As sections of the trench are filled, any space between the waste is filled in and covered by an engineered cap of concrete or earth. Environmental monitoring, such as through groundwater wells at the site, can detect the release of radioactive particles into the environment.

No above-ground facilities for radioactive waste disposal exist in the United States, although the concept

has undergone much discussion and study. Such a facility could provide permanent disposal with the waste entombed in an above-ground concrete structure and possibly covered with an earthen cap.

Another above-ground waste management concept, *assured isolation*, has gained support in recent years. Assured isolation, unlike waste disposal methods, does not house the waste in a permanently sealed facility but relies on continual monitoring of and access to the waste. Waste disposal need not be permanent; the waste can be retrieved, repackaged, or even removed from the site. Ultimately, an assured isolation facility could be converted for permanent disposal, or the waste could be transferred to another facility for disposal or storage.

An assured isolation facility would be designed for long-term management of waste, probably for at least 500 years. Waste would be stored in containers in a shielded above-ground facility and could be segregated according to radioactivity. As radioactive atoms within the waste decayed to appropriate levels, the waste could be removed from the facility and disposed of safely in a landfill or other facility. Because an assured isolation facility would rely on shielding and monitoring rather than on site characteristics to protect the waste, siting requirements could be less restrictive than for a disposal facility. If future generations found a use for the waste or a superior method of disposal, they could retrieve an assured isolation facility's contents safely.

Proponents of permanent underground disposal argue that this method would relieve future generations of the responsibility for determining how to dispose of the waste. Permanent disposal also would reduce the risk of human exposure, they say, because workers would not handle and retrieve the waste. They say a permanent underground disposal facility also would be less susceptible to damage by earthquakes or floods and would be less expensive than an assured isolation facility, which would require pouring large quantities of specialized and expensive concrete and would include staffing and maintenance costs for hundreds of years.

Assured isolation may have found common ground between some supporters of a waste disposal facility and the environmental community. Many environmental

groups would prefer assured isolation to permanent underground disposal, although they say that storing low-level waste at nuclear power plants is the best option. However, development of an assured isolation facility could face obstacles in the existing legal and regulatory structures for low-level radioactive waste. Because assured isolation is a relatively new concept, it is not contemplated in the requirements for the compact facility, nor are any state or federal rules in place to govern such a facility if it were established.

The central question in evaluating the legal and regulatory viability of assured isolation concerns the final disposition of the waste. A 1999 opinion by Texas Attorney General John Cornyn (JC-0052) concluded that while development of an assured isolation facility would meet Texas' short-term obligation under the compact to manage low-level radioactive waste, it would not satisfy the state's long-term obligation to dispose of the waste permanently. Cornyn noted that an assured isolation facility eventually could be converted into a permanent disposal facility, satisfying Texas' long-term obligation to dispose of the waste permanently.

The U.S. Nuclear Regulatory Commission (NRC) has defined no specific licensing criteria for an assured isolation facility, but the commission has identified three possible approaches to licensing such a facility, outlined in a March 2001 letter to TDH's Bureau of Radiation Control. One approach would be to defer a decision on final disposition of the waste and to license an assured isolation facility as a low-level radioactive waste storage facility under renewable terms. The other approaches would involve possible physical configurations of a facility and how they could meet NRC requirements for permanent disposal.

Private facility issues

Waste Control Specialists (WCS) operates a hazardous-waste disposal facility in Andrews County on the Texas-New Mexico border. Andrews, the only incorporated town in the county, is about 30 miles east of the disposal facility. The nearest town, Eunice, N.M., is about six miles west.

Isolation and long-term planning are important considerations in evaluating how to manage low-level radioactive waste.

WCS holds licenses from TNRCC and the U.S. Environmental Protection Agency to treat, store, or dispose of hazardous waste, as well as a license from TDH to accept low-level radioactive waste for treatment or interim storage. The WCS facility contained about 25,000 cubic feet of low-level waste in March 2002, according to the Bureau of Radiation Control. Most of this waste is from noncompact sources, such as federal contracts, and is not included in the estimates of low-level waste stored in Texas cited elsewhere in this report. The facility treats and disposes of low-activity radioactive waste exempted from state licensing requirements, such as smoke detectors.

WCS supports changing state law to allow a private entity to hold a license for low-level radioactive waste disposal and has stated that it would seek to obtain a license if such a law were enacted. Issues related to the proposed venture are summarized below.

Andrews site. According to WCS, the site's favorable geology makes it well-suited to host a waste disposal facility. The facility sits atop 800 to 1,000 feet of red-bed clay. Because of the clay's low permeability, WCS says, it would take more than 150,000 years for water or other substances to seep through the layer. The only groundwater below the site lies underneath the clay formation and is considered nonpotable. The nearest source of potable groundwater, the Ogallala aquifer, is at least 10 miles from the site. The facility's landfill is dug into the clay formation and is reinforced by 10-foot-thick clay walls rising above the natural formation. A double plastic liner and dual water-collection system ensure that any moisture that accumulates in the landfill does not seep below the site. Also, groundwater monitoring wells surround the landfill to provide an early warning of any underground contamination.

Opponents contend that the Andrews site is unsuitable for disposal of hazardous or radioactive waste. They say the Ogallala aquifer, which ranges under and provides water for drinking or agriculture in seven other western states, extends beneath the WCS site. Opponents also assert that, like Sierra Blanca, the area is prone to seismic activity, citing 18 seismic epicenters within a 30-mile radius of the facility.

Licensing a private entity. Radioactive waste from the U.S. Department of Energy (DOE) is central to the issue of whether to license a private facility to dispose of low-level radioactive waste in Texas.

Many DOE activities generate low-level waste, including handling and processing of radioactive materials, chemical separation procedures, weapons production, and cleanup of contaminated facilities. DOE disposes of most of this waste at federal facilities in Idaho, Nevada, South Carolina, Tennessee, or Washington or a commercial facility in Utah. DOE contracts for waste disposal only with companies licensed under state or federal law to dispose of low-level radioactive waste. DOE's Pantex plant in Amarillo ships low-level waste to the Nevada Test Site or to Oak Ridge, Tenn., for disposal.

Under Health and Safety Code, sec. 401.203, a license for disposal of low-level radioactive waste may be issued only to a public entity specifically authorized to dispose of such waste. In combination with DOE policy, this statute effectively prevents private companies in Texas from disposing of DOE waste. If Texas allowed a private company to hold a low-level radioactive waste disposal license, it could not prohibit the company from accepting DOE waste. In JC-0052 (1999), Attorney General Cornyn concluded that a state law specifically prohibiting private entities from accepting DOE waste would violate the Supremacy Clause and the Commerce Clause of the U.S. Constitution.

Proponents of a private facility for disposing of low-level radioactive waste note that the LLRWDA spent \$50 million over 20 years in unsuccessful attempts to develop a facility for the compact. Since the abolition of the authority, no state agency has existed with the expertise or resources necessary to operate a disposal facility. Proponents say a private business could put a facility in place safely, quickly, and efficiently, using its own money rather than taxpayer dollars to provide the financial assurances to complete the project. Accepting DOE waste for disposal would make operation of the compact facility financially viable for the operator, proponents say, whereas waste from the compact alone would not be enough to justify the enormous costs of running the facility.

WCS claims that the local community and business groups support its efforts to develop a disposal facility. If the company were licensed to dispose of low-level radioactive waste, the associated economic development would benefit the citizens of Andrews County. Money earmarked in the compact for the host county would provide benefits in addition to local job creation and business growth.

Opponents of allowing a private company to hold a low-level radioactive waste disposal license argue that the operator would make millions of dollars in profit while leaving the state liable for the facility. Waste at a compact facility will remain radioactive for hundreds or thousands of years. Opponents say the private company or its insurers might not be around in the future to be held accountable if the facility failed or if contaminants escaped, so the state might have to clean up the company's mess at the taxpayers' expense.

Opponents also argue that a private company could use the license to persuade DOE to allow the company to accept DOE waste for disposal in Texas. A DOE waste-disposal contract would be highly lucrative for the company because the projected volume of DOE waste dwarfs the expected volume of compact waste. The LLRWDA estimated that the compact will generate less than 1.6 million cubic feet of low-level waste, whereas DOE expects to generate 300 million cubic feet by 2070. Opponents note that DOE's waste stream varies greatly in radioactivity and that other hazardous wastes may have been mixed with radioactive waste.

Instead of licensing a private entity to dispose of low-level waste, opponents say, a better alternative would be to require the state to hold the license but to allow a

private contractor to operate the facility. The facility could benefit from private-sector efficiency, but the state would retain control and oversight to ensure that the facility was operated properly and that the state would not have to clean up a future environmental disaster.

Public referendum. Proponents of a private facility say a public referendum on the issuance of a license is unnecessary. They say such a referendum could create a "media circus" in Andrews County, with national interest groups and other outsiders descending on Andrews in an attempt to sway local residents' opinions. Because the county has a long history of oil and natural gas production, WCS says, county residents already are aware of the benefits and risks associated with technology and industry, and they support the company's efforts to develop a low-level radioactive waste facility.

Environmental groups support requiring a public referendum in the host county and in adjacent counties. They argue that contaminants leaking from the facility into the air or groundwater could affect residents of nearby counties, and that the citizens of those counties should have an opportunity to approve or reject the development of a facility that could affect their health.

— by *Travis Phillips*

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 Room E2.180

P.O. Box 2910
 Austin, Texas 78768-2910

(512) 463-0752
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www.capitol.state.tx.us/hrofr/hrofr.htm

Staff:

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